

WARNING	Any malpractice or any attempt to commit any kind of malpractice in the Examination will DISQUALIFY THE CANDIDATE .
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PAPER – II BIOLOGY – 2015

Version Code	B2	Question Booklet Serial Number :	
Time : 150 Minutes	Number of Questions : 120	Maximum Marks : 480	
Name of Candidate			
Roll Number			
Signature of Candidate			

INSTRUCTIONS TO THE CANDIDATE

1. Please ensure that the **VERSION CODE** shown at the top of this Question Booklet is the same as that shown in the Admit card issued to you. If you have received a Question Booklet with a different Version Code, please get it replaced with a Question Booklet with the same Version Code as that of the Admit card. **THIS IS VERY IMPORTANT.**
2. Please fill in the items such as name, roll number and signature in the columns given above. Please also write Question Booklet Sl. No. given at the top of this page against item 3 in the OMR Answer Sheet.
3. This Question Booklet contains 120 questions. For each question, five answers are suggested and given against (A), (B), (C), (D) and (E) of which only one will be the **Most Appropriate Answer**. Mark the bubble containing the letter corresponding to the 'Most Appropriate Answer' in the OMR Answer Sheet, by using either **Blue or Black ball-point pen only**.
4. **Negative Marking:** In order to discourage wild guessing, the score will be subjected to penalization formula based on the number of right answers actually marked and the number of wrong answers marked. Each correct answer will be awarded **FOUR** marks. **ONE** mark will be deducted for each incorrect answer. More than one answer marked against a question will be deemed as incorrect answer and will be negatively marked.
5. Please read the instructions given in the OMR Answer Sheet for marking answers. Candidates are advised to strictly follow the instructions contained in the OMR Answer Sheet.

IMMEDIATELY AFTER OPENING THIS QUESTION BOOKLET, THE CANDIDATE SHOULD VERIFY WHETHER THE QUESTION BOOKLET ISSUED CONTAINS ALL THE 120 QUESTIONS IN SERIAL ORDER. IF NOT, REQUEST FOR REPLACEMENT.

DO NOT OPEN THE SEAL UNTIL THE INVIGILATOR ASKS YOU TO DO SO.

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Bio-II-B2/2015

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**PLEASE ENSURE THAT THIS QUESTION BOOKLET CONTAINS
120 QUESTIONS SERIALLY NUMBERED FROM 1 TO 120.
PRINTED PAGES : 32**

1. Select the wrongly matched pair

- (A) Fibre - Sunhemp
- (B) Spice - Belladonna
- (C) Edible oil - Groundnut
- (D) Fodder - Trifolium
- (E) Fumigatory - Tobacco

2. Match the modification in Column I with the part modified in Column II and choose the right option.

Column I	Column II
(1) Pneumatophores in Rhizophora	(a) Axillary buds
(2) Tendrils in pea	(b) Roots
(3) Thorns in Citrus	(c) Leaves

- (A) (1) - (b), (2) - (a), (3) - (c)
- (B) (1) - (c), (2) - (a), (3) - (b)
- (C) (1) - (c), (2) - (b), (3) - (a)
- (D) (1) - (b), (2) - (c), (3) - (a)
- (E) (1) - (a), (2) - (b), (3) - (c)

3. Select the characters which are not applicable to the anatomy of dicot roots?

- (a) Conjunctive tissue present
 - (b) Presence of protein compounds in the Casparian strips
 - (c) Polyarch xylem bundles
 - (d) Presence of pericycle
- (A) (a) and (b) (B) (b) and (d) (C) (c) and (d)
(D) (a) and (d) (E) (b) and (c)

4. Lenticels are involved in

- (A) Photosynthesis (B) Food transport
- (C) Conduction of water (D) Transpiration
- (E) Gaseous exchange

5. Match the following.

- | | | |
|-----------------------|---|--|
| (a) Collenchyma | - | (1) Specialized epidermal cells |
| (b) Subsidiary cells | - | (2) Mechanical support for growing plants |
| (c) Casparian strips | - | (3) Mesophyll tissue of dicot leaf |
| (d) Spongy parenchyma | - | (4) Suberin deposition in the radial walls of endodermis |

- (A) (a) - (2), (b) - (1), (c) - (4), (d) - (3)
(B) (a) - (2), (b) - (3), (c) - (4), (d) - (1)
(C) (a) - (1), (b) - (2), (c) - (3), (d) - (4)
(D) (a) - (4), (b) - (1), (c) - (2), (d) - (3)
(E) (a) - (3), (b) - (4), (c) - (1), (d) - (2)

6. Pick out the wrong statement

- (A) Gymnosperms lack vessels in their xylem
(B) The cell wall of parenchyma is made up of pectin
(C) The first formed primary xylem elements are called protoxylem
(D) Gymnosperms have albuminous cells and have sieve cells in their phloem
(E) Intercellular spaces are absent in collenchyma

7. i. They help in respiration
ii. They help in cell wall formation
iii. They help in DNA replication
iv. They increase surface area of plasma membrane

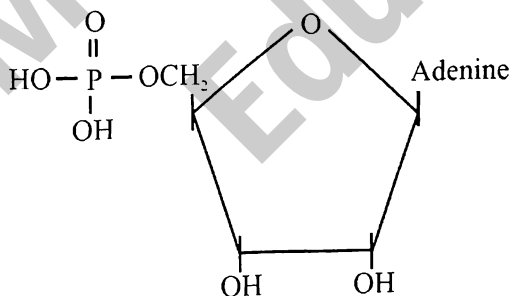
Which of the following prokaryotic structures has all the above roles?

- (A) Chromosome (B) Ribosome (C) Mesosome
(D) Lysosome (E) Polysome

8. Match the Column I with that of Column II and choose the correct combination from the options given.

	Column I – Organelle		Column II – Site for
(a)	Rough ER	(1)	Synthesis of glycoproteins
(b)	Smooth ER	(2)	Aerobic respiration
(c)	Mitochondria	(3)	Synthesis of lipid
(d)	Golgi apparatus	(4)	Protein synthesis

- (A) (a) - (1), (b) - (2), (c) - (3), (d) - (4)
 (B) (a) - (2), (b) - (3), (c) - (4), (d) - (1)
 (C) (a) - (3), (b) - (4), (c) - (2), (d) - (1)
 (D) (a) - (4), (b) - (3), (c) - (2), (d) - (1)
 (E) (a) - (4), (b) - (3), (c) - (1), (d) - (2)
9. Which of the following cell organelle is excluded from endomembrane system?
 (A) Endoplasmic reticulum (B) Mitochondria
 (C) Golgi complex (D) Lysosomes
 (E) Vacuoles
10. The given organic compound is a diagrammatic representation of



- (A) Lecithin (B) Adenosine (C) Adenylic acid
 (D) Uridine (E) Cholesterol

11. Which one of the following is the significance of mitosis?
- (A) Restricted to haploid cell.
 - (B) Cell repair
 - (C) Increases the genetic variability
 - (D) Recombination of chromosomes
 - (E) Leads to evolution of new genotypes
12. Which of the following statements about the structure of proteins is true?
- (A) The sequence of amino acids in a protein represents the secondary structure
 - (B) The helices of proteins are always left handed
 - (C) Adult human hemoglobin consists of two subunits
 - (D) The left end of a protein is called the C-terminal and the right end is called the N-terminal
 - (E) Proteins are heteropolymers containing strings of amino acids.
13. In a typical eukaryotic cell cycle, Gap 1, Synthesis and Gap 2 are the three phases included in the
- (A) Prophase (B) Metaphase (C) Anaphase
 - (D) Interphase (E) Telophase
14. Find out the correct statement
- (A) During mitosis endoplasmic reticulum and nucleolus disappear completely at early prophase
 - (B) Chromosomes are arranged along the equator during prophase of mitosis
 - (C) Chromosome is made up of two sister chromatids at anaphase of mitosis
 - (D) A cell plate is laid down during interphase
 - (E) Small disc shaped structures at the surface of the centromeres that appear during metaphase are kinetochores

15. Which of the following secondary metabolites belong to the group drugs?
I. Morphine II. Curcumin III. Codeine IV. Vinblastine V. Abrin
- (A) I and II only
(B) I and V only
(C) II and III only
(D) II and IV only
(E) III and IV only
16. Which of the following statements about the mass flow hypothesis is wrong?
- (A) It is the accepted mechanism for translocation of sugars from source to sink
(B) As glucose is prepared at source it is converted to sucrose
(C) Sucrose is actively loaded into a sieve tube
(D) The process of loading at source produces a hypotonic condition in the phloem
(E) Water in the adjacent xylem moves into the phloem by osmosis
17. Pick out the wrong statement
- (a) Apoplast is the system of adjacent cell walls that is continuous throughout the plant
(b) Endodermis is impervious to water molecules
(c) Pinus seeds germinate and establish without the presence of mycorrhizae
- (A) (a) and (b) (B) (b) and (c)
(C) (c) only (D) (b) only
(E) (a) only
18. 3-phosphoglyceric acid (PGA) as the first CO₂ fixation product in algal photosynthesis was discovered by
- (A) Joseph Priestley (B) Jan Ingenhousz
(C) T.W. Engelmann (D) Julius von Sachs
(E) Melvin Calvin

19. Match the following.

- (a) Chlorophyll *a* - (1) yellow
(b) Chlorophyll *b* - (2) bright or blue green
(c) Xanthophyll - (3) yellow – yellow orange
(d) Carotenoids - (4) yellow green
- (A) (a) - (2), (b) - (4), (c) - (1), (d) - (3)
(B) (a) - (3), (b) - (4), (c) - (2), (d) - (1)
(C) (a) - (4), (b) - (3), (c) - (2), (d) - (1)
(D) (a) - (4), (b) - (2), (c) - (1), (d) - (3)
(E) (a) - (4), (b) - (1), (c) - (3), (d) - (2)

20. Match the following and choose the correct option.

- (a) Water potential - (i) It is usually positive
(b) Solute potential - (ii) It is zero for pure water
(c) Pressure potential - (iii) It is always negative
- (A) (a) - (ii), (b) - (iii), (c) - (i)
(B) (a) - (i), (b) - (iii), (c) - (ii)
(C) (a) - (iii), (b) - (ii), (c) - (i)
(D) (a) - (ii), (b) - (i), (c) - (iii)
(E) (a) - (iii), (b) - (i), (c) - (ii)

21. Which of the following statements about plasmolysis is/are true?

- I. Plasmolysis occurs when water moves into the cell
II. Cells shrink in hypotonic solutions
III. If the external solution balances the osmotic pressure of the cytoplasm, it is said to be isotonic
- (A) I only (B) II only
(C) III only (D) I and II only
(E) II and III only

22. FAD is electron acceptor in the citric acid cycle during the oxidation of
- (A) Malic acid to oxaloacetic acid
 (B) Succinic acid to malic acid
 (C) Citric acid to alpha-ketoglutaric acid
 (D) Alpha-ketoglutaric acid to succinic acid
 (E) Oxaloacetic acid to citric acid
23. Maximum absorption of light by chlorophyll *a* occurs in which regions of the absorption spectrum?
- (a) blue (b) red (c) green (d) yellow
- (A) (a) and (b) only (B) (b) and (c) only
 (C) (a) and (d) only (D) (b) and (d) only
 (E) (c) and (d) only
24. Match the Column I with that of Column II and choose the correct combination from the options given.

	Column I – Essential elements		Column II – Deficiency causes
(a)	N, K, Mg, S, Fe, Mn, Zn, and Mo	(1)	Inhibit cell division
(b)	N, K, S and Mo	(2)	Necrosis
(c)	Ca, Mg, Cu and K	(3)	Delay in flowering
(d)	N, S and Mo	(4)	Chlorosis

- (A) (a) - (4), (b) - (3), (c) - (2), (d) - (1)
 (B) (a) - (1), (b) - (2), (c) - (3), (d) - (4)
 (C) (a) - (4), (b) - (1), (c) - (2), (d) - (3)
 (D) (a) - (2), (b) - (3), (c) - (4), (d) - (1)
 (E) (a) - (3), (b) - (4), (c) - (2), (d) - (1)

25. In which one of the following reactions of glycolysis, oxidation takes place?
- (A) Glucose 6-phosphate to fructose 6-phosphate
 - (B) Fructose 6-phosphate to fructose 1,6-bisphosphate
 - (C) 1,3-bisphosphoglycerate to 3-phosphoglyceric acid
 - (D) 3-phosphoglyceraldehyde to 1,3-bisphosphoglycerate
 - (E) 2-phosphoglycerate to phosphoenol pyruvate
26. Cyclic-photophosphorylation results in the formation of
- (A) NADPH + H⁺
 - (B) ATP and NADPH + H⁺
 - (C) ADP
 - (D) ATP
 - (E) ADP and NADP
27. Select the correctly matched pair
- (A) C. Darwin and S.F. Darwin - Gibberellic acid
 - (B) F.W. Went - Auxin
 - (C) E. Kurosawa - Ethylene
 - (D) Skoog and Miller - Abscisic acid
 - (E) Cousins - Cytokinin
28. One hormone stimulates the closure of stomata and another one influences the swelling of the axis in dicot plants. They are
- (A) Gibberellins and ethylene
 - (B) Abscisic acid and cytokinins
 - (C) Gibberellins and cytokinins
 - (D) Auxin and cytokinins
 - (E) Abscisic acid and ethylene

29. Which of the following statements regarding photoperiodism is false?
- (A) The response of plants to periods of light/day is termed photoperiodism
 - (B) The shoot apices cannot perceive photoperiods
 - (C) In day neutral plants there is no correlation between exposure to light duration and induction of flowering response
 - (D) Shoot apices modify themselves into flowering apices prior to flowering
 - (E) The site of perception of the light/dark duration is the flower
30. The residual persistent nucellus in the seed of black pepper and beet is called
- (A) Perisperm (B) Endosperm (C) Pericarp
 - (D) Scutellum (E) Apomixis
31. Consider the following statements with respect to flowering plants
- (a) The pollen grains represent the male gametes
 - (b) The functional megaspore develops into the embryo sac represent the female gamete
 - (c) Transfer of pollen grains from anther to the stigma of different plant is known as xenogamy.
 - (d) Transfer of pollen grains from anther to the stigma of another flower of the same plant is known as geitonogamy
- Of the above statements
- (A) (a) and (b) alone are correct (B) (a) and (c) alone are correct
 - (C) (a) and (d) alone are correct (D) (b) and (c) alone are correct
 - (E) (c) and (d) alone are correct
32. Which of the following is false in angiosperms?
- (A) Egg cell - Haploid
 - (B) Megaspore - Diploid
 - (C) Pollen grain - Haploid
 - (D) Synergid - Haploid
 - (E) Endosperm - Triploid

33. Consider the following statements and choose the correct option
- (a) The ovule is attached to the placenta by means of a stalk called filament
 - (b) The ovule fuses with the stalk in the region called hilum
 - (c) The two protective envelopes of ovule are called integuments
 - (d) The small opening in the tip of ovule is called germ pore

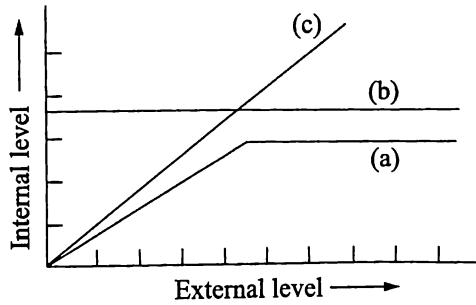
Of the above statements

- (A) (a) and (d) are correct
 - (B) (a) and (c) are correct
 - (C) (b) and (d) are correct
 - (D) (b) and (c) are correct
 - (E) (c) and (d) are correct
34. Who proved that blends of polyblend (plastic waste) and bitumen, when used to lay roads, enhanced the bitumen's water repellent properties and helped to increase road life?
- (A) Amrita Devi
 - (B) Ramdeo Misra
 - (C) W.H. Pearsall
 - (D) Ramesh Chandra Dagan
 - (E) Ahmed Khan
35. Match the following.

(a) Earthworm	(1) Catabolism
(b) Bacterial and fungal enzymes	(2) Breaks down detritus into smaller particles
(c) Accumulation of dark coloured amorphous substance	(3) Detritivores
(d) Fragmentation	(4) Humus

- (A) (a) - (3), (b) - (2), (c) - (4), (d) - (1)
 - (B) (a) - (3), (b) - (1), (c) - (4), (d) - (2)
 - (C) (a) - (2), (b) - (1), (c) - (4), (d) - (3)
 - (D) (a) - (2), (b) - (3), (c) - (4), (d) - (1)
 - (E) (a) - (3), (b) - (4), (c) - (2), (d) - (1)
36. The first trophic level in an ecosystem consists of
- (A) Primary producers
 - (B) Primary consumers
 - (C) Secondary producers
 - (D) Secondary consumers
 - (E) Top carnivores

37. The following figure given below is a diagrammatic representation of organismic response to abiotic factors. What do (a), (b) and (c) represent respectively?



- (A) (a) Conformers (b) Regulators (c) Partial regulators
 (B) (a) Regulators (b) Partial regulators (c) Conformers
 (C) (a) Partial regulators (b) Regulators (c) Conformers
 (D) (a) Partial regulators (b) Conformers (c) Regulators
 (E) (a) Conformers (b) Partial regulators (c) Regulators
38. Select the correct statement
 (A) Phosphorus cycle is an example of gaseous nutrient cycle
 (B) The pyramid of biomass in sea is generally inverted
 (C) By the process of humification, soluble inorganic nutrients go down into the soil horizon
 (D) A given organism may not occupy more than one trophic level simultaneously
 (E) Pyramid of energy is always inverted, can never be upright
39. The rate of biomass production and the rate of production of organic matter during photosynthesis are called respectively
 (A) Total productivity, primary production
 (B) Gross primary productivity, gross secondary productivity
 (C) Net primary productivity, secondary productivity
 (D) Net productivity, gross secondary productivity
 (E) Productivity, gross primary productivity
40. Allen's rule applies to
 (A) Tribes living in high altitudes
 (B) Mammals from colder climates
 (C) Fish living in Antarctic waters
 (D) Desert lizards
 (E) Marine invertebrates

41. Pick out the correct option from (A) to (E)
- (a) Primary succession takes place in areas where natural communities have been destroyed
 - (b) Hydrarch succession takes place in water
 - (c) The climax community is the community that is in near equilibrium with the immediate environment
 - (d) In newly cooled lava secondary succession occurs
- (A) (a) and (b) are correct, (c) and (d) are incorrect
(B) (b) and (c) are correct, (a) and (d) are incorrect
(C) (a) and (d) are correct, (b) and (c) are incorrect
(D) (b) only is correct, (a), (c) and (d) are incorrect
(E) (a) only is correct, (b), (c) and (d) are incorrect
42. Select the wrong statement
- (A) The presence of chromogenic substrate gives blue colour colonies, if the plasmid in the bacteria does not have an insert
 - (B) Retroviruses in animals have the ability to transform normal cells into cancerous cells
 - (C) In microinjection, cells are bombarded with high velocity microparticles of gold or tungsten coated with DNA
 - (D) Since DNA is a hydrophilic molecule it cannot pass through cell membranes
 - (E) DNA is a negatively charged molecule
43. Which of the following organisms breeds only once in lifetime?
- (A) Bamboo (B) Oysters (C) Pelagic fishes
(D) Birds (E) Mammals
44. Select the wrong statement
- (A) Human insulin is being commercially produced from a transgenic species of *Escherichia coli*
 - (B) The genetically modified *Bacillus thuringiensis* is used as biopesticide on the commercial scale
 - (C) Human protein, alpha-1-antitrypsin is used to treat emphysema
 - (D) The first transgenic cow, Rosie, produced alpha lactalbumin, enriched milk
 - (E) Bt toxin genes *Cry1Ac* control the corn borer

45. Choose the correct statement
- (A) Members of phycomyetes are facultative parasites on plants
- (B) Fusion of protoplasts between two motile or non-motile gametes is called plasmogamy
- (C) Kingdom Plantae includes all eukaryotic chlorophyll containing organisms and non-chlorophyll organisms called plants
- (D) Trichoderma belongs to basidiomycetes
- (E) Euglenoids include diatoms
46. Which of the following characters belongs to the Kingdom Monera?
- (A) Eukaryotic
- (B) Heterotrophic
- (C) Multicellular
- (D) Presence of cell walls made of cellulose
- (E) Presence of nuclear membrane
47. Match the following and choose the correct combination from the options given.

	Column I		Column II
(a)	Saprophytic protists	(1)	Trypanosoma
(b)	Golden algae	(2)	Plasmodium
(c)	Malarial parasite	(3)	Desmids
(d)	Sleeping sickness is caused by	(4)	Slime moulds

- (A) (a) - (1), (b) - (2), (c) - (3), (d) - (4)
- (B) (a) - (2), (b) - (3), (c) - (4), (d) - (1)
- (C) (a) - (4), (b) - (3), (c) - (2), (d) - (1)
- (D) (a) - (3), (b) - (4), (c) - (2), (d) - (1)
- (E) (a) - (2), (b) - (4), (c) - (1), (d) - (3)

48. Of the following statements which are not relevant to Archaeobacteria?
- (a) They live in some of the most harsh habitats
 - (b) They are present in the gut of several ruminant animals
 - (c) They are characterized by the presence of a rigid cellulosic cell wall
 - (d) They include mycoplasma
 - (e) They are also referred to as blue-green algae
- (A) (a), (b) and (c)
(B) (a), (c) and (e)
(C) (c), (d) and (e)
(D) (a), (c) and (d)
(E) (b), (c) and (e)
49. Which of the following is wrongly matched?
- (A) T.O.Diener - Viroids are found to be a free DNA
 - (B) W.M.Stanley - Crystallised proteins
 - (C) M.W.Beijerinck - Contagium vivum fluidum
 - (D) D.J.Iwanowsky - Microbes smaller than bacteria cause mosaic disease of tobacco
 - (E) L.Pasteur - Virus means venom (or) poisonous fluid
50. Which one of the following is used extensively in biochemical and genetic work?
- (A) Saccharomyces
 - (B) Aspergillus
 - (C) Claviceps
 - (D) Penicillium
 - (E) Neurospora

51. Match Column I with Column II and choose the right option.

I		II	
(a)	Claviceps	(1)	Deuteromycetes
(b)	Puccinia	(2)	Ascomycetes
(c)	Trichoderma	(3)	Basidiomycetes
(A)	(a) - (3),	(b) - (1),	(c) - (2)
(B)	(a) - (2),	(b) - (3),	(c) - (1)
(C)	(a) - (1),	(b) - (3),	(c) - (2)
(D)	(a) - (3),	(b) - (2),	(c) - (1)
(E)	(a) - (2),	(b) - (1),	(c) - (3)

52. Which one of the following is a very good pollution indicator?

- (A) Fungi
- (B) Slime moulds
- (C) Lichens
- (D) Euglenoids
- (E) Protozoans

53. In one plant, underground stems are modified to store food and in another plant, the stem tendrils develop from axillary buds to help plants climb. They are

- (A) Ginger, cucumber
- (B) Carrot, jasmine
- (C) Sweet potato, bougainvillea
- (D) Opuntia, eichhornia
- (E) Sweet potato, mint

54. Consider the following statements
- (a) In leguminous plants, leaf base becomes swollen, called pulvinus
 - (b) The fleshy leaves of onion and garlic store food
 - (c) The buds in Australian acacia tree become green and synthesise food
 - (d) In Alstonia, leaves show alternate phyllotaxy

Of the above statements

- (A) (b) and (d) are correct
 - (B) (a) and (c) are correct
 - (C) (a) and (b) are correct
 - (D) (a) and (d) are correct
 - (E) (b) and (c) are correct
55. Pick out the statement that does not apply to bryophytes
- (A) Includes the ferns and horsetails
 - (B) Thallus is a gametophyte
 - (C) Sporophyte shows foot, seta and capsule
 - (D) Gemmae help in reproduction
 - (E) Water is required for fertilization
56. Which one of the following is considered important in the development of seed habit?
- (A) Homospory
 - (B) Heterospory
 - (C) Dependent sporophyte
 - (D) Free living gametophyte
 - (E) Haplontic life-cycle

57. Which of the following is a characteristic feature of gymnosperms?
- (A) The gymnosperms are homosporous
 - (B) The male and female gametophytes do not have independent free living existence
 - (C) The sporophyte is dependent on the gametophyte
 - (D) The ovules are enclosed by the ovary
 - (E) The pollen grain is released from the megasporangium
58. Consider the following statements with respect to angiosperms
- (a) The male sex organ in a flower is the stamen
 - (b) The anthers following mitosis produce pollen grains
 - (c) In an embryo sac, the primary endosperm nucleus (PEN) is diploid
 - (d) After double fertilization the ovules develop into seeds and ovaries develop into fruit
- Of the above statements
- (A) (c) and (d) are correct
 - (B) (a) and (b) are correct
 - (C) (a) and (c) are correct
 - (D) (a) and (d) are correct
 - (E) (b) and (c) are correct
59. Select the wrong statement
- (A) Indigofera is used as a dye
 - (B) Ashwagandha is a medicinal plant
 - (C) Seeds are non-endospermous in Fabaceae
 - (D) Leaves are alternate, simple and exstipulate in Solanaceae
 - (E) Ovary superior, bicarpellary with ovules on axile placentation in Liliaceae
60. Which of these is an example for a zygomorphic flower with diadelphous stamens and marginal placentation?
- (A) Pea
 - (B) Lemon
 - (C) Brinjal
 - (D) Cucumber
 - (E) China rose

61. $\frac{1}{4} TT : \frac{1}{2} Tt : \frac{1}{4} tt$ is the binomial expansion of
- (A) $\left(\frac{1}{2}T + \frac{1}{2}t\right)^2$ (B) $\left(\frac{1}{4}T + \frac{1}{4}t\right)^2$ (C) $\left(\frac{1}{4}T + \frac{1}{2}t\right)^2$
- (D) $\left(\frac{1}{2}T + \frac{1}{4}t\right)^2$ (E) $\left(T + \frac{1}{2}t\right)^2$
62. Three alleles namely I^A , I^B and i control the blood grouping in human beings. How many different genotypes are likely to be present in the human population?
- (A) 2 (B) 4 (C) 5 (D) 6 (E) 7
63. An example for codominance
- (A) Eye colour in drosophila (B) Seed shape and colour in pea plants
- (C) AB blood group in man (D) Haemophilia in man
- (E) Baldness in man
64. The nuclear structure observed by Henkings in 50% of the insect sperm after spermatogenesis was
- (A) X body (B) Autosome (C) Y chromosome
- (D) Nucleolus (E) Polar body
65. Physical association of genes on a chromosome is called
- (A) Repulsion (B) Linkage (C) Aneuploidy
- (D) Duplication (E) Polyploidy
66. In the double-helical structure of DNA, the pitch of the helix is
- (A) 3.4 nm (B) 0.34 nm
- (C) 6.6 nm (D) 34 nm
- (E) 6.6×10^{-9} m

67. In the ribose of RNA, unlike DNA, every nucleotide residue has an additional
- (A) COOH group in the 2' position
 - (B) OH group in the 5' position
 - (C) OH group in the 2' position
 - (D) Phosphate group in the 2' position
 - (E) Uracil in the 5' position
68. What is a nucleosome?
- (A) A vesicle containing positively charged histones within nucleolus
 - (B) They are similar to endosomes
 - (C) A structure formed by wrapping of negatively charged DNA around positively charged histone octamer
 - (D) They are the transforming principles discovered by Griffith
 - (E) Negatively charged histone octamers
69. Microsatellites are
- (A) Repetitive DNA sequences
 - (B) ESTs
 - (C) YAC
 - (D) BAC
 - (E) UTR
70. Some amino acids are coded by more than one codon as the code is
- (A) unambiguous
 - (B) specific
 - (C) universal
 - (D) punctuated
 - (E) degenerate
71. DNA replicates semi-conservatively was first shown in
- (A) *Vicia faba*
 - (B) *E. coli*
 - (C) *Streptococcus pneumoniae*
 - (D) *Drosophila*
 - (E) *Caenorhabditis elegans*

72. The enzyme that catalyses transcription of RNA in bacteria
- (A) DNA dependent RNA polymerase
(B) RNA polymerase I
(C) DNA polymerase
(D) RNA polymerase II
(E) RNA polymerase III
73. A molecule to act as a genetic material has the following properties
- (i) should be able to replicate
(ii) should be structurally more stable
(iii) should be more reactive and labile
(iv) should provide scope for slow changes
- Choose the correct option
- (A) (i), (ii) and (iii) are correct
(B) (iii) alone is correct
(C) (iii) and (iv) are correct
(D) (i), (ii) and (iv) are correct
(E) (i) alone is correct
74. Choose the correct statement among the following
- (A) Taylor and his colleagues used *E.coli* to prove semi-conservative replication of DNA
(B) In Griffith's experiment the mice infected with R-strain of *streptococcus pneumoniae* died due to pneumonia
(C) Hershey and Chase proved the transforming principle experimentally
(D) Meselson and Stahl grew *staphylococcus* in a medium containing cesium chloride to prove DNA is the genetic material
(E) Semi-conservative replication was experimentally proved by Meselson and Stahl
75. A nanometre is
- (A) 10^{-9} m
(B) 10^{-4} m
(C) 10^{-6} m
(D) 10^{-12} m
(E) 10^9 m

76. The precursor of eukaryotic mRNA is
(A) 5srRNA (B) tRNA (C) rRNA
(D) snRNA (E) hnRNA
77. The disorder caused by point mutation is
(A) Down's syndrome (B) Sickle cell anemia
(C) Klinefelter's syndrome (D) Tetany
(E) Turner's syndrome
78. The secretions of the brush border cells of the intestinal mucosa along with the secretion of goblet cells constitute the
(A) succus entericus (B) chyme (C) gastric juice
(D) chylomicrons (E) bolus
79. The volume of air that will remain in the lungs after a normal expiration is called
(A) vital capacity (B) functional residual capacity
(C) residual volume (D) total lung capacity
(E) inspiratory capacity
80. Choose the correct statement among the following
(A) The intestinal mucosal epithelium has oxyntic cells
(B) Ptyalin converts proteins into proteoses and peptones
(C) Crypts of Lieberkuhn is seen between the bases of villi in the intestine
(D) Sphincter of Oddi is present at the junction of oesophagus and cardiac stomach
(E) Goblet cells secrete hydrochloric acid in stomach
81. The body temperature regulatory centre in the brain is
(A) cerebellum (B) corpus callosum (C) hypothalamus
(D) hippocampus (E) amygdala
82. Identify the correctly matched structure and its secretion
(A) Brunner's gland – Salivary amylase (B) Intestinal mucosa – Insulin
(C) Gall bladder – Bile (D) Salivary gland – Lysozyme
(E) Goblet cells – HCl

83. The entry of food into the larynx is prevented by
(A) Mitral valve (B) Diaphragm (C) Epiglottis
(D) Hyoid (E) Frenulum
84. Incomplete double circulation is seen in
(A) Fish (B) Amphibians (C) Birds
(D) Mammals (E) Arthropods
85. Gliding joint is present between the
(A) Carpals (B) Humerus and pectoral girdle
(C) Carpal and metacarpal of thumb (D) Knee
(E) Atlas and Axis
86. Choose the correct statement among the following
(A) Atrio-ventricular node is the pace maker that generates action potential and initiates the atrial systole
(B) During each cardiac cycle, the 'lub' sound is due to the closure of semilunar valves
(C) Stroke volume in each cardiac cycle is approximately 170 ml of blood
(D) QRS complex in an ECG indicates depolarisation of ventricles
(E) The opening between right atrium and right ventricle is guarded by bicuspid valve
87. Choose the wrong statement regarding urine formation
(A) Filtration is non-selective process performed by glomerulus
(B) The glomerular capillary blood pressure causes filtration of blood through three layers
(C) GFR in a healthy individual is approximately 125 ml/min
(D) A fall in GFR activates the JG cells to release renin
(E) The ascending limb of the Henle's loop is permeable to water but allows transport of electrolytes actively or passively
88. Vasa recta refers to
(A) rectum region of the insects
(B) blood capillaries in invertebrates
(C) a fine blood capillary network of afferent arteriole
(D) a fine capillary which runs parallel to Henle's loop
(E) juxtaglomerular complex of nephrons

89. Find the wrongly matched pair.

Animal	Excretory organ/Structure
(A) Balanoglossus	- Proboscis gland
(B) Earthworm	- Nephridia
(C) Grasshopper	- Malpighian tubules
(D) Prawn	- Flame cells
(E) Amphioxus	- Protonephridia

90. The condition in which the kidneys fail to conserve water leading to water loss and dehydration due to impaired ADH synthesis or release in

- (A) Grave's disease (B) Addison's disease (C) Diabetes insipidus
(D) Cretinism (E) Acromegaly

91. The lumbar region of the vertebral column in man is made up of

- (A) 1 fused vertebra (B) 7 vertebrae (C) 12 vertebrae
(D) 5 vertebrae (E) 2 vertebrae

92. Muscles of the heart are

- (A) striated and voluntary (B) non-striated and voluntary
(C) striated, unbranched and involuntary (D) non-striated and involuntary
(E) striated, branched and involuntary

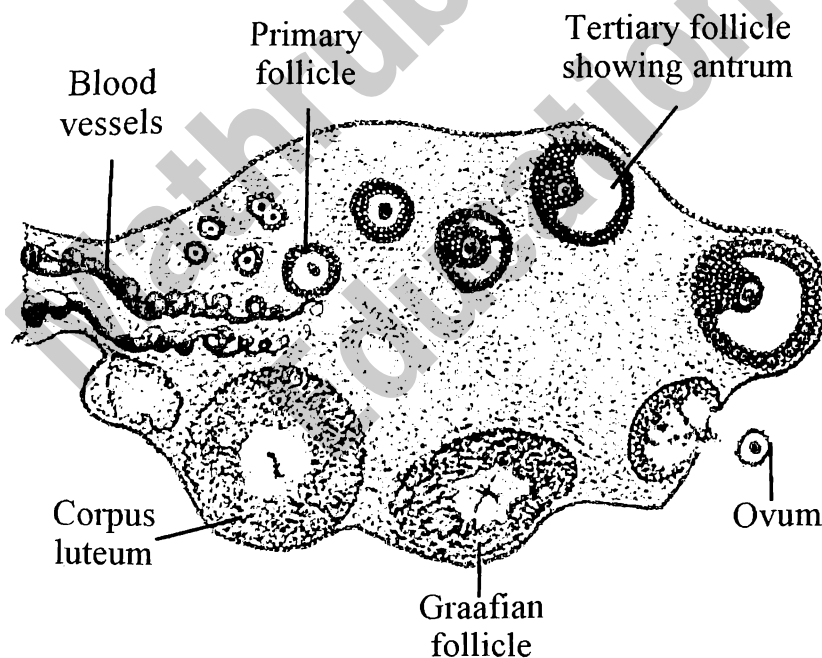
93. The skeletal muscle fibre is a 'syncytium', which means it is

- (A) made up of many fibres (B) made up of many proteins
(C) long and slender (D) swollen in the middle with tapered ends
(E) multinucleated

94. The anterior portion of the sclera is called

- (A) Lens (B) Iris (C) Pupil
(D) Ciliary body (E) Cornea

95. The projecting ridge in ampulla of semi-circular canals in ear is called
 (A) Succus entericus (B) Macula (C) Otolith
 (D) Crista ampullaris (E) Cochlea
96. The pars distalis region of pituitary does not produce these hormones
 I. Melanocyte stimulating hormone II. Vasopressin
 III. Prolactin IV. Growth hormone
 (A) III only (B) I and IV (C) II and IV
 (D) II and III (E) I and II
97. Function of the somatostatin is to
 (A) stimulate pituitary synthesis and release gonadotropins
 (B) inhibit the release of gonadotropins from pituitary
 (C) stimulate pituitary and promotes the secretion of growth hormone
 (D) inhibit the release of growth hormone from the pituitary
 (E) stimulate the secretion of thyrotropin from thyroid
98. Identify the wrongly labelled part



- (A) Primary follicle (B) Ovum (C) Graafian follicle
 (D) Corpus luteum (E) Tertiary follicle

99. Each secondary spermatocyte after second meiotic division produces
- (A) four haploid spermatids
 - (B) only one haploid spermatid
 - (C) two haploid spermatids
 - (D) two diploid spermatids
 - (E) four diploid spermatids
100. The hormone releasing IUD is
- (A) LNG 20
 - (B) Lippes loop
 - (C) CuT
 - (D) Multiload 375
 - (E) Cu7
101. Read the statements regarding a stable community and choose the correct option
- (1) must be resistant to occasional disturbances
 - (2) should show much variation in productivity from year to year
 - (3) must be resistant to invasions by alien species
- (A) (1) and (2) are correct
 - (B) (1), (2) and (3) are correct
 - (C) (1) only is correct
 - (D) (2) and (3) are correct
 - (E) (1) and (3) are correct
102. Find the wrongly matched pair
- (A) Endemism - species confined to a region and not found anywhere else
 - (B) Hot spots - Western ghats
 - (C) Sacred groves - Jaintia hills of Rajasthan
 - (D) *ex situ* conservation - Zoological parks
 - (E) Alien species to India - Water hyacinth

103. The cytokine barrier among these is

- (A) Polymorphonuclear neutrophil
- (B) Monocyte
- (C) NK cell
- (D) Interferon
- (E) Macrophage

104. Ringworms are caused by

- I. *Wuchereria*
 - II. *Microsporium*
 - III. *Haemophilus*
 - IV. *Epidermophyton*
- (A) I and II (B) II and III (C) II and IV
(D) I and IV (E) III and IV

105. Read the statements

- (1) IgE antibodies are produced in an allergic reaction
- (2) B-lymphocytes mediate cell mediated immunity
- (3) The yellowish fluid colostrum has abundant IgE antibodies
- (4) Spleen is a secondary lymphoid organ

Of the above statements

- (A) (1) only is correct (B) (1) and (2) are correct
(C) (2) and (3) are correct (D) (3) and (4) are correct
(E) (1) and (4) are correct

106. The microbial biocontrol agent for butterfly caterpillar is

- (A) *Bacillus thuringiensis*
- (B) *Sacchromyces*
- (C) *Lactobacillus*
- (D) *Cyanobacteria*
- (E) *Staphylococcus*

107. The first human-like hominid was called
 (A) *Homo habilis* (B) *Homo erectus* (C) *Homo sapiens*
 (D) Dryopithecus (E) Ramapithecus
108. Oparin and Haldane proposed
 (A) the theory of Natural Selection
 (B) that migration affects genetic equilibrium
 (C) that mutations caused speciation
 (D) that the first form of life could have come from pre-existing non-living organic molecules
 (E) that evolution of life forms had been driven by use and disuse of organs
109. Choose the wrong pair
 (A) Divergent evolution – Forelimbs of whales, bats, cheetah and human
 (B) Convergent evolution – Flippers of penguins and dolphins
 (C) Homologous structures – Vertebrate hearts
 (D) Analogous structures – Tendrils of bougainvillea and cucurbita
 (E) Adaptive radiation – Darwin's finches
110. Flame cells of flatworms help in
 (i) osmoregulation (ii) digestion (iii) reproduction
 (iv) excretion (v) bioluminescence
 (A) (ii) only is correct (B) (i) and (iv) are correct
 (C) (iii) only is correct (D) (i) and (v) are correct
 (E) (iv) and (v) are correct
111. Read the statements regarding echinoderms and choose the correct option
 (1) All are marine with organ system level of organisation
 (2) Adults are bilaterally symmetrical
 (3) They are dioecious
 (4) Fertilisation is internal and indirect development is observed
 (5) Triploblastic and acoelomate animals
 (A) (1) and (3) are correct (B) (5) alone is correct
 (C) (1), (3) and (5) are correct (D) (1) and (5) are correct
 (E) (1) and (2) are correct

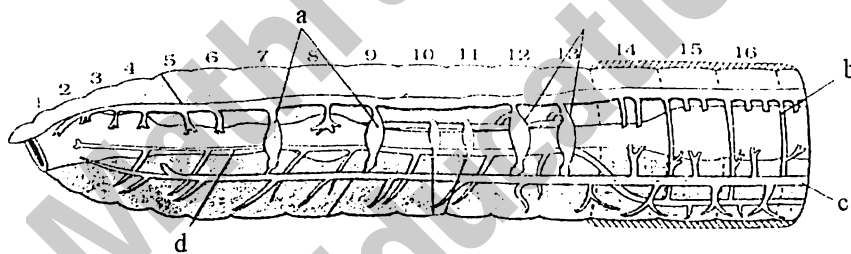
112. This class of animals are all ectoparasites on some fishes
 (A) Amphibia (B) Osteichthyes (C) Reptilia
 (D) Cyclostomata (E) Chondrichthyes

113.

Organ	Phylum	Function
Parapodia	Annelida	? a
? b	Ctenophora	Locomotion
? c	Mollusca	Rasping organ
Malpighian tubules	Arthropoda	? d
Cnidoblasts	Coelenterata	? e

From the above table find out the missing organ or function – a, b, c, d and e respectively

- (A) (a) swimming (b) comb plates (c) radula (d) excretion (e) defense
 (B) (a) defense (b) radula (c) comb plates (d) excretion (e) swimming
 (C) (a) defense (b) radula (c) comb plates (d) swimming (e) excretion
 (D) (a) protection (b) parapodia (c) visceral mass (d) locomotion (e) excretion
 (E) (a) swimming (b) parapodia (c) comb plates (d) anchorage (e) digestion
114. In the circulatory system of *Pheretima*, a, b, c and d represents



- (A) a) Lateral hearts b) Sub neural vessel c) Commissural vessel d) Lateral oesophageal vessel
 (B) a) Lateral hearts b) Lateral oesophageal vessel c) Sub neural vessel d) Commissural vessel
 (C) a) Lateral hearts b) Commissural vessel c) Sub neural vessel d) Lateral oesophageal vessel
 (D) a) Commissural vessels b) Lateral hearts c) Lateral oesophageal vessel d) Sub neural vessel
 (E) a) Commissural vessel b) Lateral hearts c) Sub neural vessel d) Lateral oesophageal vessel

115. The structure in earthworm which serves as a wedge to force open cracks in the soil is
(A) Peristomium (B) Setae (C) Clitellum
(D) Typhlosole (E) Prostomium
116. Which among these is not involved in excretion in cockroaches?
(A) Malpighian tubules (B) Nephrocytes (C) Ureose glands
(D) Maxillary palps (E) Fat body
117. Frogs
(A) are uricotelic
(B) have olfactory lobes in the midbrain
(C) do not have renal portal system
(D) have lymphatic system
(E) have gall bladder which secretes bile
118. Most of the cartilages in vertebrate embryo are replaced in adult by
(A) Blood (B) Bones
(C) Tendons (D) Ligaments
(E) Muscle
119. Which one is a specialized connective tissue among these?
(A) Adipose tissue (B) Bone (C) Areolar tissue
(D) Fibroblasts (E) Muscle
120. The moiety present at the 5' end of ribose sugar in a polynucleotide is
(A) OH (B) CH₂ (C) Phosphate
(D) Adenine (E) 5' methyluracil

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Education