RANKERS

A COMPLETE GUIDE
for
10th STD - SCIENCE

BASED ON
SAMACHEER KALVI TEXT BOOK

RANKERS EDUCATION

TRICHY

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CONTENTS

BIOLOGY

Textbook questions

PART – A

1. Mendel observed 7 pairs of contrasting characters in *Pisum sativum*. One of the following is not a part of that. Find out.
   a) Tall and dwarf
   b) Yellow and green seed colour
   c) Terminal and axial Flower
   d) Smooth and rough stem

2. Primitive man evolved in –
   a) Africa b) America c) Australia d) India

3. Which of the following is inheritable?
   a) an altered gene in sperm
   b) an altered gene in testes
   c) an altered gene in zygote
   d) an altered gene in udder cell

4. Theory of natural selection was proposed by -
   a) Charles Darwin b) Hugo de Vries c) Gregor Johann Mendel d) Jean Baptiste Lamarck

5. Somatic gene therapy
   a) affects sperm b) affects egg c) affects progeny **d) affects body cell**

PART – B

1. Mendel has observed Tallness as dominant character in Garden pea plant. Similarly tongue rolling is a dominant character in man. In a group of 60 students, 45 can roll their tongue and 15 are non rollers.
a) In the above context, calculate the percentage of dominant and recessive characters.

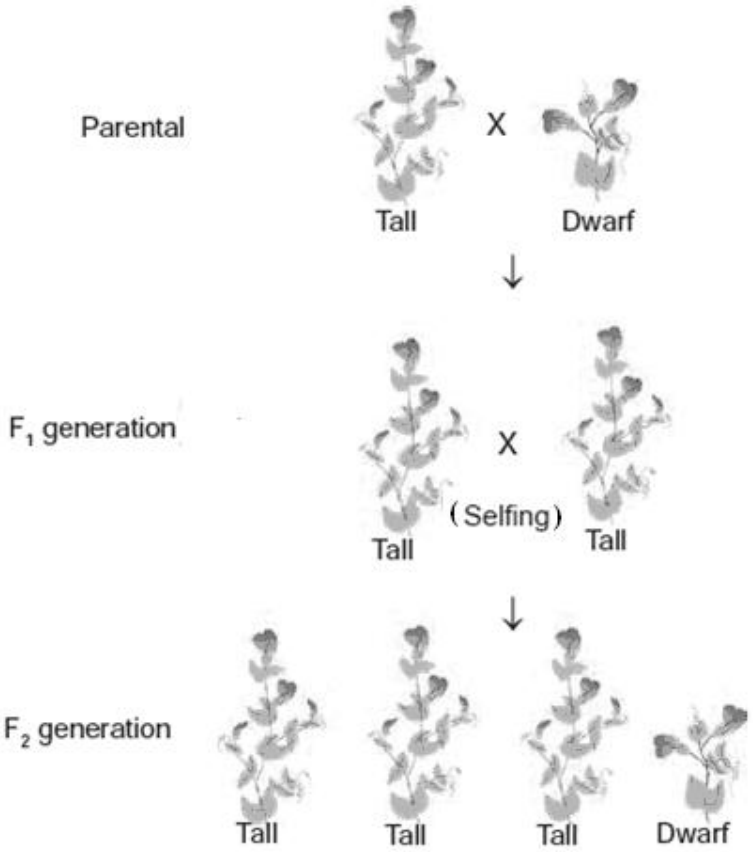
The percentage of dominant character = $\frac{45}{60} \times 100 = 75\ \%$

The percentage of recessive character = $\frac{15}{60} \times 100 = 25\ \%$

b) In Garden pea plant, draw the diagrammatic representation of mono hybrid cross as explained by Mendel.

Mendel selected the garden pea plant, *Pisum sativum* for his experiments. He crossed a tall plant with a dwarf plant, produced progeny and calculated the percentage of tallness and dwarfness in subsequent generations. When a pure breeding tall plant was crossed with a pure breeding dwarf plant, all plants were tall in the first filial generation (F_1) i.e., there was not any medium height plants or dwarf plants. This means that only one of the parental traits were seen and not the mixture of the two. When such a F_1 tall plant was allowed to have self pollination, both the tall and dwarf plants appeared in second filial generation (F_2). in the ratio of 3:1.

This indicates that both tallness and dwarfness were inherited in the F_1 plants but only tallness trait was expressed.



2. The heritable characters are varying in different species and within the same species. Name the variation in the following cases.

The eye colour among the human beings are varied as blue, black, brown, green, etc.,
a) This is called as ---------- variation. (**Intra specific**)

The dentition in rabbit and elephant are not the same.
b) This is called as ---------- variation. (**Inter specific**)

3. Sexually reproducing organisms produce offsprings with marked, significant and visible variation.
Asexually reproducing offspring show minor variations.
a) Do you agree with the above statements?
Yes. The above statements are correct.

b) Among the following organisms list out the asexually reproducing organisms. (Paramoecium, Euglena, Earthworm and Bird)
Paramoecium and Euglena are the asexually reproducing organisms.

4. Here is a certain important hereditary jargons, fix a suitable one from the list given below.
(alleles, variation, speciation, gene, allelomorph)

a) ---------- are the factors which form the physical basis of inheritance.(**genes**)
b) ---------- is alternate expression of same gene. (**alleles**)
c) ---------- are contrasting pairs of alleles. (**allelomorph**)

5. A change that affects the body cell is not inherited. However, a change in the gamete is inherited. Radiation effects of Hiroshima has been affecting generations.
Analyzing the above statements, give your interpretation.

The ill effects produced by nuclear weapons are of two types:
(i) Somatic and (ii) Genetic
In **somatic effects**, the general body cells of the person exposed to nuclear radiations are affected. This may lead to deadly diseases like cancer and shorten the lives of the people.
In **genetic effects** the genes of the person exposed to nuclear radiation get damaged. As nuclear radiations affect the gamete the genetic disorders are passed onto the next generations.

6. Sequentially arrange the different species of man from primitive to modern man.
(Neanderthal man, Homo habilis, Homo erectus, Homo sapiens)
Homo habilis $\longrightarrow$ Homo erectus $\longrightarrow$ Neanderthal man $\longrightarrow$ Homo sapiens

7. Bio-technology, the modern science in biology, has helped in producing different types of products.
One of the following groups does not have a product of bio-technology.
Pick out and give reasons.
a) Enzymes, Organic acids, Steroids, Vaccines
b) Vaccines, Enzymes, Anti biotics, Organic acids
c) Anti biotics, Hormones**,** Steroids, Vaccines
d) Steroids, Enzymes, Anti bodies, Vaccines.

The groups which does not have a product of bio-technology is
d) Steroids, Enzymes, Anti bodies, Vaccines
Anti bodies are not the products of bio-technology.

8. Identical twins are syngenic with similar chromosomal contents. Natural clones are those who possess identical chromosomes.
Fill up with the suitable word given in the bracket.
a) Identical twins are ---------- (**Natural clones** / Induced clones)
b) Identical twins are ---------- (dissimilar to each other / **similar to each other**).

9. The ancestor of particular type of frog found in India and Srilanka were the same

a) With reference to the above map, identify the factor that has resulted in the formation of a new species.

Geographical isolation is the main factor that has resulted in the formation of a new species.
The ancestor of particular type of frog found in India and Srilanka were the same. When these are isolated by geographical barriers there is a chance for a change to develop in their gene flow (Genetic drift), leading to formation of a new species.

b) State a few other factors that help in the formation of new species.

Reproductive Isolation and Physiological Isolation

PART – C

1. Human evolution has a record of changes for the past of 15 million years.

a. Name the different species of mankind in chronological order from primitive to modern man

Homo habilis, Homoerectus, Neanderthal man, ArchaicHomosapiens, Modern Homo sapiens

b. When were the primitive caves developed?

18,000 years ago

c. Narrate the life led by early man like hominids

3-4 million years ago, men like hominids, walked into Eastern Africa. They hunted with stone weapons but were mostly fruit eaters. They were probably not taller than four feet but, walked upright in the grass lands of East Africa. These creatures were called the First human like being – the hominid. The hominid was called Homo habilis.

Additional questions

1 Mark

1. Genetic material which influences the traits is

   a) DNA b) RBC c) WBC d) Antibodies

2. ---------- worked out the first ever scientific experimental study on heredity.

   a) Jean Baptiste Lamarck b) Charles Darwin **c) Gregor Johann Mendel** d) Ian Wilmut

3. Mendel observed variations in the characteristics of
   a) coconut **b) garden pea plant (Pisum sativum)** c) ground nut d) none of these
4. The genotype of a character is influenced by factors, called ----------
   a) chromosomes b) ribosomes c) clones **d) Genes**
5. The alternate expressions of the same gene are called ----------
   a) alleles b) clones c) chromosomes d) DNA
6. The contrasting pair of alleles make up an
   a) Enzyme b) antibody c) antibiotic **d) allelomorph**
7. ---------- put forth the law of natural selection **or** theory of natural selection
   a) Jean Baptiste Lamarck **b) Charles Darwin** c) Mendel d) Ian Wilmut
8. ---------- is associated with the theory of evolution
   a) Jean Baptise Lamarck **b) Charles Darwin** c) Mendel d) Ian Wilmut
9. ---------- put forth the 'Use and Disuse theory'
   a) Jean Baptiste Lamarck b) Charles Darwin c) Mendel d) Ian Wilmut
10. Mankind in India and all other parts of the world, form a single species called
    a) Homo sapiens b) Hominids c) Homo habilis d) none of these
11. Monohybrid cross ratio is
    a) 2 : 1 b) 1 : 1 c) 2 : 2 **d) 3 : 1**
12. First human like being
    a) Hominid *or* **Homo habilis** b) Neanderthal man c) Homo sapiens d) none
13. ---------- used to hide to protect them and buried their dead.
    a) Hominid **b) Neanderthal man** c) Homo habilis d) none
14. The meat eaters who existed 1.5 million years ago were called
    a) Homo sapiens b) Hominids c) Homo habilis **d) Homo erectus**
15. ---------- is an Anti-Viral protein produced by virus infected cells
    a) insulin b) vitamin c) steroid **d) interferon**
16. Komari is a foot and mouth disease of
    a) man **b) cattle** c) birds d) none of these
17. Cholesterol, containing steroid drugs like prednisolone, is produced from the fungus ----------**a) Rhizopus** b) Penicillium c) Agaricus d) none of these
18. ---------- are bio-catalysts that speed up reaction in cells.
    a) Enzymes b) vaccines c) antibodies d) antibiotics
19. ---------- help the cultivator to increase productivity.
    a) Nif–genes b) steroids c) DNA ligase d) none of these
20. ---------- is used for the production of vinegar.
    a) cholesterol b) citric acid c) butyric acid **d) acetic acid**

21. ---------- are derived lipids

a) Enzymes b) vaccines c) antibodies **d) steroids**

22. ---------- coined the term vaccine

a) Edward Jenner b) Charles Darwin c) Mendel d) Ian Wilmut

23. Monoclonal anti -bodies, are used for treatment of

a) fever b) diabetes **c) cancer** d) jaundice

24. Dolly was a cloned sheep, developed by ----------

a) Edward Jenner b) Charles Darwin c) Mendel **d) Dr. Ian Wilmut**

25. Beta cells of pancreas produce

a) insulin b) vaccine c) vitamin d) WBC

26. Bio technologically synthesized---------- is used to cure pernicious anaemia

a) vitamin B_{12} b) vitamin C c) vitamin D d) vitamin K

27. ---------- enzyme is derived from amyloproteins of bacteria

a) zymase b) invertase **c) amylase** d) none of these

28. ---------- is treated by the biotechnologically produced insulin

a) Diabetes b) cancer c) malaria d) jaundice

29. ---------- are molecular scissors which cut DNA at specific sites.

a) Ligases **b) Restriction enzymes or Restriction endonucleases**

c) Proteases d) none of these

30. ---------- are the paste enzyme which helps to join the broken DNA fragments.

a) Ligases b) Proteases c) Endonucleases d) none of these

2 Mark

Fill up the blanks form the given pair of answers

1. Insulin is used to cure ---------- (Anemia / Diabetes)
   Ans: Diabetes

2. Expression of morphological characters as tall or dwarf plant, violet or white flower is called ---------- (Phenotype / Genotype)
   Ans: Phenotype

3. Differences in the characteristics among the individuals of the same species is called -------- (intra specific variation / Inter specific variation)
   Ans: intra specific variation

4. Differences in the characteristics among the individuals of the different genera is called ------- (Inter specific variation / Inter generic variation)
   Ans: Inter generic variation

5. Differences in the characteristics among the individuals of the different species is called ------ (Inter specific variation / Inter generic variation)
Ans: Inter specific variation

Spot the error in the following statements

1. Sexual reproduction results in offspring with minor variations. Asexually reproducing organisms produce offspring with marked, significant and visible variations.
Ans:
Asexual reproduction results in offspring with minor variations. **Sexually** reproducing organisms produce offspring with marked, significant and visible variations.

2. Somatic variations affect germ cells
Ans: Somatic variations affect **body** cells

3. Pollution in drinking water can be monitored using bio-chips
Ans: Pollution in drinking water can be monitored using **bio-sensor**

4. Antibiotics are the substances are the substances produced by chemicals
Ans: Antibiotics are the substances are the substances produced by microorganisms

5. Men like hominids were mostly meat eaters.
Ans: Men like hominids were mostly **fruit** eaters.

Assertion and reason

1. **Assertion (A) :** Giraffe has long neck and long legs
Reason (R) : Giraffes were forced to extend their neck and stretch their legs to reach the leaves of tall trees. Over a long period of time, this resulted in long neck and legs in giraffe.
a) **A** is correct & **R** is relevant b) **A** is not correct & **R** is relevant
c) **A** is correct & **R** is not relevant d) Both **A** & **R** are not correct

Ans: a) **A** is correct & **R** is relevant

2. **Assertion (A) :** Restriction endonucleases are molecular scissors
Reason (R) : They cut DNA at specific sites.
a) **A** is correct & **R** is relevant b) **A** is not correct & **R** is relevant
c) **A** is correct & **R** is not relevant d) Both **A** & **R** are not correct

Ans: a) **A** is correct & **R** is relevant

Answer the following

1. Define heredity

The inheritance of characteristics through generation is called heredity.

2. What is meant by Monohybrid Cross?

The first experiment of Mendel considering the inheritance of a single trait (Height of the plant Tall/Dwarf) is called Monohybrid Cross.

3. What is Phenotype?

Expression of morphological characters as tall or dwarf plant, violet or white flower is called Phenotype.

4. What is Genotype?

The expression of gene (or Chromosomal make up) of an individual for a particular trait is called Genotype.

5. What are genes?

The genes are the factors which form the physical basis for inheritance of Characters.

6. What are alleles?

The alternate expressions of the same gene are called alleles.

7. What is an allelomorph?

The contrasting pair of alleles make up an allelomorph. Examples : Tall and dwarf plants, wrinkled and smooth seed coat, white and violet coloured flower.

8. What is variation?

Variation may be defined as the differences in the characteristics among the individuals of the same species (intra specific variation) or among the different genera (inter generic variation) or different species (Inter specific Variation).

9. What are the two types of variation?

a. Somatic Variation: It pertains to body cells and it is not inherited.

b. Germinal Variation: It pertains to germ cells or gametes and it is inheritable. It leads to speciation and evolution.

10. Write on the theory of Natural Selection

Charles Darwin made a number of observations in many parts of the world and put forth the law of natural selection involving struggle for existence and survival of the fittest.

Variation leads to genetic diversity, which is the key for evolution.

11. What is evolution?

Evolution may be defined as a gradual development of more complex species from pre-existing simpler forms.

12. Write on evolution tree

To understand evolution, a branching diagram or "Tree" is used to show the inferred evolution, relationships, among various biological species or other entities based upon similarities and differences in their physical and genetical characters.

13. What is Genetic engineering?

Genetic engineering is the modification of the genetic information of living organisms by manipulation of DNA by adding, removing or repairing part of genetic material (DNA) and changing the phenotype of the organism. It is also known as **gene manipulation** or **recombinant DNA Technology** (r-DNA Technology)

14. What are benefits derived through the Genetic engineering?

1. Understanding of the gene structure and function through basic research.
2. Production of large quantities of insulin, interferon(Anti-Viral Protein produced by Virus infected cells) human growth hormones, proteins (Polypeptides) and vaccines for foot and mouth disease of cattle (komari – in Tamil) etc.,
3. This technique is also employed in the transfer of genes involved in Nitrogen fixation (Nif– genes). This will help the cultivator to increase productivity.

15. What are the basic techniques in Genetic engineering?

Genetic Engineering has developed after the discovery of two enzymes.
The enzymes which can cut DNA into fragments, and enzymes which can join such fragments.
Restriction enzymes or Restriction endonucleases are molecular scissors which cut DNA at specific sites.
DNA ligases are the paste enzyme which helps to join the broken DNA fragments.

16. What are enzymes?

Enzymes are bio-catalysts that speed up reaction in cells.

17. What are Anti-Biotics?

Antibiotics are chemical substances derived from microbes like fungi, bacteria etc., employed to kill the infectious germs and cure a disease.

18. What are vitamins?

These are chemical compounds present in variable minute quantities in natural food stuffs. They do not furnish energy but are very essential for energy transformation and regulation of metabolism.

19. What are Vaccines?

Vaccines are substances that confer immunity against specific disease. They act as antigens and stimulate the body to manufacture antibody.

20. What are Monoclonal anti-bodies?

These are the anti bodies produced by cloned cells. Monoclonal anti -bodies, are now used for treatment of cancer.

21. What is cloning?

Cloning is an experimental technique wherein a group of morphologically and genetically identical organisms are produced.

22. What is clone? What are the two types clones?

A clone may be defined as an exact carbon copy or copies of a single parent.

i) **Natural clones**: The natural clones include identical twins.
ii) **Induced clones**: The induced (artificial) clones are developed by nuclear transfer into the host cell

5 Mark

1. What are the significances of Variation?

1. It is the source of raw material for evolution.
2. Animals are able to adapt themselves to the changing environment.
3. Organisms are better suited to face the struggle for existence
4. Variations give the organisms an individuality of their own.
5. Without variation, there would be no science of heredity as all individuals of a race, would be identical in all aspects.

2. Write on Lamarckian View on organic evolution *or* **Write on Use and Disuse Theory**

Jean Baptiste Lamarck postulated the Use and Disuse Theory. According to Lamarck, use of a part / organ efficiently by a species, for generations over a long period of time, results in that part / organ being well developed in the subsequent generations and disuse of part/organ for a long period would make that part / organ diminished or degenerated.

Lamarck quotes the example of development of long neck of Giraffe. Giraffes were forced to extend their neck and stretch their legs to reach the leaves of tall trees. Over a long period of time, this resulted in long neck and legs in giraffe. Lamarck remarks that the "will or want" for a character makes the organisms to posseses it at a later time.

3. Write a note on Human evolution

- Fifteen million years ago, in Africa existed hairy bodied Gorilla and Chimpanzees like Hominids.
- After that 3-4 million years ago, men like hominids, walked into Eastern Africa. Evidence shows that they hunted with stone weapons but were mostly fruit eaters. They were probably not taller than four feet but, walked upright in the grass lands of East Africa. These creatures were called the First human like being – the hominid. The hominid was called Homo habilis.
- The next stage of human evolution came into existence 1.5 million years ago with the rise of Homo erectus who were meat eaters
- The Neanderthal man who lived in East and Central Asia 1 million years ago, used to hide to protect them and buried their dead.
- Archaic Homo sapiens arose in South Africa and moved across continents and developed into distinct races during the ice age.
- Between 75,000 – 10,000 years, the modern Homo sapiens arose. Prehistoric caves were developed about 18,000 years ago, agriculture came around 10,000 years back and human settlements started.

4. What are the applications of Bio-technology?

1. **Brewing Industry:** Fermentation in alcoholic beverages like beer, wine etc.,
2. **Enzyme Technology :** Enzymes are bio-catalysts that speed up reaction in cells. They can be used to catalyze the industrially important reactions and are more efficient than inorganic catalysts. Many enzymes are utilized in the pharmaceutical industry.
3. **Anti-Biotics :** These are substances produced by some microbes that help in increasing the immunity to human beings which are toxic to other micro-organisms.
4. **Organic Acids:** Acetic acid is used for the production of vinegar.
5. **Vitamins:** These are chemical compounds present in variable minute quantities in natural food stuffs. They do not furnish energy but are very essential for energy transformation and regulation of metabolism.
6. **Vaccines:** Vaccines are substances that confer immunity against specific disease. They act as antigens and stimulate the body to manufacture antibody.
7. **Steroids:** They are a type of derived lipids Eg: Cholesterol, containing steroid drugs like prednisolone is produced from fungus Rhizopus.
8. **Monoclonal anti-bodies :** These are the anti bodies produced by cloned cells. Monoclonal anti -bodies, are now used for treatment of cancer.

5. Write a note on stem cell culture

One of the most fascinating branches in applied embryology is stem cell culture. The stem cells are the most unspecialized mass of cells. They are derived from animals and plants.

They have two important characteristic features. They are:

1. Unspecialized cells which have the potentiality of growing and multiplying into enormous number of same type of cells by repeated mitosis.
2. They can be introduced to become any other type of tissues with specific functions i.e., they can be induced to become a cardiac muscle, beta cells of pancreas (which produce insulin), special neurons in brain etc.,

Types of Stem Cells: *There are two kinds of stem cells*

1. **Embryonic Stem Cells:**

The embryonic stem cells can be derived from early embryo which is developed by "invitro fertilization" (fertilization made artificially in the laboratory). After fertilization the zygote develops into a hollow blastula by cell division. The inner mass of undifferentiated cells are isolated and they are considered as embryonic stem cells.

2. Adult or Somatic Stem Cells:

The body of higher animals and human beings have many well differentiated tissues like epithelial, connective, muscular, vascular, supporting, nervous and reproductive tissues. In these tissues, there are some undifferentiated cells and are considered as the adult or somatic stem cells. They can grow, multiply and can be differentiated into same type of tissues into which they are implanted. The mechanism of adult or somatic stem cell culture is similar to that of embryonic stem cell culture. The somatic stem cells are derived from sources such as bone marrow, embryos, amniotic fluid and umbilical cord.

6. What are the microbial Products of Bio-technology?

1. **Vaccines :** Killed or live germs suspension which is employed to induce the production of antibodies and bring forth immunity.
2. **Antibiotics :** Antibiotics are chemical substances derived from microbes like fungi, bacteria etc., employed to kill the infectious germs and cure a disease.
3. **Vitamin B_{12} :** Bio technologically synthesized vitamin B_{12} is used, to cure pernicious anaemia.
4. **Enzymes :** Bio-Chemically significant enzymes are derived from microbes \ Ex. Amylase is derived from amyloproteins of bacteria.
5. **Insulin :** Diabetes is treated by the biotechnologically produced insulin.

7. Write on Bio-sensor and Bio-chips

Bio sensor:

It is a device consisting of immobilized layer of biological material such as enzyme, antibody, hormone, nucleic acids, organelles or whole cells and its contact with a sensor. The sensor converts biological signals into an electrical signal.

It is used in medicines and industry.

1. Blood glucose level can be detected.
2. Production of any toxin in the body due to infection can be detected.
3. Pollution in drinking water can be monitored.
4. Odour, freshness and taste of food can be measured.

Bio-Chips

Bio-Chips are microchips which are developed by employing techniques of Bio-technology. In future, biological computers will be developed using bio-chips. Bio-Chips will be useful in defense, medicine etc.,

8. Write a note on Gene Therapy

Insulin dependent diabetes is treated with insulin injection. Insulin dependent diabetes is caused by the degeneration of beta cells due to a defective gene. Applying the principle of Bio-technology, it is possible to correct the defective gene. When the defective gene is corrected with a new gene, the genetic defect developed is, rectified and cured. Gene Therapy is the means to treat or even cure genetic and acquired diseases like cancer and Aids by using normal gene to supplement or replace the defective gene. It can be used to treat defects in Somatic i.e., (body) or Gametic (sperm or eggs) Cell.

Types of Gene Therapy

1. **Somatic gene therapy:** The genome (gene set) of the recipient is changed. But this change is not passed along to the next generation.

2. **Germ line gene therapy**: Egg and sperm of the parents are changed, for the purpose of passing the changes to the next generation.

Textbook questions

PART – A

1. Pick out a case of healthy state of an individual.
Mr. X is recovering from an infectious disease, Mr. Y is taking insulin injection everyday, Mrs. Z is very much depressed, Mr. K is attending to his duty and spends time joyfully.
Ans: Mr. K is attending to his duty and spends time joyfully.

2. Which one of the following is a state of a disease in which a person is not socially balanced?
He enjoys a birthday party, He behaves rudely even for menial matters,
He is adjusting to the surrounding situation, He is attending to his ailing mother at the hospital.
Ans: He behaves rudely even for menial matters

3. Pick out the bacterial disease.
Meningitis, Rabies, Tetanus, Small pox.
Ans: Tetanus

4. One of the following is transmitted through air. Find out.
Tuberculosis, Meningitis, Typhoid, Cholera.
Ans: Tuberculosis

5. The most serious form of malaria is caused by Plasmodium ----------
P.ovale, P.malariae, P.falciparum, P.vivax.
Ans: P.falciparum

6. An example for protozoan infecting our intestine is ----------
Plasmodium vivax, Entamoeba histolytica, Trypanosoma gambiense, Taenia solium.
Ans: Entamoeba histolytica

7. One of the means of indirect transmission of a disease is----------
Sneezing, Droplet from mouth, Placenta, Utensils of patients.
Ans: Utensils of patients

8. When antibodies, extracted from some other animal is injected into your body, what kind of immunity do you gain?
Artificial active acquired immunity, Artificial passive acquired immunity,
Natural active acquired immunity, Natural passive acquired immunity.
Ans: Artificial passive acquired immunity

9. The first vaccine injected into a just born baby is ----------
Oral polio, DPT, DPT and Oral polio, BCG.
Ans: BCG

10. Pick out a non-antigen. Entry of ----------
(Germ,Toxins of germs,New forms of protein, Mother's Milk.
Ans: Mother's Milk

PART – B

11. In order to lead a healthy life a person should enjoy physical, mental and social well being
If a person lacks any one of them, then that person is suffering from ----------
Ans: Disease

12. Tamil selvan has inherited colour blindness from his father. Name the causative factor responsible for this defect ----------
Ans: Genetic factor. The recessive mutant genes cause this disorder.

13. Marasmus and Kwashiorkar are both protein deficiency defects. Marasmus differs from Kwashiorkar in enlarged belly and swelling in the face. Are these symptoms for the above diseases correct? If not, correct it.
Ans:
These symptoms are correct in case of Kwashiorkar but not for Marasmus.
In Marasmus, the child loses weight and suffers severe diarrhoea and it will appear as though bones are covered by the skin.
In Kwashiorkar the child develops an enlarged belly with swelling in the face and feet.

14. A list of disorders are given below. Pick out the odd one out and give reasons.
(colour blindness, haemophilia, night blindness, albinism, sickle cell anaemia)
Ans:
Odd one out: night blindness
Reason: Night blindness is a vitamin deficiency disease (Vitamin-A). The remaining diseases are hereditary diseases.

15. Ramya is suffering from bleeding gum and loosening teeth. On a diagnosis, it was found to have been caused by vitamin deficiency.
Suggest Ramya the kind of vitamin that is lacking in her food and tell your friend the name of deficiency disease that she suffers from.
Ans: Ramya's diet lacks vitamin C. She is suffering from the disease called scurvy.

15. a

(A) Vitamins
(B) Deficiency diseases and
(C) Symptoms are given.
Match B, C with A.

A	B	C
Vitamins	**Deficiency diseases**	**Symptoms**
e.g. Vitamin A	**Nyctalopia**	**Night Blindness**
Vitamin B_1	Scurvy	Nervous disorder
Vitamin C	Rickets	Bleeding Gum
Vitamin D	Haemorrhage	Defective calcification of bones
Vitamin K	Beri-beri	Profuse loss of blood

Ans:

A	B	C
Vitamins	**Deficiency diseases**	**Symptoms**
Vitamin A	Nyctalopia	Night Blindness
Vitamin B_1	Beri-beri	Nervous disorder
Vitamin C	Scurvy	Bleeding Gum
Vitamin D	Rickets	Defective calcification of bones
Vitamin K	Haemorrhage	Profuse loss of blood

16. Kavitha is suffering from common cold. What are the questions you will put forth to Kavitha to confirm the disease?
a. ---------- b. ----------
Ans:
a) Do you have running nose and headache?
b) Do you have fever?

PART – C

17. Kala has delivered a baby.
a. Suggest the immunization schedule for the baby, in the first six months
b. What are all the diseases that can be cured as per the schedule?

Ans:
a.

S.No	Age	Vaccine	Dosage
1	New born	BCG	1^{st} dose
2	15 days	Oral polio	1^{st} dose
3	6^{th} week	DPT & polio	1^{st} dose
4	10^{th} week	DPT & polio	2^{nd} dose
5	14^{th} week	DPT & polio	3^{rd} dose

b. The diseases that can be cured as per the schedule are:
1. Tuberculosis 2. Polio 3. Diphtheria 4. Pertussis 5. Tetanus

18. There is a widespread outbreak of malaria in your area.
a. Suggest some controlling measures to the local authorities concerned.
b. Pick out the right symptom for malaria. (chill and shiver and a rise in temperature / diarrhoea)
Ans:
a. controlling measures are:
1. Sanitary measures include ground fogging with disinfectants.
2. Closure of stagnant pools of water and covering ditches is suggested.
3. Using mosquito nets and repellants also, will grossly lower the chance for infection.

b. chill and shiver and a rise in temperature

19. 15th October is observed as 'Handwashing Day'
a. Tell your friend the effects of hand washing.
b. In a day what are the occasions in which you wash your hand?
Ans:
a. 'Hand washing' is a good habit. It keeps your hand free from dust and harmful micro organisms.
b. 1. Before and after eating food
2. After using the toilet
3. After playing
4. After sneezing
5. After handling dirty objects.

Additional questions

1 Mark

1. Normal blood sugar level in 100 mL of blood under fasting condition is
a) 60-100 mg **b) 80-120 mg** c) 70-140 mg d) 120-160 mg

2. Excess glucose is converted into ---------- and stored in liver for further use
a) sucrose b) fructose c) galactose **d) glycogen**

3. Insulin is secreted by ---------- cells of islets of langerhans of pancreas.
a) alpha **b) beta** c) gamma d) delta

4. Albinism is an inherited disorder of ---------- metabolism
a) melanin b) valine c) glucose d) glycine

5. 'High sensitivity to light' is known as
a) hydrophobia b) gynophobia **c) photophobia** d) none of these

6. Marasmus and kwashiorkor are caused by the deficiency of
a) protein b) vitamin C c) carbohydrate d) vitamin K

7. Germ theory of diseases was established by
a) Edward Jenner & Charles Darwin b) Robert Boyle & Mendel
c) Lamarck & Charles Darwin **d) Robert Koch & Louis Pasteur**

8. Deficiency of vitamin B_5 causes
a) rickets b) scurvy **c) pellagra** d) night blindness

9. Defective calcification of bones is the symptom of
a) rickets b) scurvy c) pellagra d) night blindness

10. Encephalitis is otherwise known as
a) malaria b) jaundice **c) brain fever** d) tuberculosis

11. Which is not a viral disease?
a) polio b) rabies c) meningitis **d) cholera**

12. Which of the following is a hereditary disease?
a) Kwashiorkar b) Ringworm **c) Down's syndrome** d) Polio

Organic diseases **or** metabolic disorder	Diabetes mellitus, Diabetes insipidus, Coronary heart diseases, Renal failure, Hyoertension, Obesity, Alzheimer's disease, Stroke affecting the functions of the brain	
Hereditary diseases **or** Genetical disorders	Albinism, Haemophilia, Sickle cell anaemia, Thalassemia, Down's syndrome, Bubble boy syndrome	
Nutritional deficiency diseases	Marasmus, Kwashiorkar	
Diseases caused by micro organisms	Viral diseases	Polio, Rabies, Hepatitis, Meningitis, Encephalitis (brain fever)
	Bacterial diseases	Tuberculosis, Leprosy, Cholera, Typhoid, Diphtheria, Tetanus, Plague, Pneumonia, Syphilis, Gonorrhoea
	Fungal diseases	Ringworm, Dandruff, Athletes' foot
	Protozoan diseases	Malaria, Amoebic dysentery, Sleeping sickness,
Diseases caused by macro organisms (Tapeworm, Liver fluke, Round worm, Filarial worm)	Taeniasis, Ascariasis, Filariasis	

13. H_1N_1 virus causes
a) Influenza b) AIDS c) Tetanus d) Tuberculosis

14. HIV (Human Immuno deficiency Virus) causes
a) Influenza **b) AIDS** c) Tetanus d) Tuberculosis

15. ---------- is an air borne disease affecting the lungs and bones
a) Filariasis b) AIDS **c) Tuberculosis** d) none of these

16. A rod shaped bacterium which causes TB (Tuberculosis) is
a) Mycobacterium tuberculosis b) Salmonella Typhi
c) Plasmodium falciparum d) none of these

17. ---------- vaccine prevents tuberculosis (TB)
a) DPT b) DT c) MMR **d) BCG**

BCG	Tuberculosis Vaccine
DPT	Diphtheria, Pertussis, Tetanus Vaccine (**Triple antigen**)
MMR	Mumps , Measles, Rubella
DT	Diphtheria, Tetanus (**Dual antigen**)
TT	Tetanus toxoid

18. A short rod shaped bacterium which causes Typhoid is ----------
a) Mycobacterium tuberculosis **b) Salmonella Typhi**
c) Plasmodium falciparum d) none of these

19. Plasmodium falciparum causes
a) Typhoid **b) Malaria** c) tuberculosis d) All of these

20. The vector of malaria is
a) female anopheles mosquito b) male mosquito c) housefly d) none of these

21. Amoebic dysentery (Amoebiasis) is caused by
a) Plasmodium falciparum b) Salmonella Typhi **c) Entamobea histolytica** d) none of these

Disease	Causative agent
Influenza	A(H_1N_1) Virus
TB (Tuberculosis)	Mycobacterium tuberculosis
Typhoid	Salmonella Typhi
Malaria	Plasmodium falciparum
Amoebic dysentery (Amoebiasis)	Entamobea histolytica
AIDS (Acquired Immune Deficiency Syndrome)	HIV (Human Immuno Deficiency Virus)

22. Expulsion of excess unused glucose in the urine due to less production of insulin leads to
a) diabetes mellitus b) diabetes insipidus c) hypertension d) renal failure

23. The parasite plasmodium multiply within the body of mosquitoes to form
a) sporozoites b) spore c) gemmates c) none of these

24. The toxic substance which is responsible for the chill and high fever of a person affected with malaria is
a) haemoglobin **b) haemozoin** c) myoglobin d) none of these

25. Sir. Ronald Ross was awarded the Nobel prize for his work on
a) AIDS b) Typhoid **c) Malaria** d) Cholera

26. At the time of childbirth, germs are transferred from the infected mother to the child through
a) umbilical cord b) small intestine c) lungs d) none of these

27. HIV (Human Immuno Deficiency Virus) was isolated by
a) Robert Gallo & Luc Montagnier b) Sir. Ronald Ross c) Charles Darwin d) none of these

28. ---------- is transmitted through sexual contact or through blood
a) Cholera b) Typhoid **c) AIDS** d) All of these

29. ---------- is a retro virus with glycoprotein envelope and RNA
a) A(H1N1) b) Tobacco mosaic virus c) bacteriophage **d) HIV**

30. HIV causes profound immuno suppression in human due to the depletion of
a) WBC b) RBC c) both d) none of these

31. ELISA & Western Blot are the tests for
a) Malaria **b) AIDS** c) Typhoid d) diabetes mellitus

32. Confirmatory test for AIDS is
a) ELISA test **b) Western Blot test** c) both d) none of these

33. ---------- act as mechanical carrier and transmit the parasite which causes amoebic dysentry
a) house flies b) mosquitoes c) tapeworm d) all of these

2 Mark

Match the following

1.

No.	Vitamin	Deficiency disease
1	Vitamin B_1	Sterility
2	Vitamin B_5	Pernicious anaemia
3	Vitamin B_{12}	Pellagra
4	Vitamin E	Beri-Beri

Ans:

No.	Vitamin	Deficiency disease
1	Vitamin B_1	Beri-Beri
2	Vitamin B_5	Pellagra
3	Vitamin B_{12}	Pernicious anaemia
4	Vitamin E	Sterility

2.

No.	Disease	Symptoms
1	Haemorrhage	Night blindness
2	Nyctalopia	Defective calcination of bones
3	Scurvy	Profuse loss of blood
4	Rickes	Bleeding gums and loosening of teeth

Ans:

No.	Vitamin	Deficiency disease
1	Haemorrhage	Profuse loss of blood
2	Nyctalopia	Night blindness
3	Scurvy	Bleeding gums and loosening of teeth
4	Rickes	Defective calcination of bones

3.

1	Polio	Fungal disease
2	Typhoid	Protozoan disease
3	Athletes' foot	Viral disease
4	Malaria	Bacterial disease

Ans:

1	Polio	Viral disease
2	Typhoid	Bacterial disease
3	Athletes' foot	Fungal disease
4	Malaria	Protozoan disease

4.

No.	Disease	Causative agent
1	Influenza	HIV
2	Amoebic dysentery	Plasmodium falciparum
3	AIDS	A(H_1N_1) Virus
4	Malaria	Entamobea histolytica

Ans:

No.	Disease	Causative agent
1	Influenza	A(H_1N_1) Virus
2	Amoebic dysentery	Entamobea histolytica
3	AIDS	HIV
4	Malaria	Plasmodium falciparum

5.

1	BCG	Tetanus toxoid
2	DPT	Dual antigen
3	DT	Triple antigen
4	TT	Tuberculosis Vaccine

Ans:

1	BCG	Tuberculosis Vaccine
2	DPT	Triple antigen
3	DT	Dual antigen
4	TT	Tetanus toxoid

6.

No.	Disease	Factor
1	Common cold	Hereditary disease
2	Kwashiorkor	Metabolic disorder
3	Down's syndrome	Viral disease
4	Obesity	Nutritional deficiency disease

Ans:

No.	Disease	Factor
1	Common cold	Viral disease
2	Kwashiorkor	Nutritional deficiency disease
3	Down's syndrome	Hereditary disease
4	Obesity	Metabolic disorder

7.

1	Sir. Ronald Ross	Germ theory of diseases
2	Robert Gallo & Luc Montagnier	Awarded Nobel prize for his work on malaria
3	Robert Koch & Louis Pasteur	Isolated HIV

Ans:

1	Sir. Ronald Ross	Awarded Nobel prize for his work on malaria
2	Robert Gallo & Luc Montagnier	Isolated HIV
3	Robert Koch & Louis Pasteur	Germ theory of diseases

Spot the error in the following statements

1. Excess glucose is converted into insoluble sucrose and stored in liver and muscles for future use
Ans:
Excess glucose is converted into insoluble **glycogen** and stored in liver and muscles for future use

2. Viruses are dead particles inside the host cell and behave as living substances outside the host cell.
Ans:
Viruses are **living substances** inside the host cell and behave as **dead particles** outside the host cell.

3. Bacteria are multicellular prokaryotes and visible under Compound Microscope.
Ans:
Bacteria are **unicellular** prokaryotes and visible under Compound Microscope.

4. Fungi are green saprophytic or parasitic plants
Ans:
Fungi are **non green** saprophytic or parasitic plants

5. Protozoans are multi cellular animalcules.
Ans:
Protozoans are **unicellular** animalcules

6. Western blot test is a confirmatory test for cancer
Ans:
Western blot test is a confirmatory test for **AIDS**

7. Foreign proteins entering the body are called antibodies
Ans:
Foreign proteins entering the body are called **antigens**

8. The keratinized layer of skin is affected in people suffering from 'Scurvy'
Ans:
The keratinized layer of skin is affected in people suffering from **'Ringworm'**

9. Sporozoites (The infectous stage-malarial parasite) are stored in blood of mosquito
Ans:
Sporozoites (The infectous stage-malarial parasite) are stored in **salivary glands** of mosquito

10. Immunization with DPT vaccine is an effective measure to prevent tuberculosis.
Ans:
Immunization with **BCG** vaccine is an effective measure to prevent tuberculosis.

Reason and Assertion

1. **Assertion:** The clinical symptoms of Albinism are milky white coloured skin and marked photophobia (high sensitivity to light).
Reason: Albinism is an inherited disorder of melanin metabolism, characterized by the absence of melanin in the skin, hairs and eyes.
Does the reason satisfy the given assertion?
Ans: Yes the reason satisfies the assertion.

2. **Assertion:** HIV causes AIDS. It causes profound immuno suppression in humans.
Reason: It is due to the depletion of one type of WBC, which is involved in the formation of antibodies called CD4 plus T-helper cells
Does the reason satisfy the given assertion?
Ans: Yes the reason satisfies the assertion.

3. **Assertion:** Tuberculosis is transmitted through air.

   Reason: Mycobacterium tuberculosis is a rod shaped bacterium.

   Does the reason satisfy the given assertion?
   Ans: No the reason does not satisfy the assertion.
   The correct reason is as follows.
   Large number of bacteria leave the patients through the droplets of sputum expelled by the patients while eating, sneezing, talking, laughing and so on by the patients. The droplets may remain suspended in the air for a long time. The dust arising from the sputum may also contain viable germs. The waxy cell wall of the tuberculosis bacillus prevents it from drying up and so it can remain viable outside the body for a long period. The germs suspended in the air may be inhaled by a healthy person.

4. **Assertion:** In Marasmus, the child loses weight and suffers severe diarrhoea and it will appear as though bones are covered by the skin. In Kwashiorkar the child develops an enlarged belly with swelling in the face and feet.
   Reason: This due to the deficiency of proteins

   Does the reason satisfy the given assertion?
   Ans: Yes the reason satisfies the assertion.

5. **Assertion:** Diabetes mellitus is a state of expulsion of excess unused glucose in the urine.
   Reason:. This is due to kidney failure.
   Does the reason satisfy the given assertion?
   Ans: No the reason does not satisfy the assertion. Diabetes mellitus is due to less production of insulin

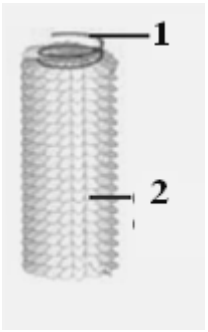
To raise questions

1. Kumar is suffering from typhoid. What are the questions you will put forth to Kumar to confirm the disease?
   a. ---------- b. ----------
   Ans:
   a) Do you suffer from continuous fever?
   b) Do you suffer from inflammation and ulceration of intestine?

2. Ravi is suffering from malaria. What are the questions you will put forth to Ravi to confirm the disease?
   a. ---------- b. ----------
   Ans:
   a) Do you feel chillness and fever?
   b) Does the fever recurring at intervals?

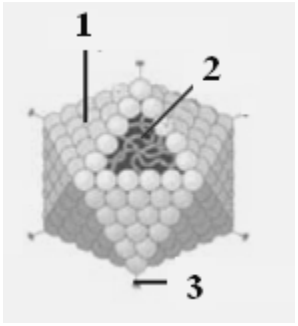
Label the parts in the given diagram

1. Tobacco mosaic virus



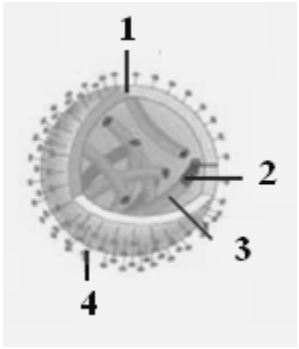
1. RNA 2. Capsomere of capsid

2. Adeno virus



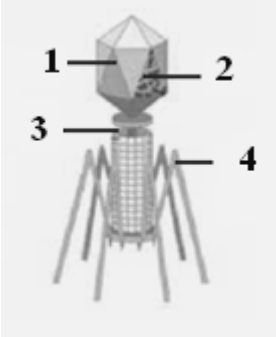
1. Capsomere 2. DNA 3. Glycoprotein

3. Influenza virus



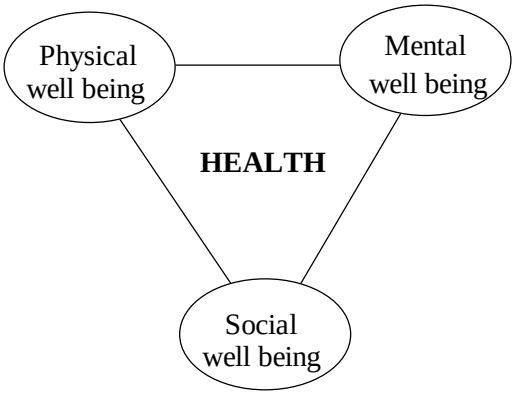
1. Membranous envelope 2. RNA 3. Capsid 4. Glycoprotein

4. Bacteriophage



1. Head 2. DNA 3. Tail sheath 4. Tail fiber

5. Draw a schematic representation of different dimensions of health



Fill up the blanks from the given pair of answers

1. The genetical disorders are caused due to ---------- (defective genes / deficiency of vitamins)
   Ans: defective genes

2. ---------- is a Viral disease (encephalitis / Gonorrhoea)
   Ans: encephalitis

3. HIV destroys WBC which are involved in the formation of antibodies called ----------
   (CD4 plus T-helper cells / AB4 plus D-helper cells)
   Ans: CD4 plus T-helper cells

4. Mode of transmission of typhoid is ---------- (air / contaminated food and water)
   Ans: contaminated food and water

To interpret what happens in the given situations

1. What happens if insulin is not produced in sufficient quantity?

If Insulin is not produced in sufficient quantity, excess of sugar cannot be stored and utilized. As a result, sugar continues to get accumulated in the blood, till it is lost through urine. This leads to other complications and results in diabetes mellitus. Diabetes mellitus is a state of expulsion of excess unused glucose in the urine due to less production of insulin.

2. What happens if HIV enters the blood?

HIV causes profound Immuno suppression in humans. It is due to the depletion of one type of WBC, which is involved in the formation of antibodies called CD4 plus T-helper cells (lymphocytes). HIV causes AIDS.

3. What happens if melanin is absent in the skin, hairs and eyes?

Albinism is an inherited disorder of melanin metabolism, characterized by the absence of melanin in the skin , hairs and eyes. The recessive mutant genes cause this disorder. The clinical symptoms of Albinism are milky white coloured skin and marked photophobia (high sensitivity to light).

4. What happens if the child is given protein deficient food?

Protein deficiency causes Marasmus and Kwashiorkar. In Marasmus, the child loses weight and suffers severe diarrhoea and it will appear as though bones are covered by the skin. In Kwashiorkar the child develops an enlarged belly with swelling in the face and feet.

Find the odd one out

1. Haemophilia, sickle cell anaemia, Down's syndrome, Bubble boy syndrome, hepatitis
   Ans: Hepatitis
   (hepatitis is not a hereditary disease)

2. Marasmus and Kwashiorkar , Nyctalopia
   Ans: Nyctalopia
   (Nyctalopia is caused due to the deficiency of vitamin, while Marasmus and Kwashiorkar are caused due to the deficiency of protein)

3. Epidermophyton, plasmodium, microsporum, trichophyton
   Ans: Plasmodium
   (Plasmodium is a protozoan while others are fungi)

4. Cholera, Typhoid, Pneumonia, hepatitis
   Ans: Hepatitis
   (Hepatitis is a viral disease while others are bacterial diseases)

5. Ringworm, cholera, malaria, rabies
   Ans: Ringworm
   (Cholera, malaria & rabies are transmitted by animals and insects)

5 Mark

1. Define health and explain the dimensions of health

Health is a state of physical, mental and social well being of an individual and not merely absence of a disease

Dimensions of Health

1. Physical dimension

A person who is free from disease, is bright with his skin shining enjoying normal metabolism, has a good lustrous hair and has no black rings around his eyes.

2. Mental dimension

A mentally healthy person who knows his capacities does not overestimate or underestimate himself and can judge his shortcomings and weaknesses.

3. Social dimension

A person adjusting himself in society, does not find fault with others. He maintains interpersonal relationships with his family members and colleagues at workspot and is free from interpersonal conflicts and will not quarrel.

2. Write a note on non communicable diseases

Diseases not caused by organisms are known as non communicable diseases.

1. Organic diseases *or* **Metabolic disorders:**

Eg: Diabetes mellitus, Diabetes insipidus, Coronary heart diseases, Renal failure, Hypertension, Obesity, Alzheimer's disease.

2. Hereditary diseases *or* **Genetical disorders:**

The genetical disorders are caused due to defective or mutated genes.

Eg: Albinism, Haemophilia, Sickle cell anaemia, Thalassemia, Down's syndrome, Bubble boy syndrome.

3. Nutritional Deficiency Diseases:

A diet which contains all essential nutrients in correct proportion, is indispensable for maintaining good health. Deficiency in certain food constituents, causes various kinds of diseases.

Eg: Protein deficiency causes Marasmus and Kwashiorkar.

3. Write a note on communicable diseases *or* **infectious diseases**

A disease caused by a parasitic organism and transmitted from one person to another by the transfer of the parasite is known as infectious disease.

1. Viral diseases:

Viruses are living substances inside the host cell and behave as dead particles outside the host cell. They cause deadly diseases such as. polio, rabies, hepatitis, meningitis, encephalitis (brain fever), etc.

2. Bacterial Diseases:

Bacteria are unicellular prokaryotes and visible under Compound Microscope. Though many bacteria are harmless, some are parasitic and produce diseases. Bacteria can enter the host body through the mouth, nostrils or cuts and bruises on the skin. They multiply rapidly, producing toxins in high concentration to affect health. Some bacterial diseases in man are Tuberculosis, Leprosy, Cholera, Typhoid, Diphtheria, Tetanus, Plague, Pneumonia, Syphilis, Gonorrhoea, etc.

3. Fungi and Fungal Diseases:

Fungi are non green saprophytic or parasitic plants living on dead and decaying organic matter or living organisms. Certain species of fungi are parasitic on man and cause Ringworm attacking the

keratinized layer of skin, destroying it in circular patches Dandruff, Athletes' foot are some other fungal diseases in man.

4. Protozoan Diseases:
Protozoans are unicellular animalcules, some parasitize man and cause diseases such as malaria, amoebic dysentery, sleeping sickness, etc.

5. Diseases caused by parasitic macro-organisms:
Infestations of the body with tapeworm, liver fluke, round worm, filarial worm, etc, cause diseases in man like Taeniasis, Ascariasis, Filariasis, etc,.

4. Write on causative agent, symptoms, transmission and prevention of common cold

Causative agent:
More than hundred strains of viruses are responsible, for causing common cold in man. Children are more susceptible to common cold than adults.

Symptoms:
1. Inflammation of upper respiratory passage – nasal epithelium.
2. Flow of mucous.
3. Headache, slight rise in temperature, etc,.

It lowers the resistance of the body, leading to a number of secondary infections like pneumonia, bronchitis, etc,.

Transmission:
1. It spreads mostly through the droplets discharged from the nose and the mouth of the patient in the process of talking, laughing, sneezing, etc,.
2. It may also spread through close inanimate objects like handkerchief, bedding, clothes, utensils, toilet articles, etc,. (called ***fomites***)

Control and prevention:
There are no effective measures to control common cold. However, a good nourishing food, avoiding contact with patients and wearing suitable clothing are suggested, to keep away from common cold.

5. Write on causative agent, symptoms, transmission and prevention of Influenza

Causative agent:
A(H_1N_1) Virus. It is spherical in shape and highly contagious, causing influenza.

Symptoms:
Sudden onset of fever accompanied by aches and pains in the back and limbs.

Transmission:
It spreads through nasal and mouth droplets of patients and enters into the respiratory tract of normal man**.** It also spreads through fomites.

Prevention:
1. Avoid contact with the patients.
2. Avoid crowding.

6. Write on causative agent, symptoms, transmission and prevention of Tuberculosis

Tuberculosis is an airborne disease affecting the lungs and also parts of our body such as bones, joints, lymph glands, alimentary tract, liver, kidney, etc,.

Causative agent:

Mycobacterium tuberculosis. It is a rod shaped bacterium causes tuberculosis (TB).

Symptoms:

i) The affected parts develop lesions in the form of small nodules called tubercles from which the disease gets its name.

ii) Persistant cough

iii) Loss of body weight

Transmission:

Tuberculosis is transmitted through air. Large number of bacteria leave the patients through the droplets of sputum expelled by the patients while eating, sneezing, talking, laughing and so on by the patients. The droplets may remain suspended in the air for a long time. The dust arising from the sputum may also contain viable germs. The waxy cell wall of the tuberculosis bacillus prevents it from drying up and so it can remain viable outside the body for a long period. The germs suspended in the air may be inhaled by a healthy person.

Prevention:

1. Keeping oneself healthy and avoiding insanitary conditions, overcrowding and poor ventilation.
2. Sunlight and fresh air are important agents, as they act as natural disinfectants readily destroying the germs.
3. Isolation of the patients and frequent sterilization of articles used by them are also important.
4. Incineration (burning) of the droplets, the sputum from the patients to prevent its occurrence in the air.
5. Immunization with BCG vaccine is an effective measure to prevent this disease.
6. The patient should cover his mouth and nose while coughing.

7. Write on causative agent, symptoms, transmission and prevention of Typhoid

Causative agent:

Salmonella typhi. It is a short rod shaped bacterium with numerous flagella causes typhoid.

Symptoms:

1. Continuous fever.
2. Inflammation and ulceration of intestine.
3. Enlargement of spleen and a characteristic red spot eruption on the abdomen.

Transmission:

Transmission of typhoid is through food and water contaminated with the germ, the personal contact with patients and carriers. Flies are also important transmitting agents of this disease.

Prevention and control:

Isolation of the patient, control of flies, hygienic food habits, proper public sanitary measures are effective means of prevention of this disease. Artificial immunization with typhoid vaccine is advised. A recovery from typhoid usually confers a permanent immunity.

8. Write on causative agent, symptoms, transmission and prevention of Malaria

Causative agent:

A tiny protozoan –Plasmodium is responsible for causing malaria. Four different species of Plasmodium namely, P.vivax, P.malariae, P.falciparum and P.ovale occur in India causing malaria. Of these, the malignant and fatal malaria, caused by Plasmodium falciparum is the most serious one.

Transmission:

Through the vector - the female ***Anopheles*** mosquito**.**

Symptoms:

1. Malaria is characterized by chillness and rise in temperature. This is followed by perspiration and lowered body temperature. The person feels normal for some time but the fever recurs at regular intervals.
2. Successive attacks of malaria result in the distension of spleen and destruction of liver tissues.

Prevention and control:

1. Sanitary measures include ground fogging with disinfectants.
2. Closure of stagnant pools of water and covering ditches is suggested.
3. Using mosquito nets and repellants also, will grossly lower the chance for infection.

9. Describe the life cycle of malarial parasite – Plasmodium

The sexual stage of Plasmodium takes place in female Anopheles mosquito whereas the vegetative stage occurs in man. When a female Anopheles mosquito bites an infected person, these parasites enter the mosquito and undergo further development in the mosquito body. The parasites multiply within the body of the mosquito to form sporozoites that are stored in the salivary glands of mosquito. When these mosquitoes bite a person, the sporozoites (the infectious stage) are introduced into his body; they multiply within the liver cells first and enter the RBC of man, resulting in the rupture of RBC. This results in the release of toxic substance called haemozoin which is responsible for the chill and high fever, recurring three to four days.

10. Write on causative agent, symptoms, transmission and prevention of Amoebic dysentry (Amoebiasis)

Causative agent:

Entamoeba histolytica – a protozoan parasite in the large intestine of man causes **Amoebiasis**.

Symptoms:

1. Fever.
2. Constipation and abdominal pain and cramps.
3. Stools with excess mucous and blood clot.

Transmission:

It is a water and food borne disease. House flies act as mechanical carrier and serve to transmit the parasite from the faeces of infected persons to the food – thereby contaminating the food and water.

Prevention and control:

Precaution may be taken by providing germ free clean water; clean food habits. Good sanitary facilities will control the flies.

11. Write on causative agent, symptoms, transmission and prevention of Ringworm

Causative agent:
Three different genera of fungi namely, Epidermophyton, Microsporum and Trichophyton cause ringworm.
Symptoms:
The above fungi live on the dead cells of outer layer of skin in man and cause superficial infections in skin, hair, nail, etc; and form patches and Itching
Transmission:
By direct contact or through fomites such as towels, combs, etc,.
Control and prevention:
Avoid contact with infected person and articles used by them.

12. Write a note on modes of transmission of infectious germs

The transfer of a disease causing germ from an infected person to a normal healthy person through certain agents or direct contact is called transmission of the disease.
The transmission can take place in one of the following ways:
1. Direct Transmission:

- By direct transfer of germs from the patient to normal healthy person through close contact, the diseases like diphtheria, pneumonia, cholera, typhoid, measles, mumps, etc, are transmitted.
- During sneezing, coughing and talking, the droplets from the patients are discharged from the mouth and the nose and enter the air. While a normal person is inhaling such air, laden with the droplets, he gets infected.
- Through the umblical cord, the germs are transferred from the infected mother to the child at the time of childbirth by the direct contact method.

2. Indirect transmission through fomites:
Some germs may remain viable outside the body of the hosts and may be transferred indirectly through close inanimate objects used by the patients like clothing, bedding, handkerchief, toilet articles, utensils, drinking cups and glasses that are freshly soiled with the germs present in the discharges of the patients. Such contaminated objects are called **fomites**.

3. Transmission by animals:
Various animals such as ticks, mites, birds, insects and mammals transmit diseases like cholera, malaria, rabies, etc;

13. Write on different types of Immunity

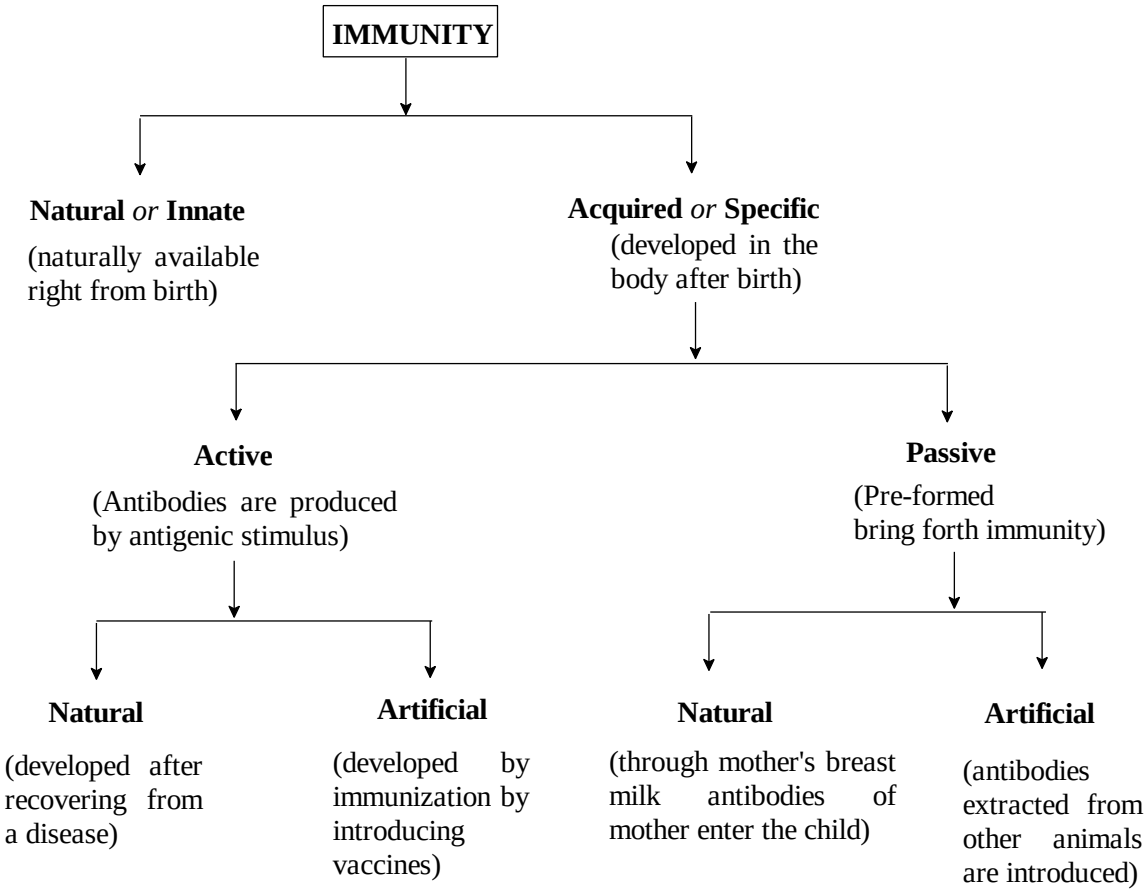
Natural *or* **Innate Immunity:**
The natural or innate immunity that enables an individual to resist the disease, to which the particular species is immuned. E.g. Plant diseases do not affect animals.

Acquired or Specific Immunity:
The resistance against some infectious diseases developed by an individual during lifetime on exposure to the infections is called acquired or specific immunity.
The acquired or specific immunity is of two kinds – active acquired immunity and passive acquired immunity.

Active acquired immunity:
This kind of immunity is developed by our body, during the first infection of any pathogen. The antibodies produced in the blood stays for a long period and kills the similar pathogens whenever they enter the body.
If the antibody production is stimulated naturally, after recovery from a disease, it is called *Natural Active Acquired Immunity.*
If the antibody synthesis is stimulated by application of vaccines or any other man made methods, the immunity gained is called *Artificial Active Acquired Immunity.*
E.g. The polio drops and triple antigen injected into the child in the immunization programme.

Passive Acquired Immunity:
In this type of immunity, a readymade antibody is introduced from outside instead of stimulating the body to produce antibody with antigenic stimulus.
If the readymade antibody is taken from the mother's blood into the foetus, it is called *Natural Passive Acquired Immunity.*
If the readymade antibody is given to an individual artificially, (produced in some other animal and extracted) it is called *Artificial Passive Acquired Immunity*. This immunity is not permanent.

Types of Immunity



14. Write a note on immunization

Administering vaccines to prevent the disease is called immunization. This process of Immunisation develops Artificial Active Acquired Immunity. Immunisation through inoculation is a mass means of protecting a greater number of people against the spread of diseases.

BCG Tuberculosis Vaccine
DPT Diphtheria, Pertussis, Tetanus Vaccine (Triple antigen)
MMR Mumps, Measles, Rubella
DT Diphtheria, Tetanus (Dual antigen)
TT Tetanus toxoid

15. Write a note on "Treatment and prevention of the diseases"

Treatment means medical management of the symptom of the disease.
Medical management includes:
i) Treatment involving medicine.
ii) Treatment not involving medicine.

Treatment involving medicine:
Medicines are generally used to treat infectious diseases. These medicines either reduce the effect of the disease or kill the cause of the disease. The antibiotics are used as blocks to the pathways of the disease without affecting ourselves.

Treatment not involving medicine:
As a person is recovering from the effect of fracture or neurotic problem, yoga and physiotherapy do a great deal of help to do normal activities. People addicted to alcohol and drugs are given counseling to overcome the habit.

Prevention:
Getting rid of a disease causing germs, is a means of prevention of the disease.
Prevention can be achieved in two ways:
i. General – preventing the infectious germs by keeping away from the exposure to the germs. Hygienic life style, avoiding overcrowding, fresh air, safe drinking water and good sanitary measures are all ways to prevent a disease causing germ, coming into contact with us.
ii. Specific – This relates to a peculiar property of the immune system that usually fights the microbial infections. e.g. Immunization programme.

16. Write a note on HIV and Prevention

Acquired Immune Deficiency Syndrome (AIDS) is a dreadful disease transmitted through sexual contact or through blood and blood products.
Robert Gallo and Luc Montagnier isolated the virus, Human Immuno Deficiency Virus (HIV) which causes AIDS.
HIV is a retro virus with glycoprotein envelope and the genetic material – RNA. HIV causes profound Immuno suppression in humans. It is due to the depletion of one type of WBC, which is involved in the formation of antibodies called CD4 plus T-helper cells (lymphocytes).

Symptoms:
Significant weight loss, chronic diarrhoea, prolonged fever, opportunistic infections such as

tuberculosis, candidiasis and recurrent herpes zoster (viral) infection.

Test for Virus:

1. Enzyme Linked Immuno Sorbent Assay (ELISA)
2. Western Blot – a confirmatory test.

Prevention:

1. Protected sexual behaviour.
2. Safe sex practices.
3. Screening the blood for HIV before blood transfusion.
4. Usage of disposable syringes in the hospitals.
5. Not sharing the razors / blades in the saloon.
6. Avoid tattooing using common needle.

17. Tabulate the vitamin deficiency diseases and their symptoms

Vitamin	Deficiency diseases	Symptoms
Vitamin A	Nyctalopia	Night blindness
Vitamin B_1	Beri-Beri	Nervous disorder
Vitamin B_5	Pellagra	Dementia, dermatitis, diarrhoea
Vitamin B_{12}	Pernicious anaemia	Destruction of RBC
Vitamin C	Scurvy	Bleeding gums and loosening of teeth
Vitamin D	Rickets	Defective calcification of bones
Vitamin E	Sterility	Inability to reproduce
Vitamin K	Haemorrhage	Profuse loss of blood

18. Tabulate the immunization schedule followed in India

S.No	Age	Vaccine	Dosage
1	New born	BCG	1^{st} dose
2	15 days	Oral polio	1^{st} dose
3	6^{th} week	DPT & polio	1^{st} dose
4	10^{th} week	DPT & polio	2^{nd} dose
5	14^{th} week	DPT & polio	3^{rd} dose
6	9-12 months	Measles	1^{st} dose
7	18-24 months	DPT & polio	1^{st} booster
8	15 months-2 years	MMR vaccine	1^{st} dose
9	2-3 years	Typhoid vaccine	2 doses at 1 month gap
10	4-6 years	DT & Polio	2^{nd} booster
11	10^{th} year	TT & Typhoid	1^{st} dose
12	16^{th} year	TT & Typhoid	2^{nd} booster

19. Breast feed is the best food. Justify

Antibodies or Immunoglobins are found in breast milk. Through breast milk antibodies are passed on to the nursing baby. Bottle fed infants do not have the advantage of fighting the ingested pathogens on their own until the antibodies are produced in them. An infant should be breast fed for a minimum of six months. Medical establishment knows that infants who are breastfed contract fewer infections than bottle fed infants. Breast milk protects the child, against bacteria like Escherichia coli, Salmonella, Shigella, Streptococci, Staphylococci, Pneumococci and viruses like Polioviruses and Rotaviruses.

3. STRUCTURE AND FUNCTIONS OF HUMAN BODY-ORGAN SYSTEMS

Textbook questions

Part-A

1. Unipolar neurons are found in ----------
(Brain, Spinal cord, Embryonic nervous tissue, Adult nervous tissue)
Ans: Embryonic nervous tissue

2. The sensory organs contain ----------
(Unipolar neuron, Bipolar neuron, Multipolar neuron, Medullated neuron)
Ans: Bipolar neuron

Embryonic nervous tissue contains	**Unipolar neurons**
Sensory hair cells of the sense organs like rods and cones of retina contains	**Bipolar neurons**
Cerebral cortex contains	**Multipolar neurons**

3. The part of brain which controls emotional reactions in our body is ----------
(Cerebellum, Cerebrum, Thalamus, Hypothalamus)
Ans: Hypothalamus

Cerebrum	Seat of consciousness, initiates voluntary activities
Thalamus	Conducting centre for sensory and motor signaling.
Hypothalamus	Controls body temperature. Controls emotional reactions. Regulates sexual behavior.
Corpora quadrigemina	Controls and regulates the various visual reflexes and optical orientation.
Cerebellum	Regulates the group movements of voluntary muscles as in walking or running.
Pons	Relays the information from cerebrum to cerebellum, contains sleep centre and respiratory centre
Medulla oblongata	Coordination pathway for both ascending and descending nerve tracts. Centre of reflexes: Regulation of heartbeat, blood vessel contraction, breathing
Spinal cord	Conducts impulses to and from the brain and acts as reflex centre

4. One of the following is the part of the brain stem. Pick out.
(Fore brain and mid brain, Mid brain and hind brain, Fore brain and hind brain, Fore brain and spinal cord)
Ans: Mid brain and hind brain

5. Spinal nerves are ----------
(Sensory nerves, Motor nerves, Mixed nerves, Innervating the brain)
Ans: Mixed nerves

Optic nerves from eyes	Sensory nerves
Vagus nerve innervating the heart	Motor nerves
Facial nerve & all spinal nerves	Mixed nerve

6. An endocrine gland found in neck is ----------
(adrenal gland, pituitary gland, thyroid gland, pancreas)
Ans: thyroid gland

7. An endocrine gland which is both exocrine and endocrine is----------
(pancreas, pituitary, thyroid, adrenal)
Ans: pancreas

8. Normal blood glucose level in 100 ml of blood is ----------
Ans: 80 – 120 mg

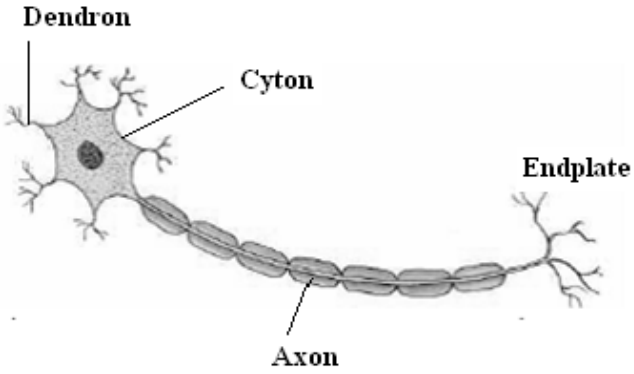
9. The "T" lymphocytes are differentiated to resist infection in ----------
(parathyroid gland, lymph gland, thymus gland, adrenal gland).
Ans: thymus gland

10. In Meiosis-I, the pairing of homologous chromosomes take place during ---------- stage.
(leptotene, zygotene, pachytene, diplotene)
Ans: zygotene

Part-B

11. Copy the diagram and label any two parts in the group given
(cyton, axon, dendron, endplate)

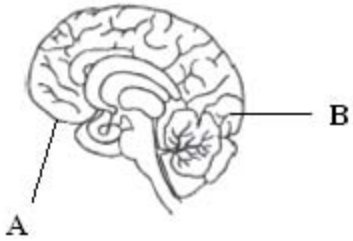
Ans:



12. This diagram is human brain, and the functions of different parts are given below.

A. Seat of smell B. Seat of vision
Mark A and B in the parts of the brain, corresponding with the function.

Ans:



13. On the basis of the function performed, Pick out the right statements.
a. Pitutiary gland secretes hormones and enzymes
b.Thyroid gland secretes thyroxine and insulin.
c. Testes produces sperms and the hormone androgen.
d. Pancreas produces enzymes and harmones.
Ans: c. Testes produces sperms and the hormone androgen.

14. Based on relationships fill in the blanks.
Thyroxine: personality hormone;
adrenaline: ----------
Ans: Emergency hormone

15. Correct the statements if they are wrong.
a .alpha cells produce insulin and beta cells produce glucagon
b. cortisone suppresses the immune response
c. thymus gland is a lymphoid mass.
d. Ovary produces eggs and Androgen..

Ans:
a .alpha cells produce glucagon and beta cells produce insulin
d. Ovary produces eggs and Oestrogen.
(Statements b & c are correct)

16. Reduction division is the process by which gametes are produced. The cells in which reduction division take place are
(germinal epithelial cells, the sensory epithelial cells, cuboidal epithelial cells, columnar epithelial cells)
Ans: germinal epithelial cells

17. In Amoeba, the cell division takes place ----------
(involving changes in the chromatin reticulum, without involving changes in the chromatin reticulum, leading to reduction in the number of chromosomes, without dividing the nucleus)

Ans: without involving changes in the chromatin reticulum

Unicellular animalcules like amoeba	Amitosis	No change in the chromatin reticulum
Body cells of all animals and plants	Mitosis	Change in the structure of chromosomes, but no change in the chromosomal number.
The germinal epithelial cells of animals	Meiosis	Change in the structure and number of chromosomes.

18. Pick out the item which has sequential arrangements
a. zygotene → Leptotene → Pachytene → Diplotene → Diakinesis
b. Diakinesis → zygotene → Leptotene → Pachytene → Diplotene
c. Leptotene → zygotene → Pachytene → Diplotene → Diakinesis
Ans: c. Leptotene → zygotene → Pachytene → Diplotene → Diakinesis

19. The important event of meiosis is the crossing over. It occurs during
(Leptotene, Pachytene, Diplotene, Zygotene)
Ans: Pachytene

Additional questions

2 Mark

Assertion and Reason

1. **Assertion (A):** Our body works efficiently by synchronizing the functions.
Reason (R): In our body the neural or nervous system and the endocrine system do the function of coordinating and integrating all the activities of the organs.
a) **A** is right **R** is wrong
b) **A** is wrong **R** is right
c) **A** is right and **R** explains **A**
d) Both **A** and **R** are wrong

Ans: c) **A** is right and **R** explains **A**

2. **Assertion (A):** Spinal nerves are mixed nerves.
Reason (R): They do both sensory and motor functions.
a) **A** is right **R** is wrong
b) **A** is wrong **R** is right
c) **A** is right and **R** explains **A**
d) Both **A** and **R** are wrong

Ans: c) **A** is right and **R** explains **A**

3. **Assertion A):** Non-Myelinated or non-Medullated neuron appears greyish in colour.
Reason (R): This neuron is not enclosed by myelin sheath.
a) **A** is correct, **R** is wrong
b) **A** is wrong, **R** is correct
c) Both **A** & **R** are correct
d) Both **A** & **R** are wrong

Ans: c) Both **A** & **R** are correct

4. **Assertion (A):** Production of excess of dilute urine is diabetes insipidus
Reason (R): This is due to less production of ADH
a) **A** is correct, **R** is wrong
b) **A** is wrong, **R** is correct
c) Both **A** & **R** are correct
d) Both **A** & **R** are wrong

Ans: c) Both **A** & **R** are correct

5. **Assertion (A) :** Meiosis-II is called Meiotic Mitosis.
Reason (R) : Meiosis-II is similar to Mitosis and so it is called Meiotic Mitosis.
a) **A** is correct, **R** is wrong
b) **A** is wrong, **R** is correct
c) Both **A** & **R** are correct
d) Both **A** & **R** are wrong

Ans: c) Both **A** & **R** are correct

6. **Assertion (A) :** Pituitary gland is called as the conductor of endocrine orchestra
Reason (R) : Some of the endocrine glands are regulated by the pituitary gland
a) **A** is correct, **R** is wrong
b) **A** is wrong, **R** is correct
c) Both **A** & **R** are correct
d) Both **A** & **R** are wrong

Ans: c) Both **A** & **R** are correct

7. **Assertion (A) :** Adrenaline and noradrenaline are called emergency hormones or hormones of flight and fight
Reason (R) : They rapidly mobilize the body to face a stress or emergency situation.
a) **A** is correct, **R** is wrong
b) **A** is wrong, **R** is correct
c) Both **A** & **R** are correct
d) Both **A** & **R** are wrong

Ans: c) Both **A** & **R** are correct

8. **Assertion (A) :** Thyroxine is also called as personality hormone.
Reason (R) : It affects indirectly the growth of the body
a) **A** is correct, **R** is wrong
b) **A** is wrong, **R** is correct
c) Both **A** & **R** are correct
d) Both **A** & **R** are wrong

Ans: c) Both **A** & **R** are correct

Fill up blanks from the given pair of answers

1. Cell body of neuron has ---------- structure (tetrahedral / polyhedral)
   Ans: polyhedral

2. Synaptic knob is filled with chemicals called ---------- (Hormones / neuro transmitters)
   Ans: neuro transmitters

3. Axon is covered by a membrane called ---------- (nodes of Ranvier / Neurilemma)
   Ans: Neurilemma

4. White fatty fibre which covers the neurilemma is ---------- (Myelin sheath / Schwann cells)
   Ans: Myelin sheath

5. The gaps left by the myelin sheath on the axon are called ------ (Nodes of Ranvier / Nissl granule)
   Ans: Nodes of Ranvier

6. ---------- cells are found over the myelin sheath. (Schwann cells / hair cells)
   Ans: Schwann cells

7. White colour of white matter of cerebrum is due to the presence of --------- (myelin sheath / pons)
   Ans: myelin sheath

8. The major part of the brain (nearly two third of the brain) is ---------- (cerebrum / cerebellum)
   Ans: cerebrum

9. ---------- pairs of cranial nerves arise from the brain. (12 / 21)
   Ans: 12

10. ---------- pairs of spinal nerves arise from the spinal cord. (13 / 31)
    Ans: 31

11. All spinal nerves are ---------- (mixed nerves / motor nerves)
    Ans: mixed nerves

12. ---------- is located between thalamus and hind brain (mid brain / fore brain)
    Ans: mid brain

13. Posterior most part of the brain is ---------- (pons / medulla oblongata)
    Ans: medulla oblongata

14. ---------- transmit electric impulses towards the cyton. (Dendrites / Axon)
    Ans: Dendrites

15. The endocrine system provides chemical integration through ---------- (hormones / enzymes)
    Ans: hormones

16. ---------- controls growth and reproduction (Nervous system / Endocrine system)
    Ans: Endocrine system

17. ---------- divides the cerebrum longitudinally into two halves as right and left cerebral hemispheres. (median cleft / corpus callosum)
Ans: median cleft

18. Right and left cerebral hemispheres are united at the base by a sheet of nervous tissue called ------ (median cleft / corpus callosum)
Ans: corpus callosum

Ventricle is filled with	Cerebro spinal liquid (Nutritive liquid)
Pons	Connects the lobes of cerebellum
Corpus callosum	Unites cerebral hemispheres
White fatty fibre	Myelin sheath
Synaptic knob is filled with	Neuro transmitters
Axon is covered by	Neurilemma membrane
Gaps left by myelin sheath on the axon are called	Nodes of Ranvier
Point of contact between the neighbouring nerve cells is called	Synapse
Canal passes through the mid brain	Cerebral aqueduct
Canal runs through the center of the spinal cord	Central canal
Median cleft	Divides the cerebrum into two halves
Corpus callosum	Unites right and left cerebral hemispheres

19. Personality hormone is ---------- (Adrenaline / Thyroxine)
Ans: Thyroxine

Personality hormone	Thyroxine
Emergency hormones *or* Hormones of flight and fight	Adrenaline and noradrenaline
Dual role playing endocrine gland	Pancreas
Conductor of endocrine orchestra	Pituitary gland

20. ---------- stimulates the growth of mammary glands in female and milk production after child birth.(Lactogenic hormone / Relaxin)
Ans: Lactogenic hormone

21. ---------- speeds up the child birth process, by stimulating the contraction and relaxation of the uterus in the female.(Progesterone / Oxytocin)
Ans: Oxytocin

22. Less production of Somatotropic hormone in children leads to ---------- (Dwarfism / Gigantism)
Ans: Dwarfism

Less production of Somatotropic hormone or Growth hormone in children	Dwarfism
Excess production of Somatotropic hormone or Growth hormone in children	Gigantism
Excess production of Somatotropic hormone or Growth hormone in adolescents	Acromegaly
Less production of Antidiuretic hormone (ADH)	Diabetes insipidus
Less secretion of thyroxine (deficiency of iodine)	Simple goiter
Less secretion of thyroxine	Myxoedema, Cretinism
excess production of thyroxine	Exophthalmic goiter or Grave's disease.
Less production of insulin	Diabetes mellitus

23. ---------- raises up the blood pressure & responsible for producing concentrated urine in small quantity.(Vasopressin / Melatonin)
Ans: Vasopressin

24. ---------- stimulates a rise in the body temperature & regulates iodine and sugar level in the blood. (Thyroxine / Thymosin)
Ans: Thyroxine

25. ----------favours conversion of glucose into glycogen & maintains normal blood glucose level (Insulin / Glucagon)
Ans: Insulin

26. ---------- is secreted when glucose level in the blood is low & influences conversion of glycogen into glucose, thus raising the blood glucose level. (Insulin / Glucagon)
Ans: / Glucagon

27. ---------- maintains electrolyte balance, body fluid volume, osmotic pressure and blood pressure. (Aldosterone / Androgen)
Ans: Aldosterone

28. ----------produces an anti-inflammatory reaction and suppresses the immune response. (Aldosterone / Cortisone)
Ans: Cortisone

29. ---------- maintains pregnancy and regulates menstrual cycle. (Progesterone / Relaxin)
Ans: Progesterone

30. ---------- relaxes the muscles of the pelvic region at the time of child birth. (Progesterone / Relaxin)
Ans: Relaxin

31. Parathormone and Calcitonin maintain ---------- metabolism (carbohydrate / mineral)
Ans: mineral

32. ---------- stimulates the differentiation of "T" lymphocytes to resist infection.
(Thymosin / Thyroxin)
Ans: Thymosin

33. ---------- hormone is involved in concentration of pigments in some specific areas like areola and scrotal sacs (Melatonin / Thyroxin)
Ans: Melatonin

34. The chromosomes condense and appear like threads in ---------- stage (Leptotene / Diplotene)
Ans: Leptotene

35. In ---------- stage of cell division the chromatin reticulum unwebs and individual chromosomes are liberated from one another. (Prophase – I / Metaphase – I)
Ans: Prophase – I

36. The homologous chromosomes come closer and start pairing in ---------- stage of cell division (Zygotene / Pachytene)
Ans: Zygotene

37. In ---------- stage of cell division the paired chromosomes become shorter and thicker and crossing over takes place. (Zygotene / Pachytene)
Ans: Pachytene

38. In ---------- stage of cell division a reduction in the number of chromosomes occurs (Anaphase – I / Telophase – I)
Ans: Anaphase – I

39. The bivalent chromosomes gets shortened in ---------- stage of cell division (Prophase – II / Metaphase– II)
Ans: Prophase – II

40. The paired chromosomes are called ---------- (Bivalents / Univalent)
Ans: Bivalents

Find the odd one out

1. Insulin, Cortisone, Glucagon, Adrenaline and noradrenaline
Ans: Insulin
(Insulin converts glucose into glycogen while other hormonrs convert glycogen into glucose)

2. Testosterones , Oestrogen, Progesterone, Relaxin
Ans: Testosterones (androgen),

3. Pons, Cerebellum, Medulla oblongata, Cerebrum
Ans: Cerebrum
(Cerebrum is a part of fore brain while others are parts of hind brain)

4. Pituitary gland, Pineal gland, Thymus gland
Ans: Thymus gland
(Thymus gland is present in thorax while other two glands are present in head)

5. Simple goitre, Myxoedema, Cretinism, Grave's disease
Ans: Grave's disease
(Grave's disease is due to excess secretion of thyroxine while other diseases are due to less secretion of thyroxine)

Correct the mistakes in the given statements

1. Chemically hormones are carbohydrates or carboxylic acids or fats.
Ans: Chemically hormones are **proteins or amino acids or steroids.**

2. Pituitary is a tiny gland of the size of a pea attached to the thalamus of the brain.
Ans: Pituitary is a tiny gland of the size of a pea attached to the **hypothalamus** of the brain.

3. Pineal gland is called as the conductor of endocrine orchestra.
Ans: Pituitary gland is called as the conductor of endocrine orchestra.

4. Vasopressin is an iodinated protein, composed of the amino acid, tyrosine and iodine.
Ans: Thyroxine is an iodinated protein, composed of the amino acid, tyrosine and iodine.

5. Thymus is a dual role playing endocrine gland
Ans: Pancreas is a dual role playing endocrine gland

6. Alpha cells islets of Langerhans produce insulin and amylin.and Beta cells produce glucagon
Ans: Alpha cells islets of Langerhans produce **glucagon** and Beta cells produce **insulin** and **amylin.**

Answer the following

1. What are the three major parts of a nerve cell?
i) cell body ii) dendrites and iii) axon

2. What is cyton?
Cell body of neuron is called as cyton

3. What are dendrons? Write their function.
Dendrites or Dendrons are shorter fibres which branch repeatedly and project out of the cell body. Dendrites transmit electrical impulses towards the cyton.

4. What is axon?
One of the fibres arising from the cell body is very long with a branched distal end and it is called as Axon.

5. What are white neurons?
When the axon is enclosed by the white fatty myelin cover it is called Myelinated or Medullated or White neurons. This forms the cerebral medulla of our brain.

6. What are grey neurons?
This neuron is not enclosed by myelin sheath; so it appears greyish in colour. The axon is covered by only neurilemma and Schwann cells. This type of neuron is found in the grey matter of cerebrum. This is also known as non-Myelinated or non-Medullated neuron.

7. What are unipolar neurons?

An unipolar neuron has a nerve cell body with a single process or fibre, which will act both as axon and Dendron.

The embryonic nervous tissue contains unipolar neurons.

8. What are bipolar neurons?

Bipolar neuron has a cell body and two process at the ends, one acting as axon and the other acting as Dendron.

The sensory hair cells of the sense organs like rods and cones of retina are made up of bipolar neurons.

9. What are multipolar neurons?

Multipolar neuron has a cell body with many dendrites and an axon.

The cerebral cortex contains the multipolar neurons.

10. How is the human nervous system divided?

The human nervous system is divided into

a) The Central Nervous System (CNS) : *brain and spinal cord*

b) The Peripheral Nervous System (PNS) : *The nerves arising from the brain and spinal cord*

c) The Autonomic Nervous System (ANS) : *sympathetic nerves and parasympathetic nerves.*

11. What is meant by synapse?

The dendrites and the synaptic knobs of the axons of neighbouring neurons are in physical contact with one another without fusing. This point of contact between the neighbouring nerve cells is called synapse.

12. What is meant by nerve impulse?

The conduction of stimuli by the nerve cells is called nerve impulse.

13. What are meninges?

The central nervous system is covered by three protective coverings or envelops collectively called meninges.

14. Name the three protective coverings of central nervous system

1. Duramater (outermost cover)
2. Arachnoid membrane (middle cover)
3. Piamater (innermost cover)

15. Write the functions of cerebrum

1. Cerebrum is the seat of consciousness, intelligence, memory, imagination and reasoning.
2. It receives impulses from different parts of the body and initiates voluntary activities.
3. There is a centre for hearing, another for seeing, another for tasting, another for smelling, and another for speaking and so on.

16. Write the functions of hypothalamus

It controls body temperature, urge to eat and drink, regulation of sexual behaviour, express emotional reactions like excitement, anger, fear, pleasure and motivation.

17. What is meant by corpora quadrigemina? Write its function

The dorsal portion of the mid brain consists of four hemispherical bodies called **corpora quadrigemina** which controls and regulates the various visual reflexes and optical orientation.

18. Write the functions of cerebellum

Cerebellum regulates and coordinates the group movements of voluntary muscles as in walking or running.

19. What is pons? write its functions

It is the bridge of nerve fibres that connects the lobes of cerebellum. It relays the information from the cerebrum to cerebellum. It also contains sleep centre and respiratory centre.

20. Write the functions of medulla oblongata

Medulla is the posterior most part of the brain where it merges with the spinal cord. It acts as a coordination pathway for both ascending and descending nerve tracts. Medulla is the centre for several reflexes involved in the regulation of heartbeat, blood vessel contraction, breathing, etc,

21. What are the two enlargements of spinal cord?

The spinal cord has two enlargements – one in the neck region of the body called cervical plexus and another in the lumbar region of the vertebral column called lumbar plexus.

22. Write the functions of spinal cord

The spinal cord conducts impulses to and from the brain and acts as a reflex centre.

23. What are sensory nerves?

The cranial nerves which take impulse from the sense organ to the brain are called sensory nerves.
e.g., optic nerves from the eyes.

24. What are motor nerves?

The cranial nerves which take impulse from the brain to the effector organ are called motor nerves.
e.g. vagus nerve innervating the heart.

25. What are mixed nerves?

The cranial nerves which do both sensory and motor functions are called mixed nerves.
e.g. facial nerve

26. What is the function of autonomic nervous system (ANS)?

It controls the functions of the vital organs of the body through its two antagonistic divisions namely, sympathetic nerves and parasympathetic nerves.

27. What are endocrine glands?

Endocrine glands are ductless glands (without ducts), secreting the chemical substances called hormones. The hormones are carried by the blood from the site of production to the site of action.

28. Name the endocrine glands found in head

1. Pituitary gland 2. Pineal gland

Head	a) pituitary gland b) pineal gland
Neck	a) thyroid gland b) parathyroid gland
Thorax	Thymus gland
Abdomen	a) pancreas – Islets of Langerhans b) adrenal glands –adrenal cortex and adrenal medulla c) gonads – testes in man and ovaries in woman

29. Pituitary gland is called as the conductor of endocrine orchestra. Why?

Since some of the endocrine glands are regulated by the pituitary gland, it is called as the conductor of endocrine orchestra.

30. Write the functions and malfunctions of STH or GH

STH or GTH : Somatotropic hormone or Growth hormone
Function: It brings forth growth in general
Malfunctions:
- Less production in children – **dwarfism** with retarded growth
- Excess production in children – **gigantism** with excess growth
- Excess production in adolescents – **acromegaly** with large limbs and lower jaw

31. Write the functions of FSH

FSH : Follicle stimulating hormone
Functions:
It stimulates the maturation of graafian follicles (in the ovary) in the female, to produce the eggs and sperm formation in the males.

32. Write the functions of LTH

LTH : Lactogenic hormone
Functions:
It stimulates the growth of mammary glands in female and milk production after child birth.

33. Write the functions of oxytocin

It speeds up the child birth process, by stimulating the contraction and relaxation of the uterus in the female.

34. Write the functions and malfunctions of ADH

Vasopressin or Antidiuretic hormone (ADH)
Functions:
It helps in the reabsorption of water, producing concentrated urine in small quantity.
It constricts the blood vessels and raises up the blood pressure
Malfunction:
Less production of ADH results in diabetes insipidus, leading to production of excess of dilute urine.

35. Write the male and female sex hormones

Male sex hormone : Testosterone
Female sex hormones : Oestrogen and progesterone.

36. Write the functions of thyroxine

- It increases the rate of metabolism.
- It stimulates a rise in the body temperature.
- It promotes growth and differentiation of tissues.
- It regulates iodine and sugar level in the blood.
- It controls working of kidneys and urine output.

37. Thyroxine is also called as personality hormone. Why?

Since it affects indirectly the growth of the body, thyroxine is also called as personality hormone.

38. Write on 'Hypothyroidism'

Hypothyroidism–Less secretion of thyroxine causes many abnormalities. like simple goitre, myxoedema and cretinism.

a) Simple goiter – It is due to the deficiency of iodine in our diet. Thyroid gland bulges as a swelling in the neck and it is called as goiter.

b) Myxoedema – It is caused in the adults, the symptoms are, low metabolic rate, loss of mental and physical vigour, increase in weight, thickening of skin, lowered heartbeat, mental dullness, etc.

c) Cretinism – This is produced in children and the symptoms are stunted growth, retarded mental development, defective teeth, protrusion of tongue and loose skin.

39. Write on 'Hyperthyroidism'

Hyperthyroidism – The excess production of thyroxine causes exophthalmic goiter or **Grave's disease.** The symptoms are high metabolic rate, high blood pressure, high irritability, profuse sweating, loss of weight, fatigueness and protrusion of eyeballs.

40. What is islets of Langerhans? Name the hormones produced by it

The endocrine portion of pancreas is called islets of Langerhans. It consists of two type of cells namely, alpha cells and beta cells. Alpha cells produce a hormone called glucagon and Beta cells produce insulin and amylin.

41. Write the functions of insulin

- It promotes the uptake of glucose by the cells for tissue oxidation.
- It favours conversion of glucose, into glycogen and its storage in the liver and the muscles.
- It prevents the formation of glucose from protein and fat.
- It maintains normal blood glucose level at 80 – 120 mg / 100 ml of blood.

42. What is diabetes mellitus?

Less production of insulin causes diabetes mellitus, in which the excess unused glucose is excreted in the urine.

43. Write the functions of glucagon

- It is secreted when glucose level in the blood is low.
- It influences conversion of glycogen into glucose, thus raising the blood glucose level.

44. Write the functions of aldosterone (Mineralocorticoid)

•It maintains mineral metabolism, by favouring reabsorption of sodium and water and excretion of potassium and phosphate ions.

•It maintains electrolyte balance, body fluid volume, osmotic pressure and blood pressure.

45. Write the functions of cortisone (glucocorticoid)

It stimulates the breakdown of glycogen into glucose raising the blood glucose, level.

It also produces an anti-inflammatory reaction and suppresses the immune response.

46. What are emergency hormones?

Adrenal medulla secretes two hormones, namely adrenaline (epinephrine) and noradrenaline (norepinephrine). They are together called emergency hormones or hormones of flight and fight as they rapidly mobilize the body to face a stress or emergency situation.

47. Write the functions of adrenaline and noradrenaline

- They increase the heartbeat.
- They increase alertness.
- They increase the respiratory rate.
- They promote the conversion of glycogen into glucose.
- They cause dilation of pupil.
- They cause profuse sweating.
- They make the hair stand erect. (gooseflesh)
- In short noradrenaline and adrenaline mobilize the body, to face the emergency by fighting with it or running away from it.

48. Write the functions of testosterones (androgen).

Testosterones (androgen) **is** male sex hormone. It stimulates the growth of reproductive organs and the production of male sex cell, the sperms. Testosterone determines the secondary sexual characters in male, such as growth of facial hairs, hoarse voice, broadening of shoulder, etc,

49. Write the functions of reproductive hormones in female.

1. Oestrogen is responsible for growth of female reproductive organs and the appearance of secondary sexual characters in female, such as growth of pubic hairs, soft voice, feminine body, etc.
2. Progesterone maintains pregnancy and regulates menstrual cycle.
3. Relaxin relaxes the muscles of the pelvic region at the time of child birth.

50. Name the hormones secreted by parathyroid gland. Write their functions

These are found within thyroid and produce the hormones mainly parathormone and calcitonin which maintain the mineral metabolism.

51. Name the hormone secreted by thymus gland. Write their functions

Thymus gland is a lymphoid mass, present above the heart. It secretes thymosin which stimulates the differentiation of "T"lymphocytes to resist infection.

52. Name the hormone secreted by pineal gland. Write their functions

Pineal gland lies under the corpus callosum in the brain. It produces melatonin, causing concentration of pigments in some specific areas like areola, scrotal sacs, etc,

53. Meiosis-I is called Reduction division. Why?

In Meiosis-I, as the chromosomal number is reduced to half, it is called Reduction division.

54. What is meant by synapsis?

The pairing is chromosomes is called synapsis,

55. What is chiasmata?

The point of contact between the homologous pair of chromosomes is called Chiasmata.

56. What is crossing over?

This exchange of segments of chromatids between homologous chromosomes, is called crossing over.

57. What is Cytokinesis?

The cytoplasmic division is called Cytokinesis.

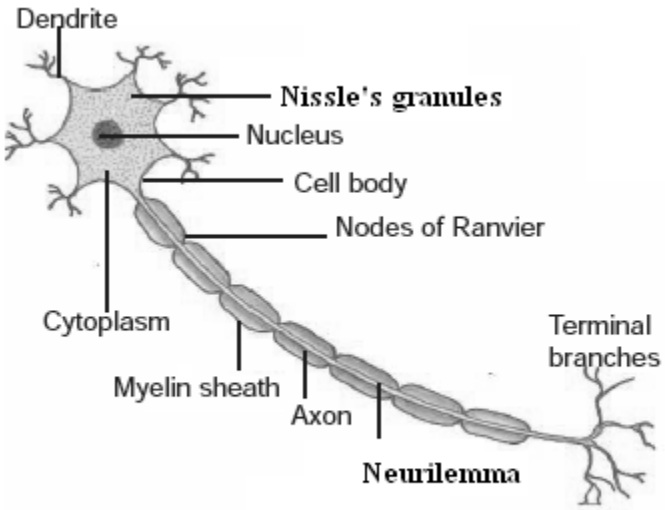
The cytoplasmic division takes place at right angles to the position of the nuclei ,resulting in the formation of four gametes.

58. Write the significance of Meiosis

1. Haploid sex cells are produced, in order to maintain the constancy in the number of chromosomes of a species.
2. Crossing over results in variation of genetic traits in the offspring.
3. Variations form the raw material for evolution.

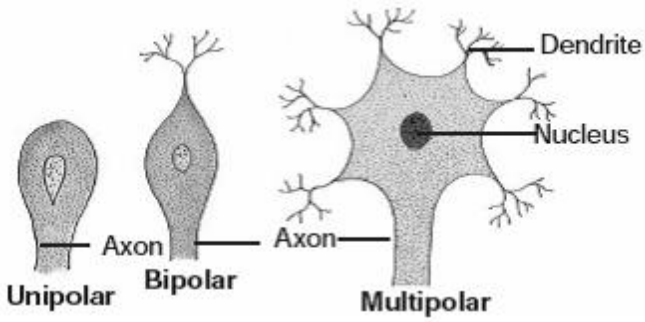
Diagram based questions

1. Draw the structure of neuron and label the parts

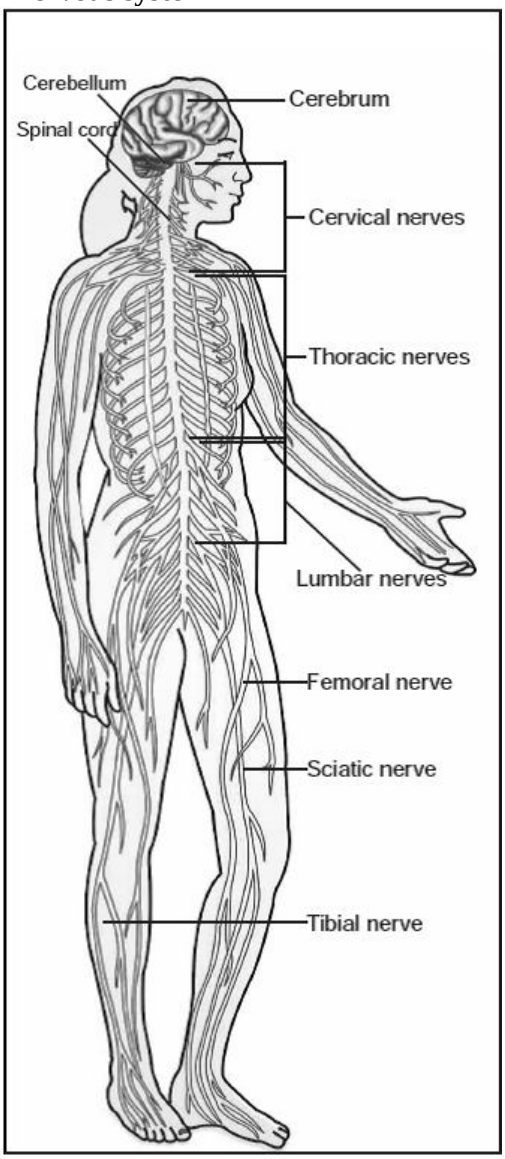


Neuron

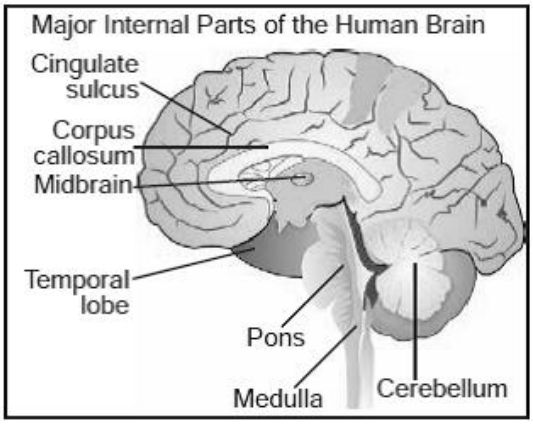
2. Draw the structure of different types of neuron



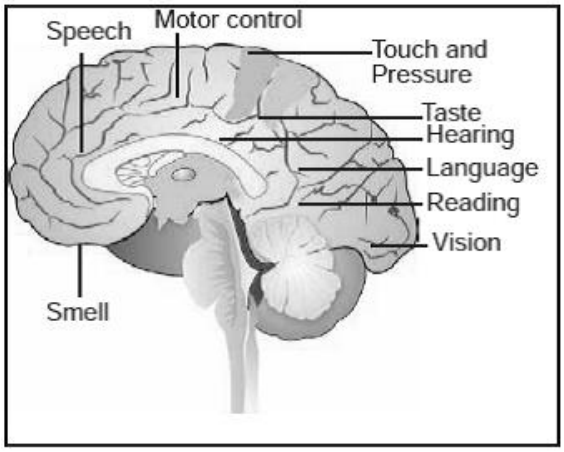
3. Draw and label human nervous system



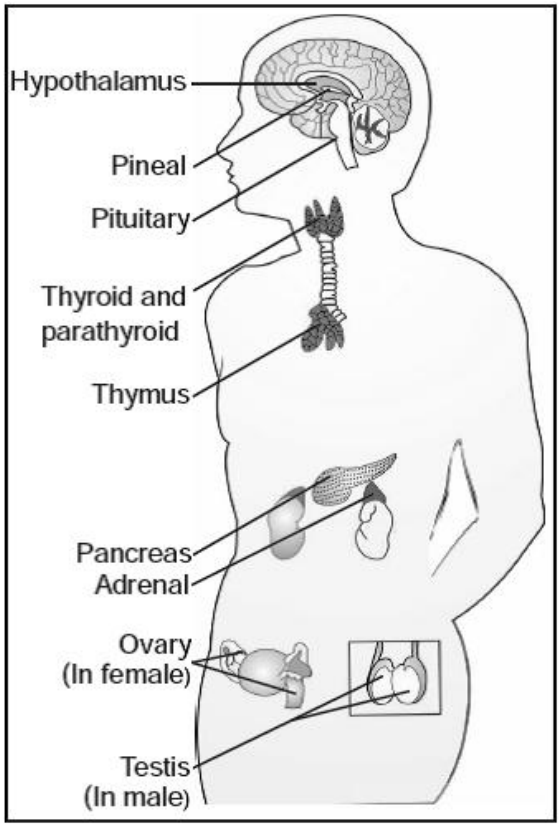
4. Draw the diagram of human brain and label the major internal parts



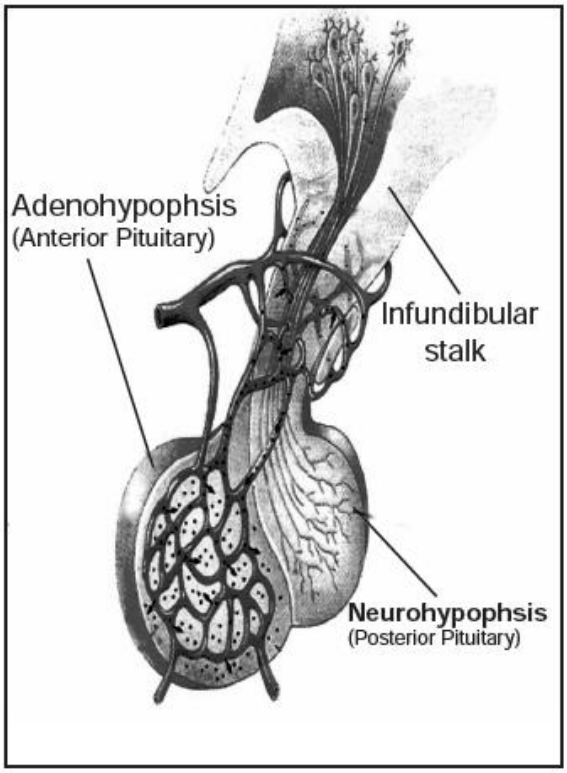
5. Draw the diagram of human brain and label the functional areas



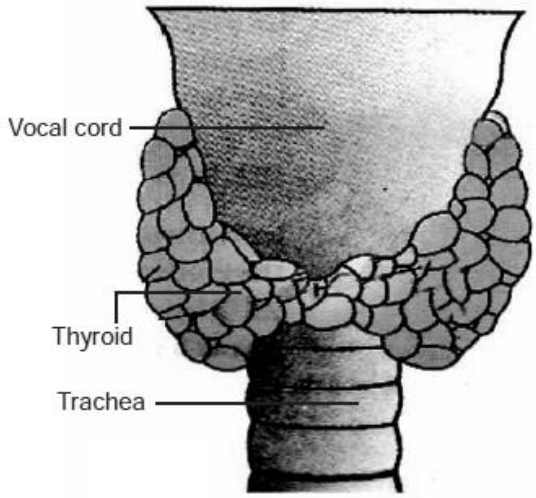
6. Draw and label the Endocrine system in man



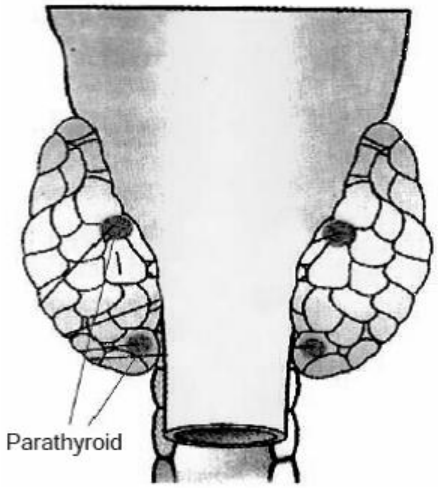
7. Give the diagrammatic internal view of pituitary gland



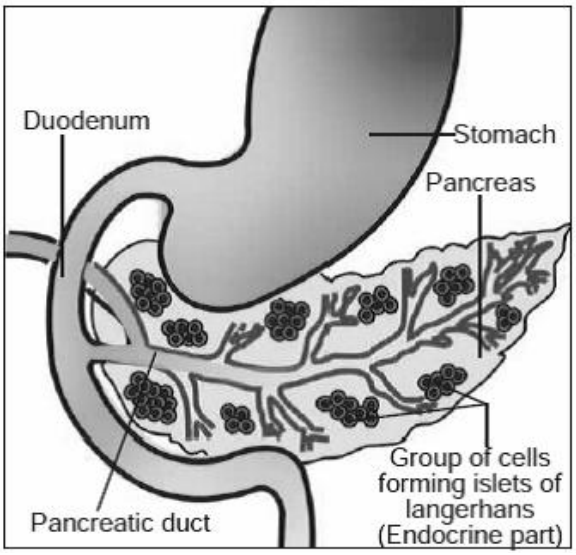
8. Draw the dorsal view of thyroid gland



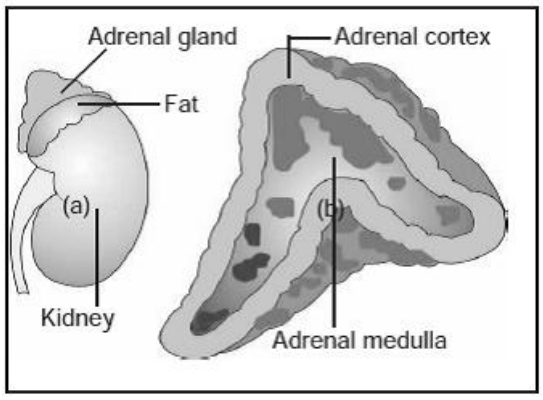
9. Draw the ventral view of thyroid gland



10. Draw the diagram of pancreas and label the parts



11. Draw the diagram of adrenal gland and LS of adrenal gland



Hormone	Function
STH or GTH : Somatotropic hormone or Growth hormone	It brings forth growth
FSH : Follicle stimulating hormone	Maturation of graafian follicles in the female, Produce the eggs and sperm formation in the males.
LTH : Lactogenic hormone	It stimulates the growth of mammary glands in female and milk production after child birth.
Oxytocin	It speeds up the child birth process,
Vasopressin or Antidiuretic hormone (ADH)	It helps in the reabsorption of water, producing concentrated urine in small quantity. It raises up the blood pressure
Thyroxine	It increases the rate of metabolism. It stimulates a rise in the body temperature. It regulates iodine and sugar level in the blood. It controls working of kidneys and urine output.
Insulin	It favours conversion of glucose into glycogen and its storage in the liver and the muscles. It prevents the formation of glucose from protein and fat. It maintains normal blood glucose level at 80 – 120 mg / 100 ml of blood.
Glucagon	It is secreted when glucose level in the blood is low. It influences conversion of glycogen into glucose, thus raising the blood glucose level.
Aldosterone	It maintains mineral metabolism, by favouring reabsorption of sodium and water and excretion of potassium and phosphate ions. It maintains electrolyte balance, body fluid volume, osmotic pressure and blood pressure.
Cortisone	It stimulates the breakdown of glycogen into glucose raising the blood glucose level. It also produces an anti-inflammatory reaction and suppresses the immune response.

Adrenaline and noradrenaline	Increase the heartbeat. Increase the respiratory rate. Promote the conversion of glycogen into glucose. Cause dilation of pupil. Cause profuse sweating. Make the hair stand erect. (gooseflesh) Mobilize the body, to face the emergency by fighting with it or running away from it.
Testosterones (androgen)	It stimulates the growth of reproductive organs and the production of male sex cell, the sperms. Testosterone determines the secondary sexual characters in male, such as growth of facial hairs, hoarse voice, broadening of shoulder, etc,
Oestrogen	Oestrogen is responsible for growth of female reproductive organs and the appearance of secondary sexual characters in female, such as growth of pubic hairs, soft voice, feminine body, etc.
Progesterone	Maintains pregnancy and regulates menstrual cycle.
Relaxin	Relaxes the muscles of the pelvic region at the time of child birth.
Parathormone and Calcitonin	Maintain the mineral metabolism
Thymosin	Stimulates the differentiation of "T"lymphocytes to resist infection.
Melatonin	Concentration of pigments in some specific areas like areola, scrotal sacs, etc,

Textbook questions

PART A

1. This is the one of the methods of reproduction in unicellular organisms like amoeba and bacteria in which they split into two equal halves and produce new ones is called.
(Fragmentation, binary fission, budding, spore formation)
Ans: binary fission

Organism	Method of reproduction
Bacteria, Amoeba, Prtozoan (Unicellular organisms)	Binary Fission
Yeast, Coelenterates (Hydra, Bryophyllum)	Budding (Vegetative propagation)
Algae, Flatworms (Spirogyra algae)	Fragmentation (Vegetative propagation)
Fungi, Algae, bacteria (Lower group of plants)	Spores (Asexual reproduction)
Flowering plants	Pollination and Fertilization (Sexual reproduction)
Mammals	Sexual reproduction

2. In sexual reproduction of flowering plants, the first event involved in this is
(fertilization, germination, regeneration, pollination)
Ans: pollination

3. Which of the following statement is true?
(Thin walled non-motile spores are called zoospores, A motile asexual spore produced by some algae bacteria and fungi are Akinetes, Uninucleate non-motile asexual spores are produced by the fungus are called conidia, Thick walled vegetative cells produced by the algae during adverse conditions are called aplanospores)
Ans: Uninucleate non-motile asexual spores are produced by the fungus are called conidia

Thin walled non-motile spores produced by algae	Aplanospores
Motile asexual spore produced by some algae bacteria and fungi	Zoospores
Thick walled spores containing food materials produced by algae	Akinetes
Uninucleate non-motile asexual spores produced by the fungus like penicilium	Conidia

4. The fertilized ovary is a fruit. The fruit develops from a single flower with multicarpellary, apocarpous superior ovary is
(Aggregate fruit, Composite fruit, Simple fruit, Multiple fruit)
Ans: Aggregate fruit

5. If a water soaked seed is pressed, a small drop of water comes out through.
(stomata, lenticel, micropyle, radicle)
Ans: micropyle

6. The mango fruit is called as stone fruit, because it has
(skinny epicarp, stony mesocarp, fleshy endocarp, hard endocarp)
Ans: hard endocarp

7. Pick out the wrong statement
(In a dicot seed there is a short longitudinal whitish ridge is called the raphae, There is a minute opening in dicot seed is known as micropyle, The rudimentary stem portion known as radicle, The rudimentary root portion is called radicle)
Ans: The rudimentary stem portion known as radicle

Short longitudinal whitish ridge in dicot seed	Raphae
Minute opening in dicot seed	Germpore or micropyle
The rudimentary root portion in dicot seed	Radicle
The rudimentary stem portion in dicot seed	Plumule

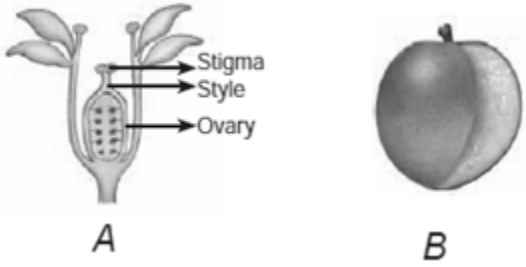
8. Consider the following statement regarding the dispersal of fruit by wind and select the correct answer
(Fruits and seeds dispersed with a sudden jerk by an explosive mechanism, Fruits of tridax carry a persistent calyx modified into pappus, The fruits of xanthium have sharp pointed stiff hooks, The mesocarp of coconut is fibrous)
Ans: Fruits of tridax carry a persistent calyx modified into pappus

9. The product of triple fusion which acts as nutritive tissue for the development of embryo is
(zygote, placenta, scutellum, endosperm)
Ans: endosperm

10. The disadvantage of self pollination is
(There is no wastage of pollen grains, The seeds are less in number, Self pollination is sure in bisexual flowers, Flowers need not depend on agents of pollination)
Ans: The seeds are less in number

PART B

11. a. Identify the given fig. A and B.



A = Gynoecium (Female part of the flower) B = Fruit

b. Which part of the A is modified in to B?
Ans: Ovary is modified into fruit

12. The methods of reproduction and the organisms are given below. Match the type of reproduction to the suitable organisms.

Fission	Spirogyra	Yeast
Budding	Protozoans	Flatworms
Fragmentation	Bryophyllum	Bacteria

Ans:

Fission	Protozoans	Bacteria
Budding	Bryophyllum	Yeast
Fragmentation	Spirogyra	Flatworms

13. In balsam plant the seeds fall off far away from the mother plant.

a) Is this statement correct or incorrect?

Correct

b) Give reason

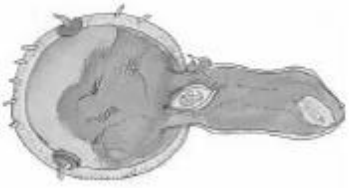
- Fruits like Balsam burst with a sudden jerk and disperse the seeds by an explosive mechanism.
- If all these seeds fall directly below the parent plant, the seedlings would have to compete for space, water, oxygen, minerals and sunlight, leading to competition. When the seedlings are grouped together at one place, they could easily be destroyed by grazing animals. So in order to eliminate the unhealthy competitive struggle that would arise from overcrowding, and to ensure the successful spreading and establishment of a species on the earth, the seeds fall off far away from the mother plant.

14. Composite fruits is formed by all the flowers of ----------, ---------- fruit is developed from a single flower with multicarpellary apocarpous superior ovary.

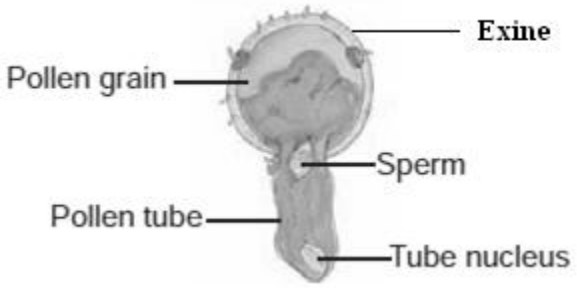
Ans: whole inflorescence and give a single fruit, Aggregate

15. Redraw the diagram and label the following parts.

a) Exine b) Tube nucleus



Ans:



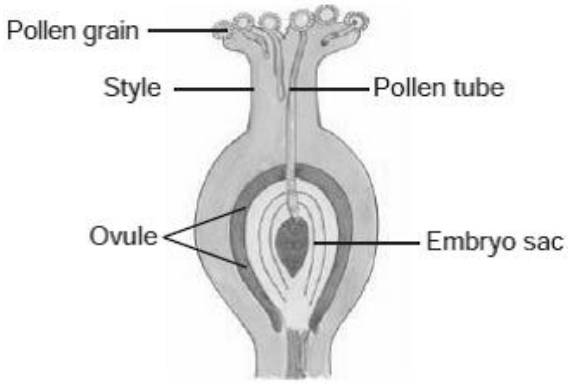
Germination of pollen grain

PART C

16. a) Name the process by which the fruit is developed.
Fertilization

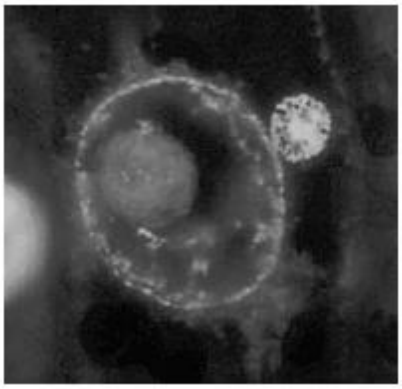
b) Give the development process in brief. c) Draw a neat diagram of that process and label.

Fertilization
The pollen tube enters into the embryo sac through micropyle. At this time, the pollen tube bursts open, gametes released from the pollen tube and enter into the embryosac. One of the gametes fuses with the egg, and the other fuses with the secondary nucleus. The fusion of a male gamete with egg is known as fertilization. The fertilized egg is known as zygote which develops into embryo.



Process of fertilization

Double fertilization
The other male gamete fuses with the secondary nucleus. The secondary nucleus is diploid in nature. The fusion of this nucleus with the second male gamete is known as triple fusion. The triple fusion nucleus is called endosperm nucleus because it develops into endosperm. Endosperm is a nutritive tissue meant for the development of the embryo. The process of fusion of a male gamete with egg and the other gamete with secondary nucleus is known as double fertilization.



Double fertilization

17. a) Write the two events involved in the sexual reproduction of flowering plant.

1. Pollination 2. Fertilization

b) Discuss the first event and write the types c) Give advantages and disadvantages of that event.

Pollination

Transfer of pollen grains from the anther to the stigma is called pollination.

Pollination is of two types. They are: 1. Self pollination 2. Cross pollination

Pollen grains are transferred mainly by wind, water, animals and insects. They are called as pollinating agents.

1. Self pollination (Autogamy)

The transfer of pollen grains from the anther of a flower to the stigma of the same flower or another flower of the same plant is known as self pollination.

Self pollination is also known as autogamy.

Advantages of self pollination

1. Self pollination is certain in bisexual flowers.
2. Flowers need not depend on agents of pollination.
3. There is no wastage of pollen grains.

Disadvantages of self pollination

1. The seeds are less in number.
2. Endosperm is minute. Therefore, the seeds produce weak plants.
3. New varieties of plants cannot be produced resulting in the degradation of the plant.

2. Cross pollination (Allogamy)

The transfer of pollen grains of a flower to the stigma of another flower of a different plant of the same species is called cross pollination or allogamy.

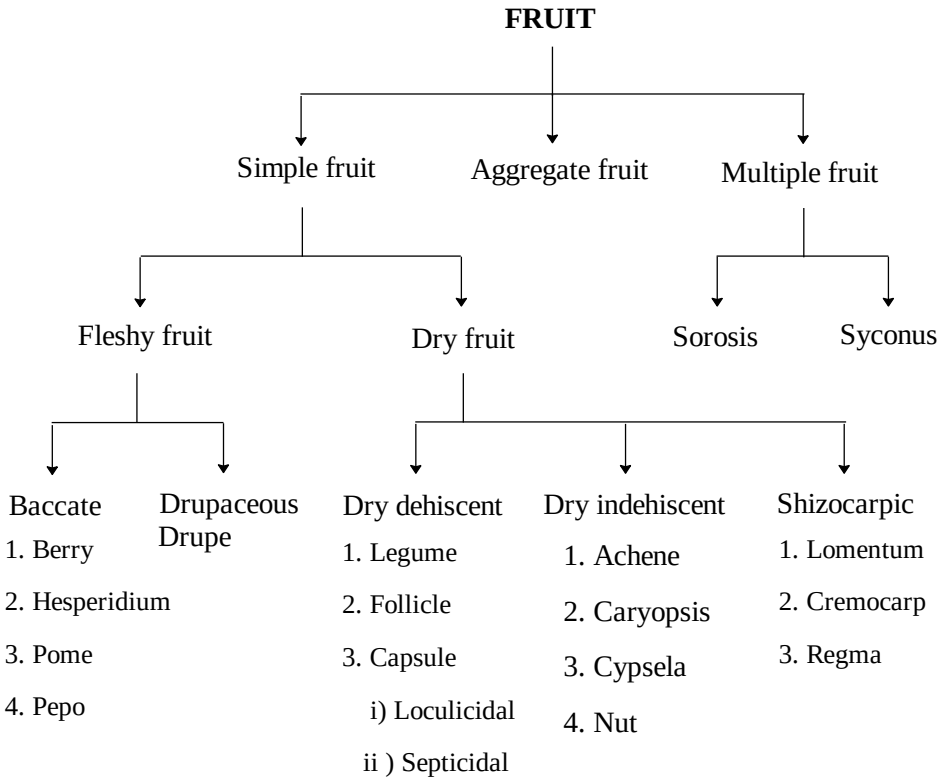
Advantages of cross pollination

1. The seeds produced as a result of cross pollination develop, germinate properly and grow into better plants, i.e., cross pollination leads to the production of new varieties.
2. More viable seeds are produced.

18. a) Fruit is the product of fertilization. Is there any fruit is formed without the act of fertilization?

Yes, some fruits develop without the act of fertilization. Such fruits are called Parthenocarpic fruits. e.g. seedless grapes, guava, mango etc.

b) Represent the classification of fruits in a diagrammatic sketch



19. Compare aggregate fruit with multiple fruit with suitable examples.

Aggregate fruits

It is developed from a single flower with multicarpellary, apocarpous, superior ovary. Each free carpel develops into a fruitlet. Hence, the aggregate fruit has a cluster of fruitlets attached to a common stalk

e.g: Polyalthia.

In Annona squamosa (custard apple), the margin of the carpels are united and appears like a single fruit.

Composite or multiple fruits

Multiple or composite fruit is formed by all the flowers of whole inflorescence and give a single fruit. There are two types of multiple fruits:

1. Sorosis Eg: Jack fruit
2. Syconus.Eg: Fig

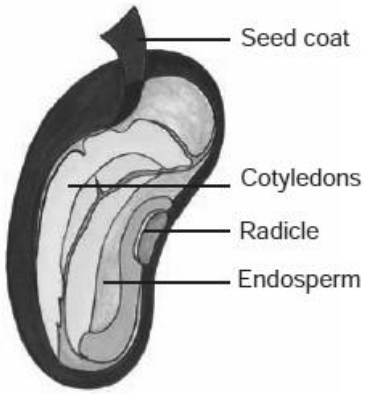
20. Describe the structure of dicot seed.

The seed is bulky, oval and slightly indented on one side. On this side there is a short longitudinal, whitish ridge called the raphae. At one end of the raphae there is a minute opening known as germ pore or micropyle.

If a water soaked seed is pressed gently a small drop of water along with air bubbles will be found coming out though the micropyle.

The embryo is enclosed by the seed coat. It consists of cotyledons attached to the primary axis which has rudimentary root portion called the radicle and a rudimentary stem portion known as plumule.

The tip of the radicle projects outside ,and is nearer to the micropyle. The plumule is placed between the two cotyledons and consists of a shoot axis, and a small bud having two tiny little folded leaves.



Additional questions

1 Mark

1. Uninucleate, non-motile spores produced by penicillium is
   a) Aplanospores b) Zoospores c) Akinetes **d) Conidia**

2. Which of the following is a motile spore?
   a) Aplanospores **b) Zoospores** c) Conidia d) all of these

3. In which of the following the stigmas are large and feathery?
   a) Vallisneria **b) Maize** c) Mango d) none of these

4. ---------- fruit has a cluster of fruitlets attached to a common stalk
   a) aggregate`` b) composite c) schizocarpic d) all of these

5. An example for aggregate`fruit `
   a) polyalthia b) Tomato c) Jackfruit d) Fig

Simple fleshy fruit	Tomato, Orange, Apple, Cucumber, Mango
Simple dry dehiscent fruit	Beans, Calotropis, Cotton, Lady's finger
Simple dry indehiscent fruit	Clematis, Mirabilis, Paddy, Tridax, Cashew nut
Schizocarpic fruits	Acacia, Coriandrum, Castor
Composite or multiple fruit	Jack fruit, Fig
Aggregate fruit	Polyalthia, Custard apple

Buccate fruits	Berry	Tomato
	Hesperidium	Orange
	Pome	Apple
	Pepo	Cucumber
Drupaceous Drupe	Mango	
Dry dehiscent fruits	Legume	Beans, pea
	Follicle	Calotropis
	Capsule	*Septicidal capsule* : Lady's finger *Loculicidal capsule* : Cotton
Dry indehiscent fruits	Achene	Clematis, Mirabilis
	Caryopsis	Paddy, Wheat, Maize
	Cypsela	Tridax
	Nut	Cashew nut, Walnut
Schizocarpic fruits	Lomentum	Acacia
	Cremocarp	Coriandrum
	Regma	Castor
Composite fruits or multiple fruit	Sorosis	Jackfruit
	Syconus	Fig, Banyan, Peepal

6. In ---------- the margin of the carpels are united and appears like a single fruit
a) polyalthia b) Fig c) Tomato **d) custard apple**

7. Which of the following is developed from multicarpellary and the epicarp contain oil glands?
a) Apple **b) Orange** c) Mango d) Cucumber

8. Stone fruit is
a) pepo b) pome c) berry **d) Drupaceous Drupe**

9. The simple fleshy fruit which is developed from pentacarpellary is
a) apple b) orange c) mango d) cucumber

10. The simple fleshy fruit which is developed from tricarpellary is
a) apple b) orange c) mango **d) cucumber**

11. The simple fleshy fruit which is developed from monocarpellary is
a) apple b) orange **c) mango** d) cucumber

12. In which of the following, pericarp is fused with the seed coat?
a) paddy b) wheat c) maize **d) all of these**

13. In which of the following, pericarp and seed coat remains free?
a) paddy b) wheat c) maize **d) Tridax**

14. ---------- a dry indehiscent, one seeded fruit with hard and woody pericarp.
a) wheat b) paddy **c) cashew nut** d) none of these

15. ---------- breaks up into three one-seeded cocci
a) Castor b) acacia c) fig d) jackfruit

16. ---------- is derived from a special type of inflorescence known as hypanthodium
a) Fig b) Castor c) Wheat d) Paddy

17. ---------- has large number of minute unisexual flowers
a) **a) Fig** b) Castor c) Wheat d) Paddy

18. Which of the following belongs to Monocotyledons?
a) pea b) bean c) gram **d) maize**

Monocotyledons	maize, rice, wheat and onion
Dicotyledons	pea, bean, gram and castor

19. Dispersal of fruits and seeds by wind is known as
a) autochory **b) anemochory** c) hydrochory d) zoochory

Autochory	Self dispersal of fruits and seeds	Balsam
Anemochory	Wind dispersal of fruits and seeds	Calotropis (Erukkum), Moringa (Drum sticks), Tridax
Hydrochory	Water dispersal of fruits and seeds	Coconut, Lotus
Zoochory	Animal dispersal of fruits and seeds	Xanthium, Achyranthus

20. Which of the following statement is correct?
a) In fruits like tomato and guava, the seeds are eaten along with the edible portion and later passed out by excreta. These types of seeds are protected from the digestive juices by their seed coat.
b) In jack fruit there are numerous, elongated, whitish flat structures in between the edible flakes. They represent the sterile or unfertilized flowers.
c) In paddy, wheat and maize, Pericarp is fused with the seed coat
d) All are correct

21. Stony endocarp is present in
a) Apple b) Orange c) Fig **d) Mango**

22. In ---------- the seeds are tiny dust like particles.
a) Orchids b) Fig c) Maize d) Paddy

2 Mark

Spot the error

1. The methods by which organisms reproduce do not depend upon the body shape and structure of organisms.
Ans: The methods by which organisms reproduce **depend** upon the body shape and structure of organisms.

2. Some Bacteria, like Lactobacilli, Salmonella multiply slowly, others like Mycobacterium tuberculosis, multiply rapidly.
Ans:
Some Bacteria, like Lactobacilli, Salmonella multiply **rapidly**, others like Mycobacterium tuberculosis, multiply **slowly**.

3. The leaf is a reproductive organ of a flowering plant.
Ans: The **flower** is a reproductive organ of a flowering plant.

4. A flower is a modified root with a unlimited growth
Ans: A flower is a modified **shoot** with a **limited** growth

5. Each pollen grain has two protective walls called exine and intine. The outer wall exine is thin and it has small pores called germination pores. The inner wall is thick and hard.
Ans:
Each pollen grain has two protective walls called exine and intine. The outer wall exine is **thick** and it has small pores called germination pores. The inner wall is **thin** and **elastic.**

Fill up the blanks

1. The first formed organism in the Earth is a ---------- (Bacterium / Virus)
Ans: Bacterium i.e. Eobacterium

2. ---------- converts milk into curd (Lactobacilli /Salmonella)
Ans: Lactobacilli

3. ---------- cause tuberculosis (Lactobacilli /Mycobacterium tuberculosis)
Ans: Mycobacterium tuberculosis

4. Zoospore is a motile spore. It uses ---------- for locomotion (Protoplasm / Flagellum)
Ans: Flagellum

5. In --------spores food materials are filled up in cells during adverse condition (Conidia / Akinetes)
Ans: Akinetes

6. Male part of a flower is ---------- (Gynoecium / Androecium**)**
Ans: Androecium

7. Female part of a flower is ---------- (Gynoecium / Androecium**)**
Ans: Gynoecium

8. ---------- is the first event in the development of fruit and seed (Pollination / Fertilization)
Ans: Pollination

9. Self pollination is also known as ---------- (autogamy / allogamy)
Ans: autogamy

10. Cross pollination is also known as ---------- (autogamy / allogamy)
Ans: allogamy

11. Pollination by birds is called ---------- (Ornithophily / Anemophily)
Ans: Ornithophily

Pollination by insects	Entamophily
Pollination by birds	Ornithophily
Pollination by animals	Zoophily
Pollination by water	Hydrophily
Pollination by wind	Anemophily

12. In the fertilization of flowering plants ---------- is a nutritive tissue meant for the development of the embryo (Endosperm / Zygote)
Ans: Endosperm

13. After fertilization,
a) The ovule develops into ----------
b) The ovary develops into ----------
c) The integuments of the ovule develop into ----------
Ans: a) seed b) fruit c) seed coats

14. Simple fleshy fruits are ---------- in nature (dehiscent / indehiscent)
Ans: indehiscent

15. ---------- fruits break into many one-seeded parts called mericarps. (Aggregate / Schizocarpic)
Ans: Schizocarpic

16. ---------- fruits show characters of dehiscent and indehiscent fruits.(Schizocarpic / Multiple)
Ans: Schizocarpic

17. ---------- fruit is developed from a single flower with multicarpellary (Aggregate / Composite)
Ans: Aggregate

18. ---------- fruit is formed by all the flowers of whole inflorescence and give a single fruit. (Aggregate / Composite)
Ans: Composite

19. In pea and bean, pericarp dehisces along --------(both dorsal and ventral sutures / one suture only)
Ans: both dorsal and ventral sutures

20. In calotropis, pericarp dehisces along ---------- (both dorsal and ventral sutures / one suture only)
Ans: one suture only

Odd one out

1. Maize, Grass, pine, vallisneria
Ans: vallisneria
(In vallisneria pollination takes place by water while in others pollination takes place by wind)

2. Tomato, Apple, Orange, Mango
Ans: Mango
(Mango is a drupe while others are baccates)

3. Clematis, Beans, Calotropis, Cotton
Ans: Clematis
(Clematis is a dry indehiscent fruit while others are dry dehiscent fruits)

4. Acacia, Jack fruit, Coriandrum, Castor
Ans: Jack fruit
(Jack fruit is a composite fruit while others are schizocarpic fruits)

5. Maize, Rice, Wheat, Gram
Ans: Gram
(Gram is a dicotyledon while others are monocotyledons)

6. Style, Stigma, ovary, anther
Ans: anther
(anther belongs to male part of flower while the others belong to female parts of flower)

Match the following

1.

Fertilized egg	parthenocarpic
Fusion of male gamete with egg	Anemophilous
Grass & Pine	Fertilization
Seedless grapes, guava, mango	Fruit wall
Pericap	Zygote

Ans:

Fertilized egg	Zygote
Fusion of male gamete with egg	Fertilization
Grass & Pine	Anemophilous
Seedless grapes, guava, mango	Parthenocarpic
Pericap	Fruit wall

2.

Simple fleshy fruit	Jack fruit
Simple dry dehiscent fruit	Paddy
Simple dry indehiscent fruit	Beans
Schizocarpic fruits	Custard apple
Composite or multiple fruit	Tomato
Aggregate fruit	Coriandrum

Ans:

Simple fleshy fruit	Tomato
Simple dry dehiscent fruit	Beans
Simple dry indehiscent fruit	Paddy
Schizocarpic fruits	Coriandrum
Composite or multiple fruit	Jack fruit
Aggregate fruit	Custard apple

3.

Autochory	Xanthium
Anemochory	Coconut
Hydrochory	Moringa
Zoochory	Balsam

Ans:

Autochory	Balsam
Anemochory	Moringa
Hydrochory	Coconut
Zoochory	Xanthium

Assertion and Reason

1. **Assertion (A) :** The mesocarp of coconut is fibrous
Reason (R) : It is easily carried away by water currents and this helps in seed dispersal
a) **A** is right **R** is wrong b) **A** is wrong **R** is right
c) **A** is right and **R** explains **A** d) Both **A** and **R** are wrong

Ans: c) **A** is right and **R** explains **A**

2. **Assertion (A) :** Fruits of Tridax carry a persistent calyx modified into a pappus (a ring of fine, feathery hairs) which act like a parachute
Reason (R) : This aids in the dispersal by wind.
a) **A** is right **R** is wrong b) **A** is wrong **R** is right
c) **A** is right and **R** explains **A** d) Both **A** and **R** are wrong

Ans: c) **A** is right and **R** explains **A**

3. **Assertion (A) :** Some fruits are provided with hooks, spines, bristles, stiff hairs, etc., on their outer coat.
Reason (R) : With the aid of these out growths, these fruits stick to the furry coats of skins of some animals and get carried away from one place to another.
a) **A** is right **R** is wrong b) **A** is wrong **R** is right
c) **A** is right and **R** explains **A** d) Both **A** and **R** are wrong

Ans: c) **A** is right and **R** explains **A**

4. **Assertion (A) :** Thus the schizocarpic fruits show characters of dehiscent and indehiscent fruits.
Reason (R) : Schizocarpic fruits break into many one seeded parts called mericarps. The mericarps containing the seeds remain indehiscent.
a) **A** is right **R** is wrong b) **A** is wrong **R** is right
c) **A** is right and **R** explains **A** d) Both **A** and **R** are wrong

Ans: c) **A** is right and **R** explains **A**

Answer the following

1. What is meant by reproduction?

Reproduction is a special biological process, by which new individuals of the same species are produced.

2. Mention a few methods of reproduction in plants and animals.

Reproduction in animals	Reproduction in plants
Fission – *Prtozoan*	Fission – *Bacteria*
Budding – *Coelenterates*	Budding – *Yeast*
Fragmentation – *Flatworms*	Fragmentation – *Algae*
	Spores – *Fungi*
Sexual reproduction – *Mammals*	Pollination and Fertilization – *Flowering plants*

3. What is binary fission?

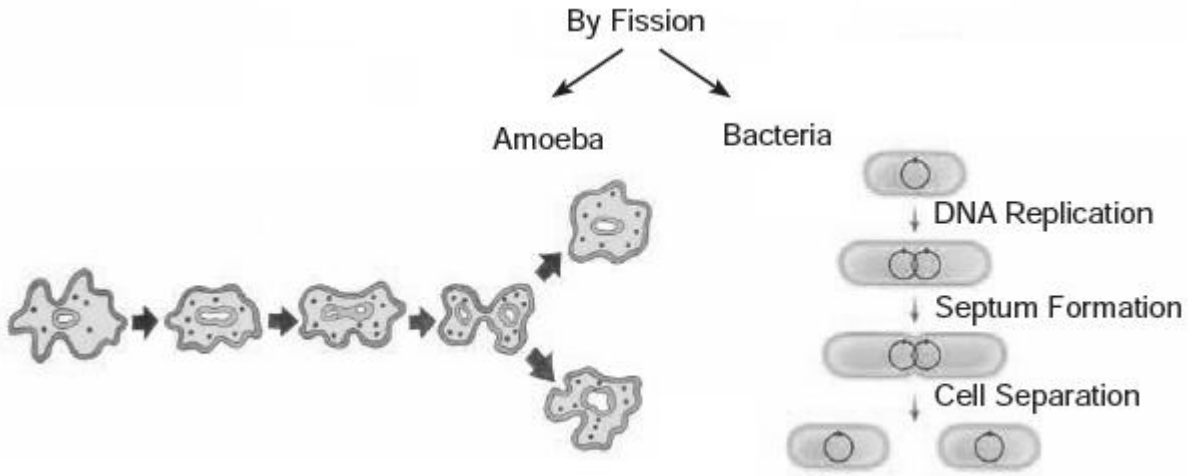
Unicellular organisms, like amoeba and bacteria, split into two equal halves and produce new ones which is called binary fission.

4. Define evolution

Evolution may be defined as a gradual development of more complex species from pre-existing forms.

5. Illustrate the mode of reproduction in unicellular organisms

Unicellular organisms, like amoeba and bacteria, split into two equal halves and produce new ones which is called binary fission.



6. Mention some of the spores of asexual reproduction

1. Aplanospores 2. Zoospores 3.Akinetes 4. Conidia:

7. Write the different modes of reproduction in multicellular organisms

1. Vegetative propagation → Fragmentation
   → Budding

2. Asexual reproduction → Spores

3. Sexual reproduction → Pollination → Fertilization

8. What is sexual reproduction?

Sexual reproduction is the process in which two components (male and female) are involved to produce offsprings of their own kind.

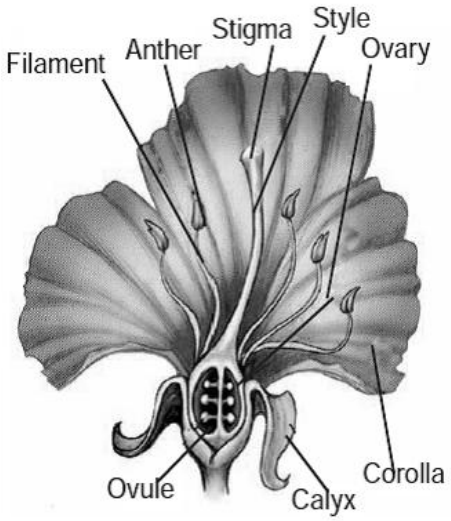
9. What are the main parts of a flower?

1. Calyx 2. Corolla 3. Androecium and 4. Gynoecium

10. Differentiate vegetative propagation and sexual reproduction

No	Vegetative propagation	Sexual reproduction
1	Vegetative propagation is the ability of plants to reproduce by bringing forth new plants from existing vegetative structures without sexual reproduction.	Sexual reproduction is the process in which two components (male and female) are involved to produce offsprings of their own kind.
2	Algae, hydra and bryophyllum reproduce by this method	Mammals and flowering plants reproduce by this method

11. Draw the diagram of a flower and label the parts

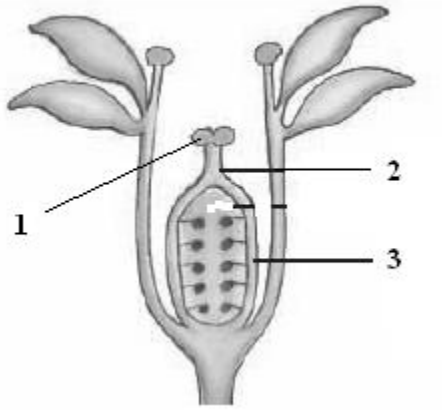


12. Identify the given figure and label the parts

Ans:

- The given figure is Androecium (Male part of a flower)
- 1. Anther 2. Filament

13. Identify the given figure and label the parts



Ans:

- The given figure is Gynoecium (Female part of a flower)
- 1. Stigma 2. Style 3. Ovary

14. What is pollination? What are its types?

Transfer of pollen grains from the anther to the stigma is called pollination.
Pollination is of two types. They are: 1. Self pollination 2. Cross pollination

15. What are pollinating agents?

Pollen grains are transferred mainly by wind, water, animals and insects. They are called as pollinating agents.

16. What are anemophilous?

Flowers pollinated by wind are called Anemophilous. e.g. Grass and pine.

17. What is meant by ferlization?

The fusion of a male gamete with egg is known as fertilization.

18. What is double fertilization?

The process of fusion of a male gamete with egg and the other gamete with secondary nucleus is known as double fertilization.

19. What is zygote?

The fertilized egg is known as zygote which develops into embryo.

20. What is meant by triple fusion?

The fusion of the secondary nucleus with the second male gamete is known as triple fusion. The triple fusion nucleus is called endosperm nucleus because it develops into endosperm. Endosperm is a nutritive tissue meant for the development of the embryo.

21. What are the post fertilization changes that take place in flowering plants?

1. The ovule develops into seed.
2. The integuments of the ovule develop into seed coats.
3. The ovary enlarges and develops into fruit.

22. Name the two parts of fruit

a) Pericap (Fruit wall) and b) Seeds

23. What are parthenocarpic fruits?

Some fruits develop without the act of fertilization. Such fruits are called parthenocarpic fruits. e.g. seedless grapes, guava, mango etc.

24. Write note on aggregate fruits

It is developed from a single flower with multicarpellary, apocarpous, superior ovary.Each free carpel develops into a fruitlet. Hence, the aggregate fruit has a cluster of fruitlets attached to a common stalk (e.g) Polyalthia In Annona squamosa (custard apple), the margin of the carpels are united and appears like a single fruit.

25. Write note on composite or multiple fruits

Multiple or composite fruit is formed by all the flowers of whole inflorescence and give a single fruit. There are two types of multiple fruits namely sorosis and syconus.

26. On the basis of the number of cotyledons in the embryo (seed), the angiosperms have been divided into two groups. What are they?

1. Dicotyledons: Seeds with two cotyledons (e.g) pea, bean, gram and castor.
2. Monocotyledons: Embryo with one cotyledon (e.g) maize, rice, wheat and onion.

27. Fruits of Tridax carry a persistent calyx modified into a pappus (a ring of fine, feathery hairs) Why?

Fruits of Tridax carry a persistent calyx modified into a pappus (a ring of fine, feathery hairs) which act like a parachute and aids in the dispersal by wind.

28. Some fruits (Xanthium, Achyranthus) are provided with hooks, spines, bristles and stiff hairs on their outer coat. Why?

Some fruits (Xanthium, Achyranthus) are provided with hooks, spines, bristles and stiff hairs on their outer coat. With the aid of these out growths, these fruits stick to the furry coats of skins of some animals and get carried away from one place to another. This aids in the dispersal of seeds.

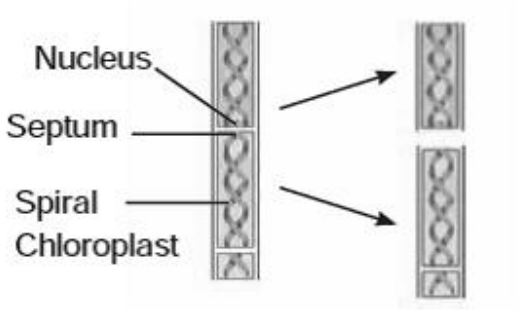
5 Mark

1. Write note on vegetative propagation

Vegetative propagation is the ability of plants to reproduce by bringing forth new plants from existing vegetative structures without sexual reproduction.

a) Fragmentation

In Spirogyra algae, the plant body breaks up into smaller fragments. Each fragment grows into a new individual.

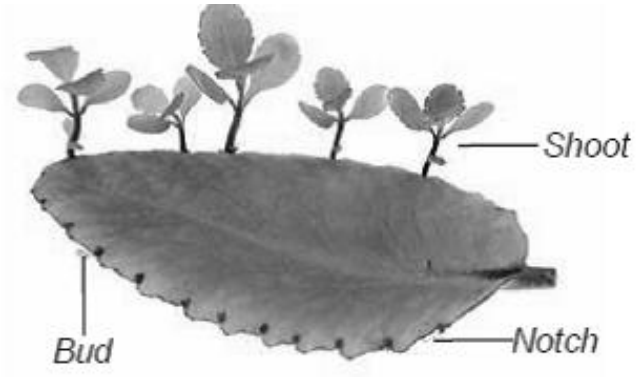


Fragmentation in spirogyra

b) Budding

In Hydra, a bud develops as an outgrowth due to repeated cell division at one specific site. These buds develop into tiny individuals and, when fully mature, get detached from the parent body to become new independent individuals.

Similarly, buds produced in the notches along the leaf margin of Bryophyllum fall on the soil and develop into new plants.



Bryophyllum

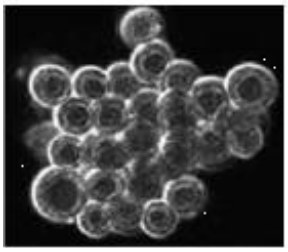
2. Write note on asexual reproduction

In lower group of plants, reproduction takes place by means of spores. The spores are covered by thick walls that protect them until they come into contact with another moist surface and can begin to grow.

Different kinds of spores:

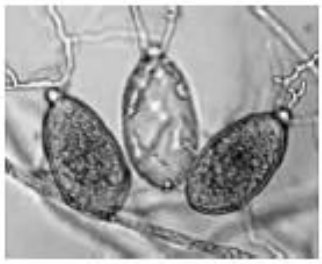
1. Aplanospores:

Thin walled non-motile spores produced by algae are called Aplanospores. New filaments are formed by the germination of these spores.



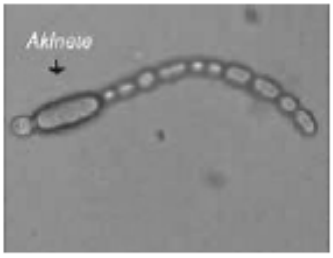
2. Zoospores:

A zoospore is a motile asexual spore that uses a flagellum for locomotion. These spores are created by some algae, bacteria and fungi to propagate themselves.



3. Akinetes:

In algae, the vegetative cells secrete thick additional wall layers. During adverse conditions, food materials are filled up in cells. These structures are called akinetes. During favourable conditions they develop into new filaments.



4. Conidia:

Conidia are uninucleate, non-motile, asexual spores produced by the fungus like penicillium

3. Write note on androecium and gynoecium

Androecium

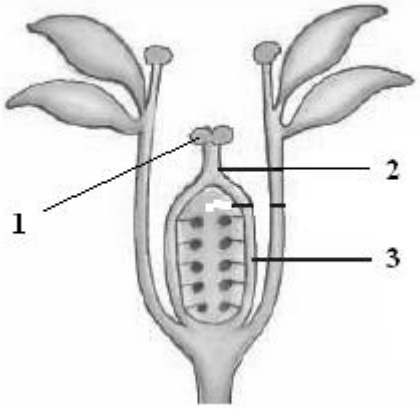
- Androecium is the male part of a flower.
- Androecium is a group of stamens.
- Each Stamen consists of a stalk called the filament and a small bag like structure called the anther at the tip.
- The pollen grains are contained in the anther within the pollen sacs.

Androecium

1. Anther 2. Filament

Gynoecium

- Gynoecium is the female part of the flower.
- It consists of the carpels or ovary.
- Gynoceium has three parts 1) Stigma 2) Style and 3) Ovary.
- The ovary contains the ovules and each ovule carries within it an embryo sac, within which lies the egg cell or the female gamete.



Gynoecium

1. Stigma 2. Style 3. Ovary

4. What is self pollination (Autogamy) ? Write its advantages and disadvantages

The transfer of pollen grains from the anther of a flower to the stigma of the same flower or another flower of the same plant is known as self pollination.
Self pollination is also known as autogamy.

Advantages of self pollination

1. Self pollination is certain in bisexual flowers.
2. Flowers need not depend on agents of pollination.
3. There is no wastage of pollen grains.

Disadvantages of self pollination

1. The seeds are less in number.
2. Endosperm is minute. Therefore, the seeds produce weak plants.
3. New varieties of plants cannot be produced resulting in the degradation of the plant.

5. What is cross pollination (Allogamy)? Write its advantages

The transfer of pollen grains of a flower to the stigma of another flower of a different plant of the same species is called cross pollination or allogamy.

Advantages of cross pollination

1. The seeds produced as a result of cross pollination develop, germinate properly and grow into better plants, i.e., cross pollination leads to the production of new varieties.
2. More viable seeds are produced.

6. Write note on a) Zoophily b) Anemophily and c) Hydrophily

a) Zoophily (Pollination by animals)

Animals, birds, squirrels and insects are attracted to the bright petals of the flowers. These flowers are also large in size and have a sweet smell. Some of these flowers have nectar and a sweet scent. This kind of pollination is called Zoophily.

b) Anemophily (Pollination by wind)

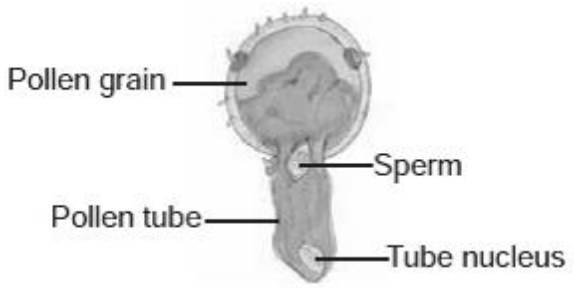
The flowers pollinated by air are mostly small in size and without any attractive colour, smell and nectar. They produce a large number of pollen grains to make up for the wastage of pollen in times of transit. The pollen grains are dry and powdery, and hence are easily carried by the wind. Some pollen grains even have wings. Stigmas are large and protruding, even branched and feathery. e.g.Maize.
Flowers pollinated by wind are called Anemophilous, e.g. Grass and pine.

c) Hydrophily (Pollination by water)

This pollination takes place in water plants or plants that are adapted to water habitat.
e.g. Vallisneria.
This pollination is known as hydrophily. The flowers are small and inconspicuous.

7. Write note on germination of pollen grain

If pollen grain falls on a suitable stigma, it starts germinating. A mature pollen consists of two cells. The larger one is vegetative cell and the smaller one is generative cell. The vegetative cell starts growing and emerges through the germination pore. It develops through the style as a long tube known as pollen tube. The generative cell gets into the tube and divides into two male gametes (sperms).



Germination of pollen grain

8. Write note on simple fruits

There are two types of simple fruits:

1) Simple fleshy fruits

In simple fleshy fruits, the pericarp is succulent and juicy when fully ripe. The fleshy fruits are indehiscent in nature. The pericarp is distinguished into three parts, namely epicarp, mesocarp and endocarp. There are mainly two types of fleshy fruits – Baccate and Drupaceous. Baccate is further classified into berry, hesperidium, pome and pepo.

2) Simple dry fruits

These fruits have a dry pericarp. They are classified based on mode of dehiscense as dry dehiscent, dryindehiscent and schizocarpic fruits.

a) Dry dehiscent fruit

These fruits split open at maturity to liberate the seeds.

b) Dry indehiscent fruit

These fruits do not split open at maturity and the seeds are liberated by the decay of pericarp

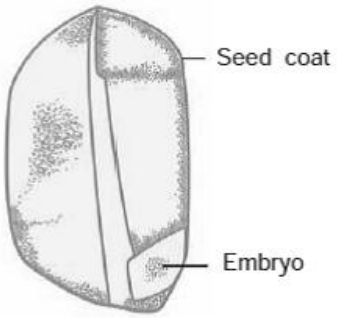
c) Schizocarpic fruits

At maturity, these fruits break into many one seeded parts called mericarps. The mericarps containing the seeds remain indehiscent. Thus the schizocarpic fruits show characters of dehiscent and indehiscent fruits.

9. Discuss the structure of monocot seed

- In paddy, the so called seed is actually a fruit.
- It is a simple indehiscent one seeded fruit known as caryopsis.
- The seed coat is very thin.
- The fruit wall (pericarp) is thin and fused with the seed coat.
- The fruit is covered by generally yellowish bract and bracteoles which are commonly known as chaff.
- The embryo consists of single cotyledon called scutellum and a shoot axis.
- The lower part of the axis is the radicle, covered by a sheath called coleorrhiza (root sheath).
- The upper part is known as plumule which is covered by a sheath called coleoptile.
- In a day or two, after the seed is placed in a moist soil, the coleorrhiza pierces the base of the seed. The radicle comes out next after splitting the coleorhiza.

- The radicle does not form the root system. Meanwhile, roots are formed from the lower most nodes of the stem. These roots are called adventitious roots. These adventitious roots form fibrous root system of matured plant.



10. Discuss the various types of dispersal mechanisms of fruits and seeds in plants

Based on the agents involved in dispersal, there are various types of dispersal mechanisms of fruits and seeds in plants.

1. Autochory:

- Autochory is an active mechanism of self dispersal of fruits and seeds.
- Fruits like Balsam burst with a sudden jerk and disperse the seeds by an explosive mechanism.

2. Anemochory

- Anemochory is the wind dispersal of fruits and seeds. Alternatively, the wind may blow them away, for which they have to be light, so that their buoyancy may enable them to float on air over long distances. Some of them are provided with hairs and membranous wing-like structures which enable them to be carried away easily (e.g. Seeds dispersed by the wind are Calotropis (Erukkum), Moringa (drum sticks) etc.,
- Fruits of Tridax carry a persistent calyx modified into a pappus (a ring of fine, feathery hairs) which act like a parachute and aids in the dispersal by wind.

3. Hydrochory:

- Hydrochory is a mechanism in which dispersal of fruits and seeds is by water.
- Fruits which are dispersed by water have outer coats that are modified to enable them to float.
- The mesocarp of coconut is fibrous, which is easily carried away by water currents.
- The spongy thalamus with air chamber of Lotus floats in water streams and after some time the fruits get separated, and the seeds germinate.

4. Zoochory:

- Zoochory is a mechanism in which dispersal of fruits and seeds is by animals.
- Some fruits are provided with hooks, spines, bristles, stiff hairs, etc., on their outer coat. With the aid of these out growths, these fruits stick to the furry coats of skins of some animals and get carried away from one place to another.
- The fruits of Xanthium have sharppointed stiff hooks and the Achyranthus the perianth and bracts are pointed. Many fleshy fruits are eaten by animals and human beings and the seeds are thrown away.
- In fruits like tomato and guava, the seeds are eaten along with the edible portion and later passed out by excreta. These types of seeds are protected from the digestive juices by their seed coat.
- Man is responsible for the dispersal of many fruits and seeds. In the pursuit of more economy, useful plants like Cinchona, Rubber and Eucalyptus have been successfully introduced by man and they have acclamalised well to the new surroundings far away from their original mother land.

Textbook questions

PART A

1. Sensitive whiskers are found in ---------- (Bat, Elephant, Deer, Cat)
   Ans: Cat
   (Whiskers of cats and dogs are sensitive to touch)

2. The tusks of elephants are modified ----------
   Ans: Incisors

3. Pick out an animal which has four chambered stomach (Elephant, Dolphin, Deer, Kangaroo)
   Ans: Deer
   (Mammals such as cows, buffaloes, antelopes, goats, deers, etc, have four chambered stomach)

4. Normal body temperature of man is ----------
   (98.4 – 98.6 ºF, 96.6 – 96.8 ºF, 94.4 –98.6 ºF, 98.4 – 99.6 ºF)
   Ans: 98.4 – 98.6 ºF

5. Mitral valve is found between ----------
   (Right auricle and right ventricle, Left auricle and left ventricle,
   Right ventricle and pulmonary artery, Left ventricle and aorta)
   Ans: Left auricle and left ventricle

PART B

6. One of the following groups contains a non mammalian animal. Pick up the group.
   a) dolphin, walrus, porcupine, rabbit, bat b) elephant, pig, horse, donkey, monkey
   c) antelope, deer, cow, buffalo, black buck d) dog, cat, crocodile, lion, tiger
   Ans: d) dog, cat, crocodile, lion, tiger

7. The epidermis of mammals contains
   a) hair, bristle, quills b) hair, nail, claw c) hair, bristle, horn d) hair, nail, scale
   Ans: a) hair, bristle, quills

8. Based on relationship, fill up:
   Whale: Baleen plates; Bat : ----------
   Ans: Bat: Wings

9. Fill in the blanks:
   Plasma: Fibrinogen ; RBC : Carrier of oxygen; WBC: ----------
   Ans: produces antibodies to resist the germs entering the body

10. Master chemists of our body are kidneys. Justify.
    a) kidneys acquire all chemicals taken in the body

b) maintain the chemical composition of blood
c) kidneys send out all chemicals taken in the body
d) kidneys store the various chemicals taken in the body

Ans: b) maintain the chemical composition of blood

11. Based on modifications make the pairs:
incisor: tusk of elephant;
---------- : quills of porcupine.
Ans: Hairs

Additional questions

2 Mark

Fill up the blanks

1. ---------- discovered the circulation of blood in man (William Harvey / Edward Jenner)
Ans: William Harvey

2. Human heart is covered by a protective double walled sac called ---------- (pericardium / capsule)
Ans: pericardium

3. Human heart is made up of special type of muscles, called ---------- (cardiac muscles, capsule)
Ans: cardiac muscles

4. The human heart beats ---------- times in a minute at rest. (72 / 92)
Ans: 72

5. ---------- are the tiny blood vessels which enable the passage of substances from the blood into the tissues (Veins / Capillaries)
Ans: Capillaries

6. A thin transparent membrane which covers the kidney is called as ---------- (capsule / cardiac)
Ans: capsule

7. Human heart is ---------- in shape (conical / bean)
Ans: conical

8. Human kidney is ---------- shaped (conical / bean)
Ans: bean

9. The outer portion of the kidney is dark in colour and is called --------(renal cortex / renal medulla)
Ans: renal cortex

10. The inner pale region of the kidney is called ---------- (renal cortex / renal medulla)
Ans: renal medulla

11. ---------- contains conical masses called renal pyramids. (renal cortex / renal medulla)
Ans: renal medulla

12. The kidneys are composed of millions of units called ---------- (neurons / nephrons)
Ans: nephrons

13. Nephrons are the structural and functional units of ---------- (kidney /heart)
Ans: kidney

14. Milk producing glands are modified ---------- (sweat glands / oil glands)

15. ---------- are the only mammals capable of powered flight (Penguin / Bats)
Ans: Bats

16. Mammals are ---------- blooded animals (warm / cold)
Ans: warm

Match the following

1.

Human heart	Master chemist of our body
Kidney	Hollow fibro muscular organ
Blood	Store house of urine
Urinary bladder	The river of life

Ans:

Human heart	Hollow fibro muscular organ
Kidney	Master chemist of our body
Blood	The river of life
Urinary bladder	Store house of urine

2.

Ureter	Transparent membrane that covers kidney
Urinary bladder	Delivers the urine out of the body
Urethra	Distensible muscular sacs
Capsule	Muscular tube

Ans:

Ureter	Muscular tube
Urinary bladder	Distensible muscular sacs
Urethra	Delivers the urine out of the body
Capsule	Transparent membrane that covers kidney

3.

Bowman's cup	Blood capillaries
Henle's loop	Doubled walled cup
Glomerulus	U-shaped

Ans:

Bowman's cup	Doubled walled cup
Henle's loop	U-shaped
Glomerulus	Blood capillaries

4.

Black buck	Marine
Platypus	Tundra
Ox	Fresh water
Porpoise	Desert

Ans:

Black buck	Desert
Platypus	Fresh water
Ox	Tundra
Porpoise	Marine

5.

RBC	Carries respiratory gases
WBC	Produces antibodies to resist the germs entering the body
Blood Platelets	Blood clotting

Ans:

RBC	Carries respiratory gases
WBC	Produces antibodies to resist the germs entering the body
Blood Platelets	Blood clotting

Spot the error

1. Human heart is divided into two chambers as auricles and ventricles
   Ans: Human heart is divided into **four** chambers as auricles and ventricles

2. The right half of the heart receives and pumps off oxygenated blood and the left half of the heart receives and pumps out deoxygenated blood.
   Ans:
   The right half of the heart receives and pumps off **deoxygenated blood** and the left half of the heart receives and pumps out **oxygenated blood**.

3. Blood is the connective tissue, consisting of the solid component, the plasma and the, fluid parts the blood cells.
   Ans:
   Blood is the connective tissue, consisting of the **fluid part, the plasma** and the **solid components, the blood cells.**

4. The kidneys are conical shaped with inner convex surface and outer concavity.
Ans: The kidneys are **bean** shaped with **outer convex** surface and **inner concavity**

5. The nephrons filter the water and form the urine.
Ans: The nephrons filter the **blood** and form the urine.

Odd one out

1. Black buck, Indian wild ass, Platypus
Ans: Platypus
(Platypus lives in fresh water while others live in desert)

2. Kidneys, Lungs, Skin, Heart
Ans: Heart
(Heart –circulatory system, others-excretory system)

3. Auricles, Ventricles, Bowman's cup, Superior vena cava
Ans: Bowman's cup
(Bowman's cup – Nephron, others – heart)

4. Elephant, Bat, Deer, Ox
Ans: Bat

Assertion and Reason

1. **Assertion (A) :** Camels have thick bunchy eyebrows
Reason (R) : To protect the eyes from sandy wind
a) **A** is right **R** is wrong
b) **A** is wrong **R** is right
c) **A** is right and **R** explains **A**
d) Both **A** and **R** are wrong

Ans: c) **A** is right and **R** explains **A**

2. **Assertion (A) :** The nocturnal bats can fly without crashing into things and still capture insects
Reason (R) : As a bat flies, it emits very rapid series of extremely high pitched clicking sounds. The sound waves bounce off objects or flying insects and the bat hears the echo.
a) **A** is right **R** is wrong
b) **A** is wrong **R** is right
c) **A** is right and **R** explains **A**
d) Both **A** and **R** are wrong

Ans: c) **A** is right and **R** explains **A**

3. **Assertion (A) :** Kidneys are as master chemist of our body.
Reason (R) : Kidneys maintain the chemical composition of the blood
a) **A** is right **R** is wrong
b) **A** is wrong **R** is right
c) **A** is right and **R** explains **A**
d) Both **A** and **R** are wrong

Ans: c) **A** is right and **R** explains **A**

Answer the following

1. What are the fundamental characteristics by which mammals can be distinguished from other vertebrates?

All mammals possess

1. Epidermal Hairs 2. Milk producing glands.

2. Mention the uses of epidermal hairs in mammals

1. The hair is an insulator against heat loss.
2. Hairs are sensory structure, as the whiskers of cats and dogs are sensitive to touch.
3. Hair is defensive for porcupine and hedgehogs with long, sharp, stiff hairs called ***quills*** to protect them from predators.

3. Name two mammals which live in desert

1. Black buck 2. Indian wild ass

4. Name some mammals which live in fresh water

1. Beavers 2. Platypus 3. Otters

5. Name some mammals which live in marine

1. Whales 2. Dolphins 3. Dugong 4. Porpoise 5. Seal 6. Walrus

6. Name some mammals which live in tundra

1. Reindeer 2. Muskdeer 3. Ox 4. Rodents

7. Name some mammals which live in high mountains

1. Mountain goats 2. Big horned sheep 3. Grizzly bears

8. Name some mammals which live in plains and forests

1. Porcupine 2. Giant squirrel 3. Deers 4. Elephants 5. Tiger
6. Leopard 7. Rhinoceros 8. Hippopotamus

9. How do marine whales and dolphins adapt to live in water?

1. In the marine whales, dolphins, etc,. the limbs are modified into flippers which are used as oars to swim in water.
2. They also posses huge subcutaneous fat deposits to conserve heat.
3. The jaws of the whales are modified into baleen plates to sieve the water and trap the minute planktonic organisms as their food called krill.

10. How do camels adapt to live in desert?

1. The skin of camels is doubly thick and contains water storing osmotic cells to conserve water, as they live in deserts.
2. Camels have thick bunchy eyebrows covering the eyes to protect the eyes from sandy wind.
3. Their nasal hole can be closed during desert storms to prevent the entry of sand particles.

11. How is the cellulose digested in plant eating mammals (Herbivores)?

Most mammals are herbivores, eating mostly plants. To digest the cellulose rich food, they have developed a mutual partnership with bacteria that have cellulose splitting enzymes.

12. What is the function of huge four chambered stomach in mammals?

Mammals such as cows, buffaloes, antelopes, goats, deers, etc,. have huge four chambered stomachs that function as storage and fermentation vats. The stomach of cattles also helps them to ruminate or cud the food.

13. Mammals have heterodont dentition. Explain this statement with examples.

Mammals have heterodont dentition with different types of teeth that are highly specialized to match particular eating habits.

Eg:

1. The carnivorous animals have tearing teeth - the canine.
2. In elephant the incisors are modified into tusks as a specialized weapon.

14. How do bats fly and capture insects?

1. Bats are the only mammals capable of powered flight.
2. The forelimbs of bats are modified into wing like structure.
3. The bat's wing is a leathery membrane of skin and the muscle is stretched over the bones of the four fingers.
4. Bats prefer to hang upside down from their legs while resting.
5. The nocturnal bats can fly without crashing into things and still capture insects by echo location. As a bat flies, it emits very rapid series of extremely high pitched clicking sounds. The sound waves bounce off objects or flying insects and the bat hears the echo.

15. Name two mammals which bear the tender young ones in their abdominal pouches.

1. Marsupials 2. Kangaroo

16. How do the polar bears adapt to live in cold polar regions?

The polar bears have thick skin coats and woolly fur to bear the biting cold of the polar regions.

17. Man is highly adapted as an intellectual social animal. Justify.

The supreme mammal – man is highly adapted as an intellectual social animal. The fingers and toes are adapted for handling extremely fine movements in holding of fine objects, in writing and using very delicate instruments.

18. The body temperature in man is maintained constant at 98.4^{o} F to 98.6^{o} F irrespective of the temperature in the surroundings. Give reason

- The temperature regulation is done as a team work, by the sweat glands of skin, kidneys, lungs and blood.
- In summer, we sweat more as a cooling up mechanism, to conduct the heat out in the sweating process. This is possible with increased blood supply to the sweat glands. The kidneys expel less urine since much of water is lost in the sweat.
- In winter, we produce little sweat as a warming up mechanism to conserve heat. The sweat glands are supplied with less amount of blood, so that the amount of heat lost is lowered. Now the kidneys excrete out more urine.

19. Mammalian respiration is more efficient in comparison to other vertebrates. Explain

- Red blood cells of mammals are fully packed with the respiratory red blood pigment haemoglobin, to carry the maximum amount of oxygen.
- The mammalian RBCs are without nucleus, as the space occupied by the nucleus is taken up by the haemoglobin molecules.

20. Fore limbs of mammals are differently used in different animals. Explain

1. Man uses his fore limb to hold an object, write, operate very fine musical instruments and delicate digital devices. The thumb is deviant from other four fingers, to enable man to do the above jobs.
2. A horse uses its fore limb to gallop.
3. A rat or bandicoot uses its fore limb to make holes in the ground to live.
4. A giraffe uses its pretty long and stout fore limbs to reach up the vegetations, at the height of the plants.
5. A monkey leaps from one branch of the tree to another using its fore limb to swing and leap.
6. A whale uses its fore-limbs as oars to swim.

21. Explain a) imprinting b) filial imprinting and c) cross fostering

a) imprinting

Social attachment between animals is called imprinting.

b) filial imprinting

The binding or attachment between the parents and the offspring is called filial imprinting.

c) cross fostering

When an individual of a species is raised by a parent of another species then the behavioural pattern is called cross fostering.

e.g the chick of cuckoo bird is fed by crow in its nest

22. Explain the social behavior of elephants

In an elephant herd, it is always the oldest she elephant that leads the herd, while the strong males will form the periphery of the herd and the young calves and other she elephants will be in the centre.

23. In man, the circulatory system is composed of four components. What are they?

1. the heart
2. the blood vessels namely arteries, veins and capillaries
3. the blood and
4. the lymph.

24. Write the differences between auricles and ventricles

Auricles	Ventricles
Auricles are thin walled upper chambers of the heart	Ventricles are thick walled lower chambers of the heart
Auricles are the receiving chambers of blood.	The ventricles pump the blood out from the heart.

25. Explain the working of heart

Human heart works by contraction and relaxation of the cardiac muscles. The contraction phase is called systole and relaxation phase is called diastole.

When the auricles are filled with blood they are in relaxation phase (auricular diastole). By now ventricles will push the blood into aorta and pulmonary artery by their contraction (ventricular systole). When the auricles contract (auricular systole) the blood is pushed into the ventricles through the bicuspid and tricuspid valves, leading to ventricular relaxation (ventricular diastole).

26. Name the valves of human heart. Write their locations and functions

Valves	Location	Function
Tricuspid valve	Right auriculo ventricular aperture	Regulates the flow of blood, from right auricle to right ventricle and not backwards.
Bicuspid valve *or* mitral valve	Left auriculo ventricular aperture	Regulates the flow of blood, from left auricle to left ventricle and not backwards.
Semi-lunar valve	Base of the pulmonary artery	Regulates the blood to flow from the right ventricle to the pulmonary artery.
Aortic valve	Base of the aorta	Regulates the flow of blood from left ventricle into aorta.

27. What is heartbeat?

The closure of the valves of the heart produce two different cardiac sounds as **"lubb"** and **"dubb".** This is known as heart beat.

28. Name the three types of blood vessels

1. Arteries 2. Veins 3. Capillaries

29. Write the differences between arteries and veins

Arteries	Veins
Arteries carry the blood from the heart to different parts of the body	The veins drain the blood from different parts of the body to the heart.
Except pulmonary artery all other arteries carry oxygenated blood	Except the pulmonary veins all other veins carry deoxygenated blood.

30. What are the important organic substances present in plasma of blood? Write their functions

The important organic substances of plasma are the plasmaproteins namely,

1. globulin (for immunity)
2. fibrinogen (for blood clotting) and
3. albumin (for water balance).

31. What are the three types of blood cells? Write their functions

1. Red Blood Cells 2. White Blood Cells 3. Blood Platelets.

Red Blood Cells –Erythrocytes

RBCs are circular, biconcave and disc shaped. While the young RBCs have nuclei, the matured ones are without nuclei. The red blood pigment haemoglobin is fully packed in the RBCs. They are concerned with carriage of respiratory gases.

White Blood Cells – Leucocytes

WBCs are amoeboid in shape with prominent nuclei. WBCs are concerned with phagocytosis of engulfing the germs and producing antibodies to resist the germs entering the body.

Blood Platelets – Thrombocytes

Platelets are irregular broken up pieces of certain giant cells. They are concerned with blood clotting to prevent the loss of blood.

32. What is excretion?

Excretion is the removal of metabolic waste products called excreta from the body.

33. Write the differences between RBC and WBC

RBC	WBC
RBCs are circular, biconcave and disc shaped.	WBCs are amoeboid in shape
The matured RBCs have no nuclei.	WBCs have prominent nuclei
The red blood pigment haemoglobin is fully packed in the RBCs	The red blood pigment is not present
They are concerned with carriage of respiratory gases.	WBCs are concerned with phagocytosis of engulfing the germs and producing antibodies to resist the germs entering the body.

34. Mention the excretory organs of our body and write their excretory products

Excretory organ	Excretory products	Sent out as
Kidneys	Nitrogenous waste products – urea, uric acid, creatinine, etc,.	Urine
Lungs	Carbondioxide and water vapour	Expired air
Skin	Excess water and salt	Sweat

35. Kidneys are called as master chemist of our body. Why?

Kidneys are the principal excretory organs of our body. Kidneys maintain the chemical composition of the blood and so they are called as master chemist of our body.

36. What are the structural components of nephron?

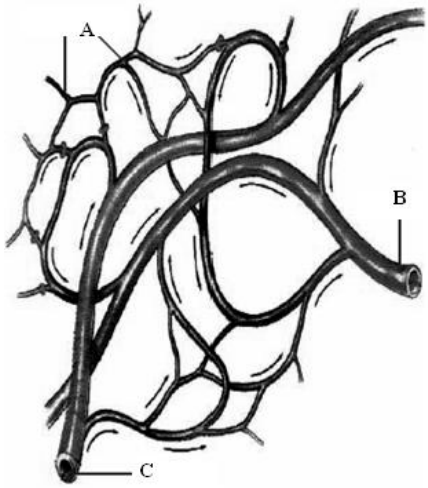
A nephron has two structural components namely, 1. Malpighian capsule 2. Uriniferous tubules.

37. Name the three portions of Uriniferous tubules

1. proximal convoluted tubule 2.U-shaped Henle's loop and 3. Distal convoluted tubule.

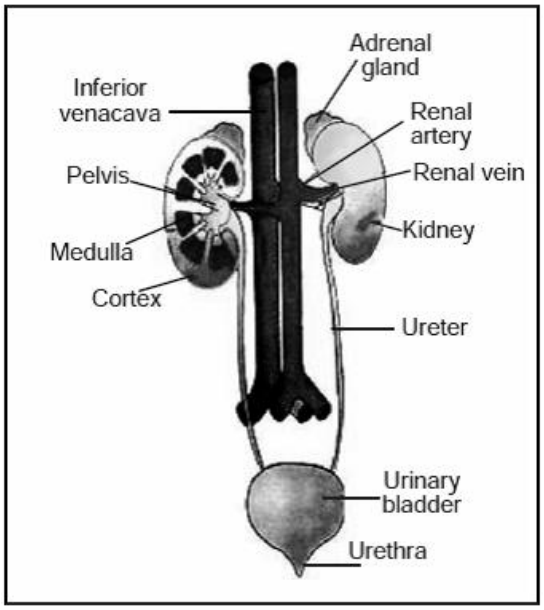
Diagram based questions

1. In the diagram given below mark the parts A, B and C

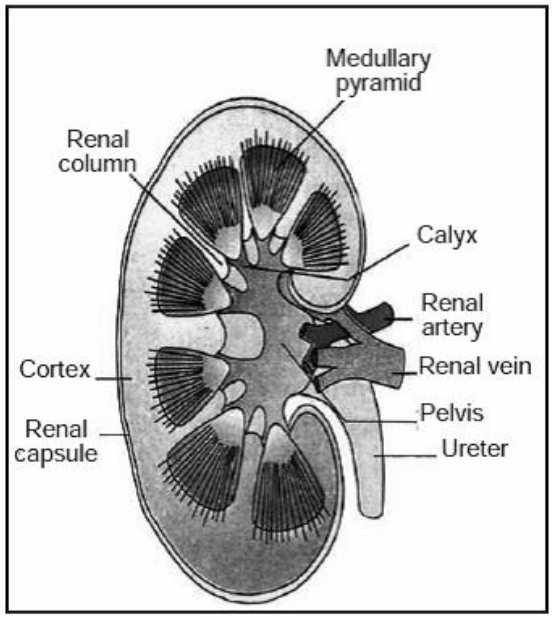


Ans: A = Capillaries B = Venule C = Arteriole

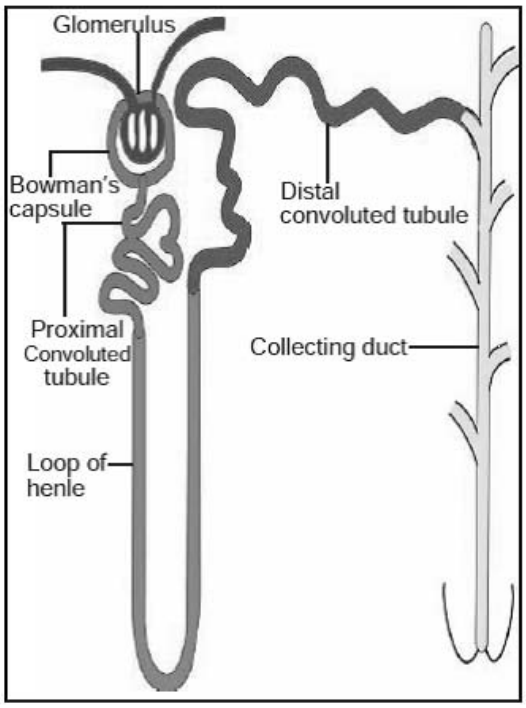
2. External structure of kidney



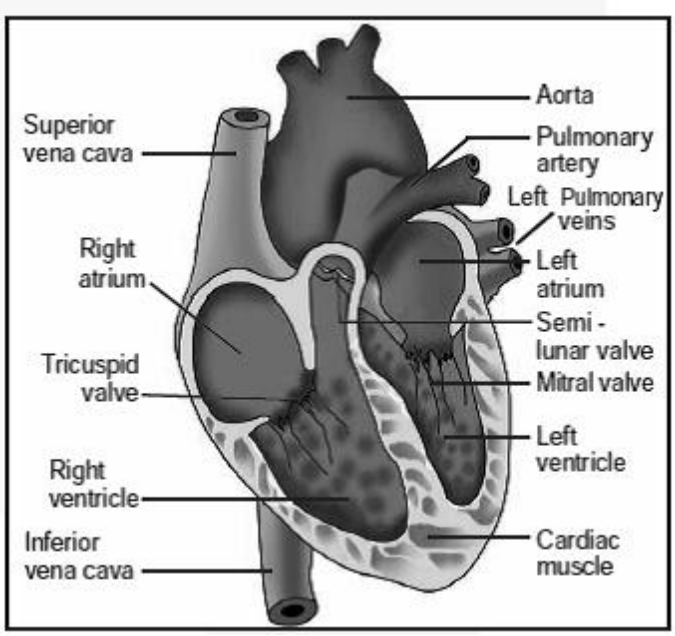
3. LS of kidney



4. Nephron



5. Human heart



6. LIFE PROCESSES

PART A

1. In monotropa the special type of root which absorbs nourishment is
(Haustoria, Mycorrhizal root, Clinging root, Adventious root)
Ans: Mycorrhizal root

2. The product obtained in the Anaerobic respiration of yeast is
(Lactic acid, Pyruvic acid, Ethanol, Acetic acid)
Ans: Ethanol

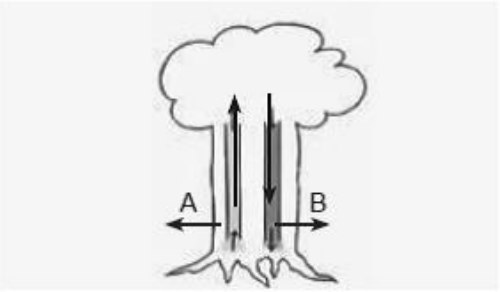
3. The roots of coconut tree are seen away from the plant. Such kind of movement of root for want of water is
(Phototropism,Geotropism,Chemo-tropism, Hydrotropism)
Ans: Hydrotropism

4. The xylem in the plants is responsible for
(transport of water, transport of food, transport of amino acid, transport of oxygen)
Ans: transport of water

5. The autrotropic nutrition requires
(CO_2 and water, chlorophyll, sunlight, all the above)
Ans: all the above

PART B

6. Name the types of vascular tissues in the plant stem which are labeled as A and B



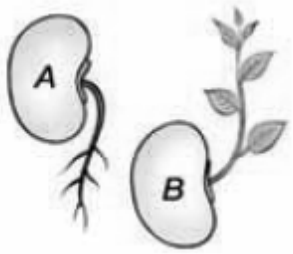
a) Name A and B
A = Xylem **B** = Phloem

b) What are the materials transported through A?
Xylem transports water and dissolved mineral.

c) What are the materials transported through B?
Phloem transports food.

d) How do the materials in A move upwards to leaves?
The materials in A (Xylem) move upwards to leaves due to root pressure and transpiration.

7. Observe the diagram



a) Mention the type of movements shown in fig, A and B.
A = Geotropism B = Phototropism

b) How does the movement differ from the movement of mimosa?
Geotropism and Phototropism : Movements dependant on growth
Mimosa (Touch-me-not plant) : Movement independent on growth

8. Match the methods of nutrition of special organs with suitable examples.

Autotrophs	Mycorrhiza	Cuscutta
Parasites	Chlorophyll	Monotropa
Saprophytes	Haustoria	Hibiscus

Ans:

Autotrophs	Chlorophyll	Hibiscus
Parasites	Haustoria	Cuscutta
Saprophytes	Mycorrhiza	Monotropa

9. In the process of respiration ---------- is six carbon compound, the lactic is ---------- carbon compound.
Glucose & Three

10. Sugar is converted into alcohol. From the above statement what kind of process takes place? Which micro organism is involved?
Anaerobic respiration (*or* fermentation) takes place. In this process the microorganism involved is yeast.

11. Pick out the odd one : The parts of the alimentary canal are
(Pharynx, mouth, buccal cavity, pancreas)
Pancreas

12. In human beings air enters into the body through ---------- and moves into----------
In fishes water enters into the body through ---------- and the dissolved oxygen of water diffuses into ----------
Nostrils, Lungs.
Mouth, Blood

PART C

13. Compare the respiration in higher plants with the respiration in lower plants

No.	Respiration in higher plants	Respiration in lower plants
1	Aerobic respiration takes place in higher plants	Anaerobic respiration takes place in lower plants
2	Oxygen is utilized during respiration	Oxygen is not utilized for respiration
3	More energy is released	Less energy is released
4	Glucose is completely oxidized to CO_2 & H_2O	Incomplete oxidation of glucose into ethanol & CO_2

14. Is the pressure created in xylem enough to conduct water in tall trees? Give reasons.

No, plants use another strategy to move water in the xylem upwards to the highest points of the plant body. This can be achieved by the process of transpiration.

The loss of water in the form of vapour from the aerial parts of the plant is known as transpiration.

The water which is lost through the stomata is replaced by water from the xylem vessels in the leaf. In fact, evaporation of water molecules from the cells of a leaf creates a suction which pulls water from the xylem cells of roots.

Thus, transpiration helps in the absorption and upward movement of water and mineral dissolved in it from roots to the leaves. It also helps in temperature regulation.

The effect of root pressure in transport of water is more important at night. During the day when the stomata are open, the transpiration pull becomes the major driving force in the movement of water in the xylem.

15. In touch me not plant the leaves show movements. What type of movement have you observed? Discuss.

When we touch the leaves of Touch– me–not plant, they begin to fold up and droop. In this movement no growth is involved but, the plant actually moves its leaves in response to touch. So, this is a movement independent of growth.

In touch-me-not plant, if we touch at one point, all the leaflets show the folding movements. This indicates that the stimulus at one point is communicated. But unlike in animal, there is no specialized tissue in plants for transmitting the information. Plant cells change the shape by changing the amount of water in them resulting in swelling or shrinking and therefore the leaves in touch-me-not plant shrinks.

Additional questions

1 Mark

1. In parasites (cuscutta & viscum) the special type of root which absorbs food from the phloem and water & mineral from xylem is called
(Haustoria, Mycorrhizal root, Clinging root, Adventious root)
Ans: Haustoria

2. Intracellular digestion takes place in
(WBC, amoeba, paramecium, sponges, coelenterates, all the above)
Ans: all the above

3. Respiratory substrate is
(carbohydrates, fats, proteins, all the above)
Ans: all the above

4. Complete oxidation of a glucose molecule in aerobic respiration produces --------ATP molecules.
(28, 38, 48, 18)
Ans: 38

5. In which of the following, respiration takes place through body surface?
(Amoeba, Hydra, Sponge, all the above)
Ans: all the above

6. The products obtained in the aerobic respiration are
(Lactic acid and CO_2, CO_2 and water, Ethanol and CO_2)
Ans: CO_2 and water

7. Green pigment present in leaves is
(vitamin, chloroform, chlorophyll, enzyme)
Ans: Chlorophyll

8. Energy currency is
(ADP, ATP, Carbohydrates, Proteins)
Ans: ATP

2 Mark

Fill in the blanks

1. Enzymes are also known as ---------- (Bio-catalysts / Bio-sensors)
Ans: Bio-catalysts

2. The mode of nutrition in green plants is ---------- (Autotrophic nutrition / Heterotrophic nutrition)
Ans: Autotrophic nutrition

3. The mode of nutrition in Parasites & Saprophytes is ----------
(Autotrophic nutrition / Heterotrophic nutrition)
Ans: Heterotrophic nutrition

4. Glycolysis occur in ---------- (Mitochondria / Cytoplasm)
Ans: Cytoplasm

5. Oxidation of pyruvic acid occur in ---------- (Mitochondria / Cytoplasm)
Ans: Mitochondria

6. Conversion of milk into curd is an example for ----------
Ans: Anaerobic respiration *or* Fermentation

7. Site for photosynthesis is ---------- (Leaf / Stem)
Ans: Leaf

8. Absorbing organs of plant ---------- (Leaves / Roots)
Ans: Roots

9. ---------- transports water and minerals (Xylem / Phloem)
Ans: Xylem

10. ---------- transports food and amino acids (Xylem / Phloem)
Ans: Phloem

11. Transpiration occurs in ---------- (Xylem / Phloem)
Ans: Xylem

12. Translocation occurs in ---------- (Xylem / Phloem)
Ans: Phloem

13. Transpiration occurs through ---------- (seed coat / stomata)
Ans: stomata

14. In xylem the conducting elements of the roots, stems and leaves are the ----------
Ans: Vessels and tracheids

15. The translocation of food and other substances takes place in the ---------- of phloem
Ans: sieve tubes

16. ---------- are one of the constituents of the phloem which act as pipe line from leaves to the other parts of the plant
Ans: sieve tubes

17. ---------- allows the phloem to move materials to the different parts of the plant
Ans: Osmotic pressure

18. In spring, sugar stored in root or stem tissue would be transported to the buds, which need energy to grow. This takes place due to ----------
Ans: Osmotic pressure

19. The unicellular animalcules like Amoeba produce ---------- to engulf the diatoms and other minute organisms and digest them within the cell.
Ans: pseudopodia

20. Paramoecium, an another protozoan has a---------- , a cytoplasmic depression to swallow the food
Ans: cytopharynx

21. ---------- carries oxygen (Blood / Lymph)
Ans: Blood

22. ---------- carries fat (Blood / Lymph)
Ans: Lymph

23. In vertebrate animals, defensive function is carried out by ---------- (RBC / WBC)
Ans: WBC

24. Filtering apparatus of nephron is called as ---------- (Glomerulus / uriniferous tubules)
Ans: Glomerulus

25. WBCs engulf the invading germs by producing ---------- around the germs and digest the germs inside them by phagocytosis.
Ans: pseudopodia

26. In human beings, air is taken into the body through the ---------- (**nostrils**)

27. The air passing through the nostrils is filtered by ---------- that line the passage. **(fine hairs)**

28. ---------- are present in the throat which keep the air passage open and prevent it from collapsing. **(Rings of cartilage)**

29. ---------- transports water with dissolved minerals absorbed from the soil. **(Xylem)**

30. ---------- transports products of photosynthesis from the leaves to the parts of the plant.**(Phloem)**

31. In microscopic organisms such as Amoeba and Paramecium, the volume of body is so small that useful substances can be distributed by a process called ---------- **(diffusion)**

32. Blood picks up oxygen from the ---------- and transport it to every cell in the body. **(lungs)**

33. Blood picks up waste product such as ---------- from the cells and excrete out from the body. **(carbon-dioxide and salts)**

34. ---------- is the process by which the metabolic waste products are removed from the plant body. **(Excretion)**

35. The kidney of vertebrates consists of ---------- which filter the blood and form the urine **(nephrons)**

36. Nephron consists of a filtering apparatus called ---------- (**glomerulus**)

37. Earthworm has dual nerve cords. Two ganglia acts as ---------- and eye spots act as ----------
(brain, photo receptors)

38. The plants or animals in which the parasites live for nourishments are called -------(guests / hosts)
Ans: hosts

39. An earthworm has ---------- (dual nerve cords / brain)
Ans: dual nerve cords

40. Well-developed sensory organ for vision and antennae for olfactory function are present in -------
(Worms / Insects)
Ans: Insects

41. Oxidation of pyruvic acid takes place in the ---------- (**mitochondria**)

Spot the error

1. The uriniferous tubules filters the plasma part of the blood to form urine. The glomerulus reabsorb the substances required in the body from that filterate and the final urine product contains mostly water and nitrogenous waste products.
   Ans:
   The **glomerulus** filters the plasma part of the blood to form urine. The **uriniferous tubules** reabsorb the substances required in the body from that filterate and the final urine product contains mostly water and nitrogenous waste products.

2. The gastro intestinal tract (alimentary canal) is a long muscular tube, about 90 mts in length and it commences from the nose and ends in the anus.
   Ans:
   The gastro intestinal tract (alimentary canal) is a long muscular tube, about **9** mts in length and it commences from the **mouth** and ends in the anus.

3. In coelenterates and sponges, the excreta diffuse out through contractilevacuoles,.
   Ans: In coelenterates and sponges, the excreta diffuse out through the cell membrane.

4. Response of the plant to the direction of light is known as geotropism
   Ans: Response of the plant to the direction of light is known as phototropism

Assertion and Reason

1. **Assertion (A):** In spring, sugar stored in root or stem tissue would be transported to the buds.
   Reason(R): Buds need energy to grow.
   a) **A** is right **R** is wrong
   b) **A** is wrong **R** is right
   c) **A** is right and **R** explains **A**
   d) Both **A** and **R** are wrong

   Ans: c) **A** is right and **R** explains **A**

2. **Assertion (A):** Rings of cartilage are present in the throat of human beings
   Reason (R): The cartilage keeps the air passage open and prevents it from collapsing
   a) **A** is right **R** is wrong
   b) **A** is wrong **R** is right
   c) **A** is right and **R** explains **A**
   d) Both **A** and **R** are wrong

   Ans: c) **A** is right and **R** explains **A**

3. **Assertion (A):** The birds are called uricotelic animals
   Reason (R): Their excretory substance is composed mostly of urea
   a) **A** is right **R** is wrong
   b) **A** is wrong **R** is right
   c) **A** is right and **R** explains **A**
   d) Both **A** and **R** are wrong

   Ans: a) **A** is right **R** is wrong

Match the following

1.

Respiratory surface for a fish	Lungs and skin
Respiratory surface for a frog	Alveoli
Respiratory surface for land vertebrates	Gill
Balloon like structure	Lungs

Ans:

Respiratory surface for a fish	Gill
Respiratory surface for a frog	Lungs and skin
Respiratory surface for land vertebrates	Lungs
Balloon like structure	Alveoli

2.

Organisms	**Excretory system**
Unicellular protozoans	Nephridia
Coelenterates and sponges	Kidney
Flat worms and round worms	Cell membrane
Annelids	Contractile vacuoles
Vertebrates	Excretory tubes

Ans:

Organisms	**Excretory system**
Unicellular protozoans	Contractile vacuoles
Coelenterates and sponges	Cell membrane
Flat worms and round worms	Excretory tubes
Annelids	Nephridia
Vertebrates	Kidney

3.

Response of the plant to the direction of light	Hydrotropism
Response of the plant to the direction of gravitational force	Chemotropism
Response of the plant to the direction of water	Phototropism
Response of the plant to the direction of chemicals	Geotropism

Ans:

Response of the plant to the direction of light	Phototropism
Response of the plant to the direction of gravitational force	Geotropism
Response of the plant to the direction of water	Hydrotropism
Response of the plant to the direction of chemicals	Chemotropism

4.

Growth of the stem towards the direction of sunlight	Hydrotropism
Growth of the roots towards the direction of gravitational force	Chemotropism
The roots of coconut tree are seen away from the plant for the want of water	Phototropism
The pollen tubes grow towards ovule	Geotropism

Ans:

Growth of the stem towards the direction of sunlight	Phototropism
Growth of the roots towards the direction of gravitational force	Geotropism
The roots of coconut tree are seen away from the plant for the want of water	Hydrotropism
The pollen tubes grow towards ovule	Chemotropism

Answer the following

1. Define nutrition

The process of obtaining energy through consumption of food is known as nutrition

2. Define respiration

The process of acquiring oxygen through breathing and making it available to cells for the process of breaking down of organic substances into simpler compounds is called as respiration.

3. What is transportation?

Transportation is the process by which the food and oxygen is carried from one organ to other organs in the body.

4. What is excretion?

It is the process by which the metabolic waste by-products are removed from the different organs and released out from the body.

5. What is meant by autotrophic nutrition?

Most of the green plants are self dependent, because they synthesize their own food materials by photosynthesis. Such mode of nutrition is described as autotrophic nutrition.

6. What is meant by heterotrophic nutrition?

Organisms which do not possess chloroplasts cannot carry out photosynthesis. So, they depend upon plants or other organisms for their nutrition. Such mode of nutrition is described as heterotrophic nutrition.

7. What are the raw materials required for photosynthesis?

Sunlight, Water, CO_2 and Chlorophyll.

8. Write the chemical equation involved in photosynthesis

$$6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} \underset{\text{Glucose}}{C_6H_{12}O_6} + 6O_2 + 6H_2O$$

9. What are parasites?

Some organisms live on other organisms for nourishment. They are called Parasites.
e.g.: Cuscutta and Viscum

10. How do parasitic plants absorb food and water from host plants?

Parasitic plants have some special roots called haustoria. These roots penetrate the host plants and absorb food from the phloem, water and minerals from xylem.

11. What are saprophytes?

Some plants obtain nutrients from nonliving organic matter. They are called saprophytes. Many fungi and bacteria are saprophytes.
Eg: Monotropa

12. How do saprophytes absorb nourishments from humus?

Saprophytes (Monotropa) have mycorrhizal roots. The plant absorbs nourishments from the humus through their mycorrhizal roots.

13. From the following organisms, identify parasites and saprophytes

(Cuscutta, Viscum, fungi,bacteria, Monotropa)
Ans:
Parasites: Cuscutta, Viscum
Saprophytes: fungi,bacteria, Monotropa

14. What is intracellular digestion?

If the food is directly taken into the cells and is digested within the cell then this sort of digestion is called intracellular digestion.
Eg: Paramoecium has a cytopharynx, a cytoplasmic depression to swallow the food (i.e microorganisms in water) and digest the food within the cells

15. What is extracellular digestion?

If the digestion takes place in the space or lumen of alimentary canal i.e outside the cell then it is called as extracellular digestion

16. What is digestion?

The process of converting the complex food into a simple chemical substance that can be absorbed and assimilated by the body is called digestion.

17. What is meant by gastroenterology?

The medical speciality that deals with the structure, function, diagnosis and treatment of diseases of stomach and intestine is called gastroenterology.

18. The digestive system is composed of two groups of organs. What are they?

1) The gastro intestinal tract
2) Accessory digestive glands

19. What are the parts of the alimentary canal?

The mouth, buccal cavity, pharynx, oesophagus, stomach, small intestine, large intestine, rectum and anus are the parts of the alimentary canal.

20. Apart from ATP, two other substances are also formed during respiration. What are they?

CO_2 and H_2O.

21. What is meant by respiratory substrate?

Substance that is used in respiration is known as respiratory substrate. Respiratory substrates are of three kinds viz., carbohydrates, fats and proteins.

22. Name the different types of respiration

Depending on whether oxygen is used or not, respiration is of two types:

1. Aerobic respiration.
2. Anaerobic respiration.

23. What is aerobic respiration?

Respiration that uses oxygen is known as aerobic respiration.

24. Aerobic respiration takes place in four stages. What are they?

1. Glycolysis
2. Oxidative decarboxylation of pyruric acid
3. Kreb's cycle
4. Electron transport chain.

25. Write on glycolysis

In Glycolysis, glucose (a simple carbohydrate) is split into two molecules of pyruvic acid. This takes place in the cytoplasm, in a series of reactions and a number of enzymes are involved. With the formation of pyruvic acid, glycolysis comes to an end.

26. What is anaerobic respiration?

In some organisms, oxygen is not utilized for respiration. This type of respiration is known as anaerobic respiration. It is also known as fermentation.

E.g. Conversion of milk into curd.

27. The rate of breathing in aquatic organisms is much faster than that seen in terrestrial organisms. Why?

Since the amount of dissolved oxygen is fairly low, compared to the amount of oxygen in the air, the rate of breathing in aquatic organisms is much faster than that seen in terrestrial organisms.

28. How do fishes breathe?

Fishes take in water through their mouth and force it past the gills where the dissolved oxygen is taken up by the blood.

29. What is transpiration?

The loss of water in the form of vapour from the aerial parts of the plant is known as transpiration.

30. What is translocation?

The transport of soluble products of photosynthesis is called translocation.

31. The effect of root pressure in transport of water is more important at night. Why?

During the day when the stomata are open, the transpiration pull becomes the major driving force in the movement of water in the xylem. Since the stomata are closed during the night the effect of root pressure is more important in transport of water at night.

32. Write the function of lymph

Lymph or tissue fluid is involved in transportation. It is similar to the plasma of blood but it is colourless and contains less protein. Lymph drains into lymphatic capillaries from the intercellular spaces, which join to form large lymph vessels that finally open into veins. Lymph carries digested and absorbed fat, from intestine and drains excess fluid from extra cellular space back into the blood.

33. What are the different ways for excretion in plants?

1. Plant waste products are stored in cellular vacuoles.
2. Waste products may be stored in leaves that fall off.
3. Other waste products are stored as resins and gums, especially in old xylem tissues.
4. Plants also excrete some waste substances into the soil around them.

34. Fishes are called ammoniatelic animals. Why?

Large amount of ammonia is found in fish excreta. So, they are called ammoniatelic animals.

35. Birds are called uricotelic animals. Why?

Birds are called uricotelic animals as their excretory substance is composed mostly of uric acids.

36. Mammals are called ureotelic animals. Why?

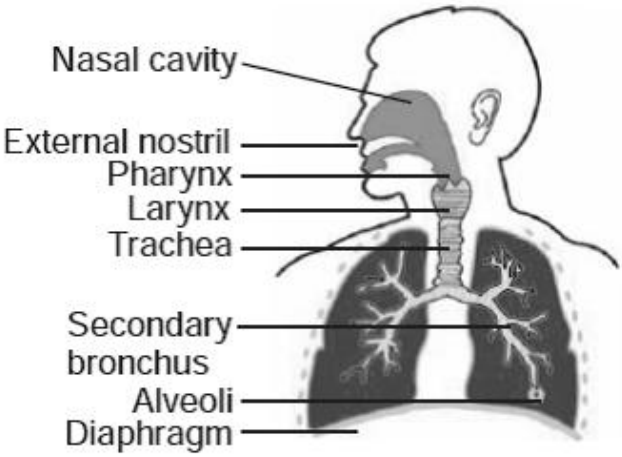
In mammals urea is the main excretory products so they are called ureotelic animals.

37. Write the function of nephron

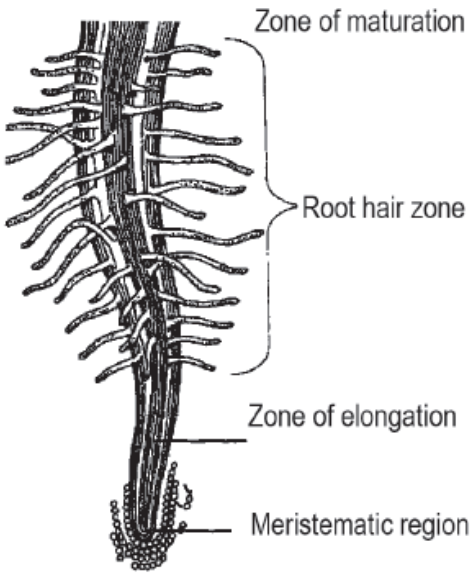
Each Nephron consists of a filtering apparatus called glomerulus and uriniferous tubules. The glomerulus filters the plasma part of the blood to form urine. The uriniferous tubules reabsorb the substances required in the body from that filterate and the final urine product contains mostly water and nitrogenous waste products.

Diagram based questions

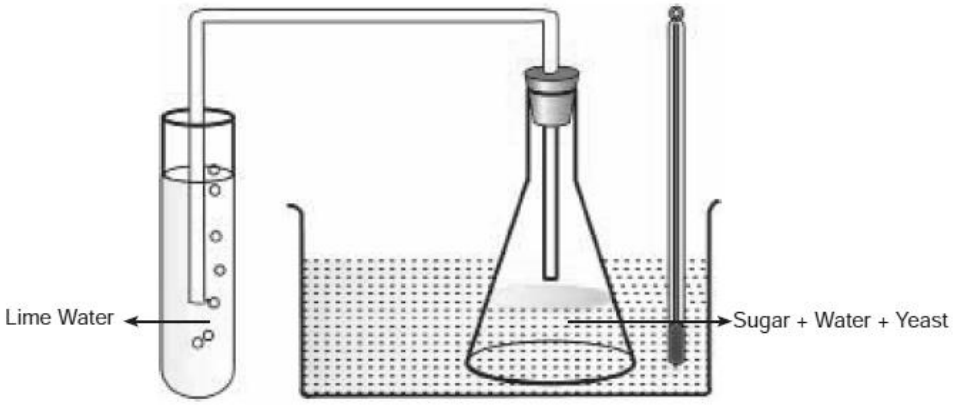
1. Draw the diagram of Human respiratory system and label the parts



2. Draw the diagram of Root hair region and label the parts



3. Observe the diagram and answer the questions given below



a) What type of respiration takes place?
Anaerobic respiration

b) What change is observed in the lime water?
Lime water turns to milky due to the liberation of CO_2 gas.

c) What are the products of fermentation?
Ethanol and CO_2

Textbook questions

Part A

1. Which of the following groups contain only bio degradable items?
Grass, flowers and leather; Grass, wood and plastic; Fruit peels, cake and plastic; Cake, wood and grass
Ans: Grass, flowers and leather & Cake, wood and grass

2. Which of the following constitute a food chain?
a) Grass, wheat and mango **b) Grass, goat and human**
c) Goat, cow and elephant d) Grass, fish and goat

3. Which of the following are environmental friendly practices?
a) carrying cloth bags to carry the purchase items during shopping b) use the public transport
c) switching off light and fans when not in use **d) all the above**

4. What is called as 'black gold'?
a) hydrocarbons b) coal **c) petroleum** d) ether

5. Odd one out.
(Plants, grasshopper, frog, tiger, snake)
Ans: tiger

6. Example for product of green chemistry is
a) plastic b) paper **c) bio plastics** d)halogen flame retardants

7. ---------- green house gas which causes climate change and global warming.
a) hydrogen b) oxygen c) nitrogen **d) carbondioxide**

8. ---------- forms decomposer in the pond ecosystem
a) plants **b) bacteria** c) frog d) phytoplanktons

9. ---------- chemical is used in seeding clouds
a) Potassium iodide b) calcium carbonate c) sulphur dioxide d)ammonium phosphate

***Note*:** potassium iodide or Dry ice

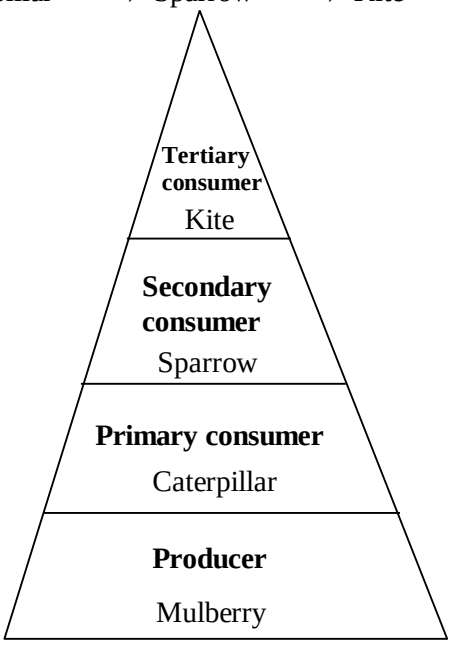
10. Example for fossil fuel is
a) copper b) iron c) magnesium **d) coal**

Part B

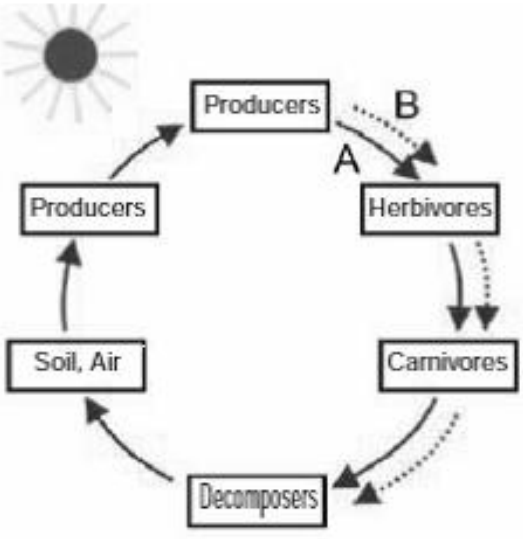
11. Study the food chain below, correct it and convert into a pyramid of energy.

Mulberry ⟶ Sparrow ⟶ Caterpillar ⟶ Kite

Ans: Mulberry ⟶ Caterpillar ⟶ Sparrow ⟶ Kite



12. Study the illustration and answer the question.



a. Which line (A or B) represent the flow of energy? Why do you say so?

Line B represents the flow of energy. This is because, in a food chain energy is passed from one organism to another in a linear fashion as follows:

Producers ⟶ Herbivores ⟶ Carnivores ⟶ Decomposers.

b. Give an example of a decomposer.

Bacteria

13. Study the food chain.

Paddy ⟶ Mouse ⟶ Snake ⟶ Kite.

If the producer has a stored up energy of 500 k Cal. how much of it goes to the organism at the third trophic level get from it?

Ans:

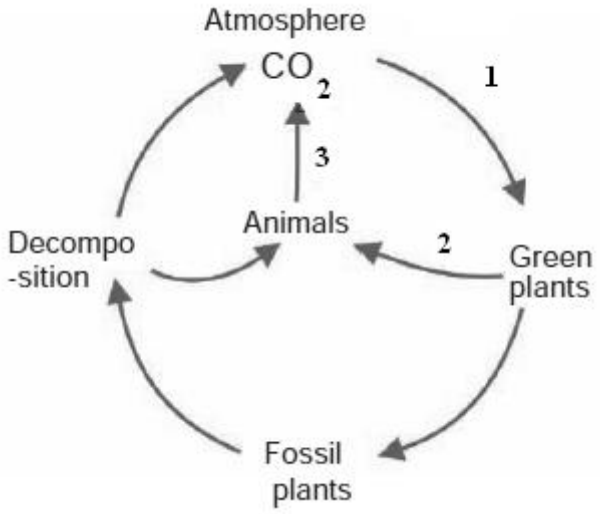
10% of the energy is transferred from one trophic level to the next because the rest is used by the organism to grow and develop.

Trophic level-1 ⟶	Trophic level-2 ⟶	Trophic level-3
(Paddy)	(Mouse)	(Snake)
500 k Cal	**50 k Cal**	**5 k Cal**

$$\left(\frac{10}{100}\times 500 = 50\right) \qquad \left(\frac{10}{100}\times 50 = 5\right)$$

Therefore, 5 k Cal. of energy goes to the organism at the third trophic level.

14.



a. Name the processes noted as no. 1 and 3

Process 1 : Photosynthesis

Process 3 : Respiration

b. Define the process 1

Photosynthesis is the process by which green plants use sunlight to synthesize food from carbon dioxide and water with the help of chlorophyll.

c. Name any one fossil fuel

Coal

Part C

15. a) Classify the following substances –wood, paper, plastic and grasses.

Bio-degradable wastes	Non-bio-degradable wastes
Wood, paper, and grasses.	Plastic

b) Give detailed account on your classification.

Substances that are broken down by biological process of biological or microbial action are called bio-degradable waste. e.g. wood, paper, grass and leather.

Substances that are not broken down by biological or microbial action are called non-bio-degradable wastes. e.g. Plastic and mineral wastes.

16. In your area there is scarcity of water due to this the people are affected. So what are the measures to be taken by you to meet out the scarcity of water? (*or* Write on fresh water management)

To meet out the water scarcity we need several ways to increase the water supply.

i) Seeding clouds

Seeding clouds with dry ice or potassium iodide particles can initiate rain if water laden clouds and conditions that favour precipitation are present.

ii) Desalination: (Reverse osmosis)

Desalination of ocean water is a technology that has great potential for increasing fresh water. In desalination, the common methods of evaporation and recondensation are involved.

iii) Dams, reservoirs and canals

Dams and storage reservoirs tap runoff water in them and transfer the water from areas of excess to areas of deficit using canals and underground pipes.

iv) Water shed management

The management of rainfall and resultant run-off is called water shed management. Water shed is an area characterized by construction of small dams to hold back water.

v) Rain water harvesting

Rain water harvesting essentially means collecting rain water from the roof of building or courtyards and storing it under ground for later use. The main idea in harvesting rain water is to check the run-off water. The rain water that falls on the roofs of buildings or in courtyards is collected through pipes and stored in underground tanks of the buildings fitted with motor for lifting water for use. The process of rain water harvesting is not only simple but also economically beneficial. It helps in meeting the increased demand for water, particularly in urban areas and prevent flooding of living areas.

vi) Wetland conservation

It preserves natural water storage and acts as aquifer recharge zones.

vii) Domestic conservation

As an individual, everyone can reduce the water loss by taking shower, using low-flow taps, using recycled water for lawns, home gardens, vehicle washing and using water conserving appliances.

viii) Industrial conservation

Cooling water can be recharged and waste water can be treated and reused.

17. Smoke, smoke everywhere smoke. Do you agree this situation is good for health. List out the harmful effects of coal burning.

Smoke, smoke everywhere smoke. This situation is not good for health because it leads to air pollution and affects animals and human beings.

Harmful effects of coal burning *Or* **Environmental effects of coal burning:**

1. Generation of waste products which contain mercury, uranium, thorium, arsenic and other heavy metals, which are harmful to human health and environment.
2. Sulphur particles present in the coal will cause acid rain.
3. Interference with ground water and water table levels.
4. Contamination of land and water ways.
5. Dust nuisance.
6. Release of CO_2, a green house gas, which causes climate change and global warming.
7. Coal is the largest contributor to the man-made increase of CO_2 in the air.

Additional questions

1 Mark

1. Hazardous bio-medical wastes are usually disposed off by means of
   a) Landfills b) Deep well injection **c) Incineration** d) none of these

2. Military related liquid and radioactive wastes are usually disposed off by means of
   a) Landfills b) Deep well injection c) Incineration d) none of these

3. ---------- is the largest contributor to the man-made increase of CO_2
   a) Petroleum **b) Coal** c) Natural gas d) Bio-gas

4. ---------- particles present in the coal will cause acid rain
   a) Sulphur b) Carbon c) dust d) phosphorus

5. Release of ----------causes climate change and global warming.
   a) SO_2 b) NO_2 c) CO **d) CO_2**

6. ---------- obtained from natural gas, is used in the production of fertilizers (urea).
   a) Hydrogen gas b) Oxygen gas c) CO d) CO_2

7. ---------- are aquatic pollutants in most of the seas
   a) SO_2 b) CO_2 **c) Tar balls** d) none of these

8. The term global village was coined by ----------
   a) Marshall McLuhan b) William Bragg c) G.P. Thomson d) none of these

9. Which of the following is an abiotic component of ecosystem?
   a) plants b) fungi c) bacteria **d) nitrogen**

10. Which of the following is a phytoplankton?
    a) Chalmydomonas b) Volvox c) Spirogyra **d) All of these**

11. Which of the following is a zooplankton?
    a) insects b) larvae of dragon-fly **c) both a and b** d) none of these

2 Mark

Match the following

1.

Phytoplankton	Primary consumers
Zooplanktons	Producers
Fish, frog, water beetles	Decomposers
Bacteria and fungi	Secondary consumer

Ans:

Phytoplankton	Producers
Zooplanktons	Primary consumers
Fish, frog, water beetles	Secondary consumer
Bacteria and fungi	Decomposers

2.

Waste products	**Disposal methods**
Radioactive wastes	Deep well injection
Hazardous waste liquid	Incineration
Bio-medical wastes	Land fills

Ans:

Waste products	**Disposal methods**
Radioactive wastes	Land fills
Hazardous waste liquid	Deep well injection
Bio-medical wastes	Incineration

Fill up the blanks

1. Burning of waste material is called ---------- (reduction / incineration)
   Ans: incineration

2. In food chain, energy is passed from one organism to another in a ---------- fashion (linear / cyclic)
   Ans: linear

3. ---------- is called Green house gas (CO_2, NO_2)
   Ans: CO_2

4. Bio-plastics are made from ---------- (corn and potatoes /wheat and paddy)
   Ans: corn and potatoes

5. Plastics and mineral wasted are ---------- (bio-degradable / non bio-degradable)
   Ans: non bio-degradable

6. Food waste and yard wastes (leaves, grass) can be composted to produce ----------
(Pesticide / Humus soil conditioner)
Ans: Humus soil conditioner

7. Desalination is a ---------- process (Osmosis / Reverse osmosis)
Ans: Reverse osmosis

8. In desalination, the common methods of ---------- and ---------- are involved
(evaporation and recondensation / osmosis and decantation)
Ans: evaporation and recondensation)

Find the odd one out

1. Wood, paper, plastic, leather
Ans: plastic

2. Wood, paper, plastic, leather
Ans: plastic

3. Hydrilla, Vallisneria, Spirogyra, Water beetles
Ans: Water beetles
(Water beetles –consumer, others – producers)

4. Grass, grasshopper, fish, frog
Ans: fish

Answer the following

1. Define pollution

Any undesirable change in the physical, chemical or biological characteristics of air, land and water that affect human life adversely is called pollution.

2. What is meant by pollutant?

A substance released into the environment due to natural or human activity which affects adversely the environment is called pollutant.
e.g. Sulphur-di-oxide, carbon-monoxide, lead, mercury, etc.

3. How are wastes classified?

Wastes are classified into two types.
1. Bio–degradable wastes 2. Non–bio-degradable wastes

Substances that are broken down by biological process of biological or microbial action are called bio-degradable waste.
e.g. wood, paper and leather.

Substances that are not broken down by biological or microbial action are called non-bio-degradable wastes.
e.g. Plastic and mineral wastes.

4. Kulhads are not the right alternative for plastic cups. Why?

Kulhads (disposable cups made of clay) are not the right alternative for plastic cups, because making these Kulhads on a large scale would result in the loss of the fertile top-soil.

5. What is the advantage of disposable paper-cups over disposable plastic cups?

Plastics cups are non-bio-degradable and hence they create pollution. Disposable paper-cups are bio-degradable and hence they do not create pollution.

6. What are bio-medical wastes?

Human anatomical wastes, discarded medicines, toxic drugs, blood, pus, animal wastes, microbiological and bio-technological wastes etc., are called bio-medical wastes.

7. What is meant by recycling of waste?

The separating out of materials such as rubber, glass, paper and scrap metal from refuse and reprocessing them for reuse is named as reclamation of waste or recycling.

8. Mention the factors which affect the ground water level

Scanty rainfall and unnecessary felling of trees affect the ground water level.

9. What is wildlife sanctuary?

Wildlife sanctuary is an area constituted by competent authority in which hunting or capturing of animals is prohibited except by or under control of the highest authority responsible for management of the area.

10. What is Ecosystem?

A community of organisms that interact with one another and with the environment is called an ecosystem.

11. What are the two types of Ecosystem?

Aquatic and terrestrial.

12. What are the major components in Ecosystem?

There are four major components, namely:

1. Abiotic factors
2. Producers
3. Consumers
4. Decomposers.

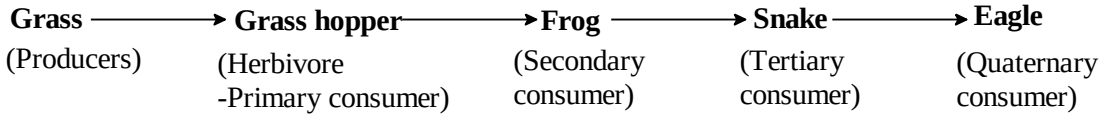
Producers, consumers and decomposers are biotic factors.

13. What is a food chain?

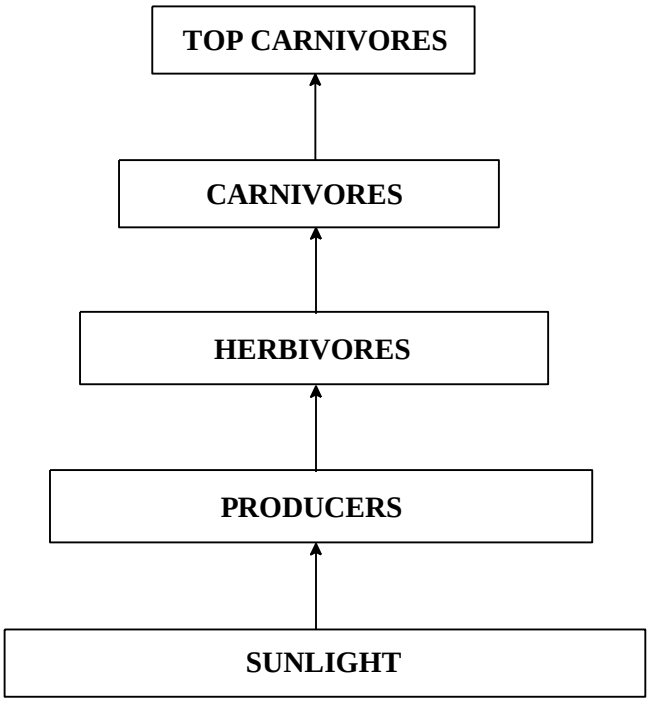
A food chain is the sequence of who eats whom in a biological community (an ecosystem) to obtain energy and nutrition.

Various organisms are linked by food chains in which the food energy is passed from one organism to another in a linear fashion.

14. Give the food chain of a grassland ecosystem.



15. With a diagram show the flow of energy in an ecosystem.



16. What is food web?

Food web is a network of food chains which are interlinked at various trophic levels.
So every component of the ecosystem is connected to one another.

17. What is eco-balance *or* ecological balance?

Thus eco-balance or ecological balance is the maintenance of balance between living components and its resources of an ecosystem, so that it remains a stable environment community for the better functioning of the organisms.

18. How can we maintain Eco-balance in an Ecosystem?

In order to maintain the eco-balance in an ecosystem, there should be recycling of nutrients, minerals, and water. Careful use of natural resources will maintain the eco-balance.

19. What will happen if the Ecosystem is disturbed?

Disturbing the Ecosystem will have a drastic impact upon the living conditions of other organisms that will result in an imbalance. For example, removal of trees and vegetation would affect both land and water ecosystems as there will be no food for organisms. Killing animals and polluting land, air and water also disturb the balance in nature.

20. Write on Bio-Geo chemical cycle

In an ecosystem, the energy from the sun is fixed by the plants. Then it is transferred to herbivores and carnivores. i.e. the energy flows in one direction only.
But the minerals required in the ecosystem are continuously absorbed by the plants and transferred to animals. As the minerals are removed from the soil, they have to be replaced or cycled. These minerals are returned to the soil by the decomposition of dead and decaying materials by saprophytic organisms such as bacteria and fungi

21. What is coal? Write its use

Coal is a compost primarily of carbon along with variable quantities of other elements chiefly sulphur, hydrogen, oxygen and nitrogen.

Coal is used as a solid fuel to produce electricity and heat through combustion.

22. Mention some useful products obtained from coal

Coal is processed in industry to get some useful products such as coke, coal tar and coal gas.

23. What is petroleum or crude oil?

Petroleum or crude oil is a naturally occurring, toxic, flammable liquid consisting of a complex mixture of hydrocarbons and other organic compounds that are found beneath the earth's surface.

24. How was petroleum formed?

Petroleum was formed from organisms living in the sea. After the death of those organisms, their bodies settled at the bottom of the sea and were covered with layers of sand and clay. Over millions of years, absence of air, high temperature and high pressure transformed the dead organisms into petroleum and natural gas.

25. Petroleum is also called 'Black Gold'. Why?

Many useful substances are obtained from petroleum. These are used in the manufacture of detergents, fibers (polyester, nylon, acrylic etc.), polythene and other plastic substances. Due to its great commercial importance, petroleum is also called 'Black Gold'.

26. What are the environmental effects of petroleum?

Oil spills:

1. Crude oil (refined fuel) spills from tanker ship and accidents have damaged natural ecosystem.
2. Oil Spills at sea are generally causing more damage than those on land. This can kill sea birds, mammals, shellfish and other organisms, because of their lateral spreading on water surface.

Tar Balls:

A tar ball is a blob of oil which has been weathered after floating on the ocean. Tar balls are aquatic pollutants in most of the seas.

27. Suggest some alternatives to petroleum-based vehicle fuels

1. Internal combustion engines (Biofuel or combustion hydrogen)
2. Electricity (for e.g. all electric (or) hybrid vehicles), Compressed air or fuel cells (hydrogen fuel cells).
3. Compressed natural gas used by natural gas vehicles.

28. Define 'Green Chemistry'

Green chemistry is the design of chemical products and processes to reduce or eliminate the use and generation of hazardous substances.

29. Write the principles of 'Green Chemistry'

1. It is better to prevent waste generation than to treat or clean up waste after it is generated.
2. Wherever practicable, synthetic methodologies should be designed to use and generate substances that possess little or no toxicity to human health and the environment.
3. Chemical products should be designed to preserve efficacy of function while reducing toxicity.

30. List some of the products produced by the process of green chemistry

1. Lead free solders and other product alternatives to lead additives in paints and the development of cleaner batteries.
2. **Bio-plastics:** Plastics made from plants including corn, potatoes or other agricultural products.
3. Flame resistant materials.
4. Halogen free flame retardants.
   e.g. silicon based materials can be used.

31. What is global village?

Global village is the term that compares the world to a small village, where fast and modern communication allows news to reach quickly. The use of electronics for faster communication is a global village concept.

32. What is the global electronic village?

Global electronic village (GEV) is a term used to refer to a village without borders; it refers to connecting people around the world technologically through Information Communication Technologies (ICTS).

5 Mark

1. Explain the methods adopted for the disposal of harmful waste materials

1. Land Fills

There are permanent storage facilities in secured lands for military related liquid and radioactive waste materials. High level radioactive wastes are stored in deep underground storage.

2. Deep well injection

It involves drilling a well into dry porous material below ground water. Hazardous waste liquids are pumped into the well. They are soaked into the porous material and made to remain isolated indefinitely.

3. Incineration

The burning of materials is called incineration.

Hazardous bio-medical wastes are usually disposed off by means of incineration.

Human anatomical wastes, discarded medicines, toxic drugs, blood, pus, animal wastes, microbiological and bio-technological wastes etc., are called bio-medical wastes.

2. Write on "Management of non-hazardous wastes" *or*
Write on "Solid waste management" *or*
Explain reuse and recycling technique in solid waste management

The separating out of materials such as rubber, glass, paper and scrap metal from refuse and reprocessing them for reuse is named as reclamation of waste or recycling.

Paper (54% recovery)

Paper can be repulped and reprocessed into recycled paper, cardboard and other products.

Glass (20% recovery)

Glass can be crushed, remelted and made into new containers or crushes used as a substitute for gravel or sand in construction materials such as concrete and asphalt.

Food waste and yard wastes

Food waste and yard wastes (leaves, grass etc.,) can be composted to produce humus soil conditioner.

3. What is wild life? Why should we protect and conserve wild life?

All non-domesticated and non cultivated biota found in natural habitat are termed 'wildlife'.
It includes all the natural flora and fauna of a geographic region.

- It is essential to protect and conserve wildlife because they have aesthetic, ecological, educational, historical and scientific values, a good biotic diversity is essential for ecological balance.
- Large scale destruction of wildlife could lead to ecological imbalance.
- Wildlife and their products could be of great economic value if utilized properly.
- The invulnerable plants could yield products of immense medicinal value in future.
- Wildlife also forms as store of vast genetic diversity which could be properly used with advances in genetic engineering.
- Thus wildlife has been of great value in the past and will continue to be so in the future.
- Protection and conservation of wildlife, therefore gains importance.

4. Write on "Pond Ecosystem"

An example for aquatic ecosystem is a pond.

Abiotic factors

It includes light, temperature, hydrogen ion concentration, inorganic substances like CO_2, H_2, O_2, N_2, phosphate, carbonate and S and organic substances like carbohydrates, proteins and lipids.

Biotic factors

It includes producers, consumers and decomposers.
Producers are the water living plants like *Hydrilla, Vallisneria* etc., and *phytoplankton* like *Chlamydomonas, Volvox* and *Spirogyra.*

Primary consumers ***or*** **herbivores**

Zooplanktons like insects, larvae of Dragon-fly consume the phytoplankton.

Secondary Consumers

These are certain fishes, frogs, water beetles etc., which feed on the primary consumers in the pond.

Tertiary Consumers

These are big fishes and kingfisher that feed on small fishes.

Decomposers

Several bacteria and fungi form the decomposers in the pond.

Textbook questions

PART A

1. Example for water-borne disease is (scabies, dracunculiasis, trachoma, typhoid)
Ans: typhoid

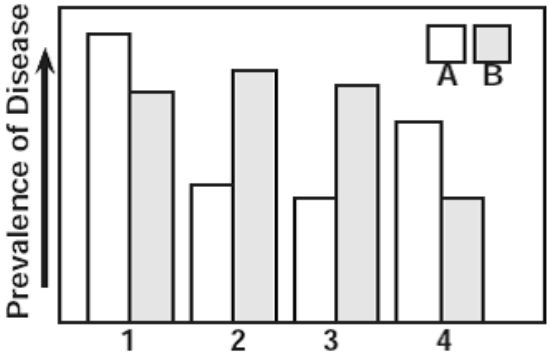
2. The settled and floating materials are removed by this treatment method.
(primary treatment, secondary treatment, tertiary treatment, peripheral treatment)
Ans: primary treatment

3. Which is a non-renewable resource? (coal, petroleum, natural gas, all the above)
Ans: all the above

4. ---------- is the chief component of natural gas. (ethane, methane, propane, butane)
Ans: methane

PART B

5. The bar graph indicates the presence of the infectious diseases in two cities A and B. Observe it and answer the questions given below.
1. Dengue fever 2. Rat fever 3. Cholera 4. Chikungunya

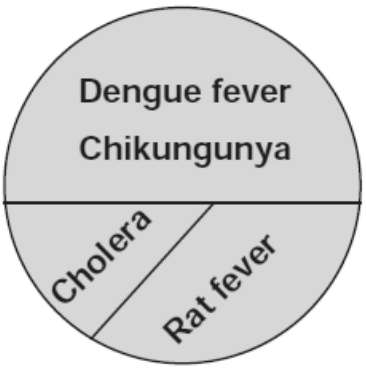


a. What may be the reason for the disease in the city A?
Mosquitoes are the vectors of Dengue fever and Chikungunya. So, the reason for these diseases in city **A** is mosquitoes which breed in water.

b. Which city needs more careful waste disposal and cleaning?
City **A**

c. How can the disease be controlled in city A?
These diseases can be controlled by,
1. ground fogging with disinfectants.
2. Closure of stagnant pools of water.
3. Using mosquito nets and repellants.

6. The pie diagram represents a survey result of infectious diseases of a village during 2008 – 2009. Analyse it and answer the following chart



a. Which diseases affect the majority of the population?
Dengue fever and chikungunya.

b. How are these diseases transmitted?
These diseases are transmitted through the vector-mosquito

c. Write any three measures to control the other two diseases.
1. Hands should be washed thoroughly after using the toilets.
2. Food and water containers should be cleaned and kept closed when they are not in use.
3. Drinking water should be from harmful micro organisms.

7. Match the suitable renewable and nonrenewable sources.

Sources	**A**	**B**	**C**
Renewable	Coal	Wind	Petroleum
Non-renewable	Hydrogen	Natural gas	Solar energy

Ans:

Sources	**A**	**B**	**C**
Renewable	Hydrogen	Wind	Solar energy
Non-renewable	Coal	Natural gas	Petroleum

8. Odd one out

a. bio alcohol, green diesel, bio ethers, petroleum
Ans: petroleum (It is a fossil fuel and not a bio fuel)

b. cholera, typhoid, scabies, dysentry
Ans: scabies (it is a water washed disease while others are water borne diseases)

9. A non renewable resource is a natural resource if it is replaced by natural process at a rate comparable or faster than its rate of consumption by humans.
Read this statement and confirm whether it is correct or incorrect. If it is incorrect give correct statement.
Ans: This is an incorrect statement.
Correct statement: A **renewable** resource is a natural resource if it is replaced by natural process at a rate comparable or faster than its rate of consumption by humans.

10. Pick out the suitable appliances to conserve the electric energy.
Florescent bulbs, copper choke, solar water heater, electric water heater, tungsten bulbs, electronic choke.
Ans: Florescent bulbs, electronic choke and solar water heater.

Additional questions

2 Mark

1. **Assertion (A):** Without water, life cannot be expected on the earth.
Reason (R): Water is essential to all living organisms. All biological functions and cell metabolism require water.
a) **A** is correct, **R** is wrong
b) **A** is wrong, **R** is correct
c) Both **A** & **R** are correct
d) Both **A** & **R** are wrong

Ans: c) Both **A** & **R** are correct

2. **Assertion (A):** Cholera is water borne disease
Reason (R): Water -borne diseases are caused by the ingestion of water communicated by human or animal faeces or urine containing pathogenic bacteria or viruses.
a) **A** is correct, **R** is wrong
b) **A** is wrong, **R** is correct
c) Both **A** & **R** are correct
d) Both **A** & **R** are wrong

Ans: c) Both **A** & **R** are correct

3. **Assertion (A):** Coal is a non-renewable resource.
Reason (R): A non-renewable resource is a natural resource if it is replaced by natural process at a rate comparable or faster than its rate of consumption by humans.
a) **A** is correct, **R** is wrong
b) **A** is wrong, **R** is correct
c) Both **A** & **R** are correct
d) Both **A** & **R** are wrong

Ans: a) **A** is correct, **R** is wrong

4. **Assertion (A):** Denmark is called the country of "winds".
Reason (R): More than 25% of their electricity needs are generated through a vast network of windmills.
a) **A** is correct, **R** is wrong
b) **A** is wrong, **R** is correct
c) Both **A** & **R** are correct
d) Both **A** & **R** are wrong

Ans: c) Both **A** & **R** are correct

Fill up the blanks from the given pair of answers

1. Sewage can be treated with ---------- (Escherichia / Nitrosomonas)
   Ans: Nitrosomonas

2. ---------- has the highest mass-energy content (Hydrogen / Petrol)
   Ans: Hydrogen

3. Natural gas is a major feedstock for the production of ---------- (Ammonia / Glucose)
   Ans: Ammonia

4. ---------- can be used as a fuel for vehicles (Ethanal / Ethanol)
   Ans: Ethanol

5. The fuel which is prepared from vegetable oil animal fats is ---------- (Kerosene / Bio diesel)
   Ans: Bio diesel

6. Anaerobic digestion of organic material by anaerobes produces ---------- (Biogas / Petrol)
   Ans: Biogas

7. ---------- is a green house gas (Methane / Hydrogen)
   Ans: Methane

8. ---------- is called the country of winds (Africa / Denmark)
   Ans: Denmark

Odd one out

1. Coal, petroleum, natural gas, hydrogen
   Ans: Hydrogen (other fuels are fossil fuels)

2. Fluorescent bulbs, electronic regulators, solar water heaters, electric water heaters
   Ans: electric water heaters (other devices conserve energy)

3. Coal, uranium, petroleum, natural gas
   Ans: uranium

4. Coal, uranium, petroleum, natural gas
   Ans: uranium

5. Dengue, filariasis, malaria, typhoid
   Ans: typhoid
   (dengue, filariasis, malaria- Water-related diseases. Typhoid-Water-borne disease)

Diseases	Cause	Example
Water-borne diseases	Ingestion of water contaminated by human or animal faeces or urine containing pathogenic bacteria or viruses.	cholera, typhoid, amoebic and bacillary dysentery and other diarrhoeal diseases.
Water-washed diseases	Poor personal hygiene and skin or eye contact with contaminated water.	scabies, trachoma and flea, lice and tick borne diseases.
Water-based diseases	Parasites found in intermediate organisms living in water.	dracunculiasis, schistosomiasis and other helminthes
Water-related diseases	Insect vectors which breed in water.	dengue, filariasis, malaria, onchocerciasis, trypanosomiasis and yellow fever

Answer the following

1. What is sewage?

Domestic, commercial and industrial waste water is called sewage.

2. What is meant by water cycle?

Water evaporates from moist surfaces, falls as rain or snow, passes through lake, rivers, entered into the ground water table and to the ocean, also fixed in glaciers and deposited over mountains. Plants absorb water from the soil, utilized for its metabolic activities and release it into the atmosphere mainly through transpiration. This is known as water cycle.

3. Write the sources of water

Rainfall, Ocean water, glaciers, ground water. Rivers, lakes and ponds.

4. What is meant by aquifers of underground water?

Geologic layers containing water is known as aquifers of underground water.

5. What is artesian well or spring?

On some areas of the earth's crust, fresh water flows freely which is called as an artesian well or spring.

6. Explain the sewage treatment process for household waste water from toilets, baths, showers, kitchens and sinks

Sewage can be treated close to where it is created (in septic tanks, bio filters or aerobic treatment systems), or collected and transported via a network of pipes and pump stations to a municipal treatment plant.

7. Explain the sewage treatment process for industrial sources of waste water

Industrial sources of waste water often require specialized treatment process. Conventional sewage treatment may involve three stages called primary, secondary and tertiary treatment.

Primary treatment

Primary treatment consists of temporarily holding the sewage in a quiescent basin where heavy solids can settle to the bottom while oil, grease and lighter solids float over the surface. The settled and floating materials are removed and remaining liquid may be discharged or subjected to secondary treatment.

Secondary treatment

Secondary treatment is used to remove dissolved and suspended biological matter. Secondary treatment is typically performed by indigenous, water–borne micro organisms in a managed habitat. Secondary treatment may require a separation process to remove the micro organisms from the treated water prior to discharge or tertiary treatment.

Tertiary treatment

Tertiary treatment is defined as either chemical or treatment of filtration done after primary and secondary treatment. Treated water is sometimes disinfected chemically or physically (for example by lagoons and micro filtration.). Before discharging into a stream, river, bay, lagoon or wetland, or it can be used for the irrigation of a golf course, green way or park. If it is sufficiently clean, it can also be used for groundwater recharge or agricultural purposes.

8. Define Bioremediation

Bioremediation can be defined as any process that is done by the use of microorganisms, fungi or their enzymes to treat the contaminants.

Eg: Nitrosomonas europaea can be used to treat sewage, freshwater, walls of buildings and on the surface of monuments especially in polluted areas where there is high levels of nitrogen compounds.

9. What is waste water? How can we use it?

Waste water is often referred to as grey water. Any water that has been used in the home, with the exception of water in the toilet can be referred to as waste water.

This water could be reused for,

1. watering yard and gardens,
2. Filtering septic systems,
3. Irrigating fields,

10 What are the benefits of house hold waste water recycling systems?

1. Less fresh water usage,
2. Reduce strain in septic tanks,
3. Recharge ground water,
4. Encourage plant growth.

11. Write on water-borne diseases

Water -borne diseases are caused by the ingestion of water contaminated by human or animal faeces or urine containing pathogenic bacteria or viruses.

Eg: cholera, typhoid, amoebic and bacillary dysentery and other diarrhoeal diseases.

12. Write on water-washed diseases

Water-washed diseases are caused by poor personal hygiene and skin or eye contact with contaminated water.

Eg: scabies, trachoma and flea, lice and tick borne diseases.

13. Write on water-based diseases

Water-based diseases are caused by parasites found in intermediate organisms living in water.

Eg: dracunculiasis, schistosomiasis and other helminthes.

14. Write on water-related diseases

Water-related diseases are caused by insect vectors which breed in water.

Eg: dengue, filariasis, malaria, onchocerciasis, trypanosomiasis and yellow fever.

15. Suggest some alternative arrangements for sewage disposal

1. Wastewater is often used in agriculture as it contains water, minerals, and nutrients. Where effluent is used for irrigation, good quality water can be reserved exclusively for drinking water.
2. Wastewater can also be used as a fertilizer, thus minimizing the need for chemical fertilizers. This reduces costs, energy, expenditure and industrial pollution.
3. Waste water is also commonly used in aquaculture or fish farming.

16. Write some basic rules for sanitation in public places

1. There should be sufficient toilet facilities.
2. The toilet facilities should be arranged in separate blocks for men and women.
3. The men's toilet block should have urinals and toilet compartments, the women's block have toilet compartments only.
4. There must be a hand washing basin with clean water.
5. There must be a clean and reliable water supply for hand washing, personal hygiene and flushing of the toilet facilities.

17. What is Energy Management?

Energy management is the process of monitoring controlling and conserving energy in a living home or in any organization.

18. What is meant by energy audit?

An energy audit is an inspection, survey and analysis on energy flows for energy conservation in a building, process or system. It is done to reduce the amount of energy input into the system without negatively affecting the output.

19. What is meant by home energy audit?

A home energy audit is a service where the energy efficiency of a house is evaluated by a person using professional equipment (such as blower doors and infra-red cameras), with the aim to suggest the best ways to improve energy efficiency in heating and cooling the house.

A home energy audit is often used to identify cost effective ways to improve the comfort and efficiency of buildings.

20. By improving efficiency in places like our schools, we can get the same benefits while using less energy. How can you improve the efficiency?

1. By substituting energy efficient, compact fluorescent light bulbs (CFL) for standard incandescent bulbs will save on average up to 6,000 megawatts of electricity each year.
2. By checking for leaks in the system, reducing water usage (especially hot water), and improving the efficiency of water delivery.
3. By recycling paper, milk cartons and other materials, schools are able to reduce the amount of waste they produce.

21. What are renewable resources?

A natural resource is a renewable resource, if it is replaced by natural processes at a rate comparable or faster than its rate of consumption by humans.

Eg: Solar radiation, Hydrogen, Wind and hydroelectricity.

22. What is solar energy?

Solar energy is the energy derived directly from the sun. Photovoltaic cell converts sunlight directly into electricity.

23. Hydrogen is a good choice among all the alternative fuel options. Why?

1. Hydrogen can be produced in unlimited quantities with on hand production technologies.
2. Hydrogen is non-toxic, reasonably safe to handle, distribute and to be used as a fuel.
3. Hydrogen has the highest mass energy content. i.e. its heat of combustion per unit weight is greater than that of other fuels.

24. How is wind power generated?

Wind power is derived from uneven heating of the Earth's surface from the sun and the warm core. In wind mills, the rotation of turbine blades is converted into electrical current by means of an electrical generator.

25. What are non-renewable sources?

A non-renewable resource is a natural resource which cannot be produced, grown, generated or used on a scale which can sustain its consumption rate. These resources often exist in a fixed amount, or are consumed much faster than nature can create them.
Eg: Fossil fuels (such as coal, petroleum and natural gas) and nuclear power (uranium)

26. What are fossil fuels?

Fossil fuels are energy rich, combustible forms of carbon or compounds of carbon formed by the decomposition of biomass buried under the earth over million of years.
Eg: coal, petroleum and natural gas

27. What is coal?

Coal is a black mineral of plant origin which is chemically, a complex mixture of elemental carbon, compounds of carbon containing hydrogen, oxygen, nitrogen and sulphur.

28. What is petroleum?

Petroleum is a dark, viscous, foul smelling liquid, a mixture of solid, liquid and gaseous hydro carbons with traces of salt, rock particles and water.

29. What is natural gas?

The composition of natural gas is chiefly methane (> 90%) with traces of ethane and propane. It is found associated with other fossil fuels, in coal beds, as methane clathrates and it is created by methanogenic organisms in marshes, bogs, and landfills.

30. Write the uses of natural gas

1. **Power Generation:**
   Natural Gas is a major source of electricity generation through the use of gas turbines and steam turbines.
2. **Domestic use:**
   Natural gas is used for cooking. Natural gas is used in heater, clothes dryers, heating or cooling and central heating.
3. Natural gas is also used in the manufacture of fabrics, glass, steel, plastics, paint and other products.

31. What is the disadvantage of burning fossil fuels?

Burning of fossil fuels lead to the release of harmful materials which cause air pollution.

32. What are Bio-fuels?

Bio-fuels are a wide range of fuels which are in some way derived from biomass.
The various liquid bio fuels for transportation are
1. Bio alcohol 2. Green diesel 3. Bio diesel 4. Vegetable oil 5. Bio ethers 6. Bio gas

33. How is bio alcohol *or* Bio ethanol produced? Write its use

Bio ethanol is an alcohol made by fermenting the sugar components of plant materials and it is made mostly from sugar and starch crops. With advanced technology being developed, cellulosic biomass, such as trees and grasses are also used as feed stocks for ethanol production. Ethanol can be used as a fuel for vehicles in its pure form.

34. How is biodiesel produced? Write its use

Biodiesel is made from vegetable oil and animal fats. It is used as a fuel for vehicles in its pure form.

35. How is biogas produced? Write its use

Biogas is produced by the process of anaerobic digestion of organic material by anaerobes. It can be produced either from bio degradable waste material or by the use of energy crops fed into anaerobic digesters to supplement gas yields. It is used as a domestic fuel.

36. What is meant by 'Energy conservation'? Why should we conserve energy?

Energy conservation refers to efforts made to reduce energy consumption.
We should conserve energy in order to
a) preserve resources for the future and
b) reduce environmental pollution.

37. Write the benefits of energy conservation

1. Energy conservation may result in increase of financial capital, environmental value, national security, personal security and human comfort.
2. Individuals and organizations that are direct consumers of energy should conserve energy in order to reduce energy costs and promote economic security.
3. Industrial and commercial users should conserve energy in order to increase the efficiency and thus maximize profit.

38. How can we help energy conservation while using lights?

1. Turn off the lights when not in use.
2. De-dust lighting fixtures to maintain illumination.
3. Focus the light where you need.
4. Use fluorescent bulbs.
5. Use electronic chokes in place of conventional copper chokes.

39. How can we help energy conservation while using fans?

1. Replace conventional regulators with electronic regulators for ceiling fans.
2. Install exhaust fans at a higher elevation than ceiling fans.

40. How can we help energy conservation while using electric Iron?

1. Select iron boxes with automatic temperature cut off.
2. Use appropriate regulator position for ironing.
3. Do not put more water on clothes while ironing.
4. Do not iron wet clothes.

41. How can we help energy conservation while using gas stove?

1. When cooking on a gas burner, use moderate flame settings to conserve LPG.
2. Remember that a blue flame means your gas stove is operating efficiently.
3. If there is yellowish flame, this indicates that the burner needs cleaning.
4. Use pressure cooker as much as possible.
5. Use lids to cover the pans while cooking.

42. How can we help energy conservation while using electronic devices?

1. Do not switch on the power when TV and Audio systems are not in use. i.e., idle operation leads to an energy loss of 10 watts / device.
2. Battery chargers such as those for laptops, cell phones and digital cameras, draw power whenever they are plugged in and are very inefficient. Pull the plug and save.

43. How can we help energy conservation while using washing Machine?

1. Always wash only with full loads.
2. Use optimal quantity of water.
3. Use timer facility to save energy.
4. Use the correct amount of detergent.
5. Use hot water only for very dirty clothes.
6. Always use cold water in the rinse cycle.

10th SCIENCE (EM) :

A COMPLETE GUIDE

for

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&

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