

Booklet Series Code : A

Important : Please consult your Admit Card / Roll No. Slip before filling your Roll Number on the Test Booklet and Answer Sheet.

Roll No. *In Figures*

--	--	--	--	--	--

In Words

O.M.R. Answer Sheet Serial No.

--	--	--	--	--	--

Signature of the Candidate : _____

Subject : BIOTECHNOLOGY

Time : 70 minutes

Number of Questions : 60

Maximum Marks : 120

DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO

INSTRUCTIONS

1. Write your Roll No. on the Question Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Subject and Series Code of Question Booklet on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point / Black Gel pen**.
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. To open the Question Booklet remove the staple(s) gently when asked to do so.
5. Please check that this Question Booklet contains **60** questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of test.
6. Each question has four alternative answers (A, B, C, D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point / Black Gel pen**.
7. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Sheet. No marks will be deducted in such cases.
8. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the questions given in the Question Booklet.
9. Negative marking will be adopted for evaluation i.e., 1/4th of the marks of the question will be deducted for each wrong answer. A wrong answer means incorrect answer or wrong filling of bubble.
10. For calculations, use of simple log tables is permitted. Borrowing of log tables and any other material is not allowed.
11. For rough work only the sheets marked "Rough Work" at the end of the Question Booklet be used.
12. The Answer Sheet is designed for **computer evaluation**. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e., not following the instructions completely, shall be of the candidate only.**
13. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
14. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so, would be expelled from the examination.
15. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistance or found giving or receiving assistance or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
16. **Telecommunication equipment such as pager, cellular phone, wireless, scanner, etc., is not permitted inside the examination hall. Use of calculators is not allowed.**

1. **During bacterial conjugation, Fertility factor "F" is carried by :**
(A) Male (B) Female
(C) Both by male and female (D) Neither by male nor by female

2. **Chromatin consists of :**
(A) histones only (B) DNA and histones only.
(C) histones and other proteins only (D) DNA, histones, and other proteins.

3. **A relationship among alleles where both alleles contribute to the phenotype of the heterozygote is called :**
(A) Dominance (B) Co-dominance
(C) Incomplete dominance (D) Pureline selection

4. **When one gene influences multiple, seemingly unrelated phenotypic traits, it is known as :**
(A) Pleiotropy (B) Epistasis
(C) Methylation (D) Epigenetics

5. **Satellite DNA is typically found in :**
(A) Centromeres (B) Heterochromatin
(C) Both centromeres and heterochromatin (D) Telomeres

6. **Expression vector differs from normal cloning vector in having :**
(A) An origin of replication (B) Suitable marker genes
(C) Unique restriction sites (D) Control elements

7. **Which of the following molecules contains an anticodon ?**
(A) mRNA (B) tRNA
(C) rRNA (D) protein

8. **The O_2 evolved in photosynthesis comes from :**
- (A) carbon dioxide (B) water
(C) glucose (D) (CH_2O)
9. **Which pigment is present in all photosynthetic eukaryotes ?**
- (A) Chlorophyll *a* (B) Chlorophyll *b*
(C) Chlorophyll *c* (D) Bacteriochlorophyll
10. **In pBR322, pBR stands for :**
- (A) Plasmid bacterial recombination (B) Plasmid bacterial replication
(C) Plasmid bolivar and rodriguez (D) Plasmid baltimore and rodriguez
11. _____ **results in the production of RNA using a DNA template.**
- (A) Replication (B) Transcription
(C) Translation (D) Amplification
12. **Which of the following does not follow base pairing rules ?**
- (A) A:T (B) U:T
(C) G:C (D) U:A
13. **Karyogamy is the :**
- (A) Fusion of protoplasts (B) Formation of a dikaryon
(C) Fusion of nuclei (D) Formation of rhizoids
14. **All of the following are matched correctly except :**
- (A) Myosin: motor protein (B) Keratin: immune defense proteins
(C) Hemoglobin: transport protein (D) Collagen: structural protein

15. Insulin is an example of a _____ protein.

- (A) Storage
- (B) Regulatory
- (C) Protective
- (D) Transport

16. Alternative versions of the same single-copy gene are :

- (A) Alleles
- (B) Mosaic genes
- (C) Pseudogenes
- (D) Regulatory genes

17. The process of photosynthesis result in the formation of two substances essential to our existence :

- (A) Chlorophyll and water
- (B) Sugar and oxygen
- (C) Sugar and water
- (D) Chlorophyll and oxygen

18. The most abundant organic molecule in nature are :

- (A) Proteins
- (B) Carbohydrates
- (C) Lipids
- (D) Nucleic acids

19. _____ first concluded that all cells arise from preexisting cells.

- (A) Theodor Schwann
- (B) Robert Hooke
- (C) Charles Darwin
- (D) Rudolf Virchow

20. The Haber-Bosch process is important in the :

- (A) Reduction of soil erosion
- (B) Development of pesticides
- (C) Manufacture of fertilizers
- (D) Development of efficient irrigation systems

21. **Eukaryotic cells differ from prokaryotic cells in that eukaryotic cells have :**
- (A) A nucleus (B) A cytoplasm
(C) A plasma membrane (D) Genetic material
22. **The nucleolus is the structure in which _____ are formed.**
- (A) Nuclear pores (B) Chromosomes
(C) Ribosomes (D) Unites of ER
23. **Grana are stacks of _____ within chloroplast.**
- (A) Prolamellar bodies (B) Thylakoids
(C) Stroma (D) Etioplasts
24. **In the cell cycle, interphase consists of :**
- (A) Mitosis and cytokinesis (B) Mitosis and the S phase
(C) The G1 and G2 phase (D) The G1, S and G2 phase
25. **During _____ the nuclear envelopes and nucleoli reforms.**
- (A) Anaphase (B) Metaphase
(C) Prophase (D) Telophase
26. **The chief reservoir of nitrogen is :**
- (A) the ocean (B) living organisms
(C) dead organic material (D) the atmosphere
27. **Nitrite is oxidized to nitrate by :**
- (A) *Nitrosomonas* (B) *Nitrobacter*
(C) ammonifying bacteria and fungi (D) d. denitrifying bacteria

28. **Water potential is defined as :**

- (A) tendency of water to enter the cell
- (B) tendency of water to leave the cell
- (C) kinetic energy of water
- (D) potential energy of water

29. **Mutualism is an interaction between two species in which :**

- (A) one species benefits and the other is harmed
- (B) both species benefit
- (C) both species are harmed
- (D) one species benefits and the other is neither harmed nor helped

30. **If the concentration of K^+ is higher outside a plant cell than inside, K^+ will enter the cell by:**

- (A) facilitated diffusion through channel proteins
- (B) facilitated diffusion via carrier proteins
- (C) active transport through channel proteins
- (D) active transport via carrier proteins

31. **Which of the following would NOT occur during signal recognition?**

- (A) The signal molecule binds to a specific receptor on the plasma membrane.
- (B) The signal molecule is transported into the cell by endocytosis.
- (C) The signal molecule is transported out of the cell by exocytosis.
- (D) The signal molecule remains outside the cell.

32. **In biological reactions, when a molecule is oxidized it _____ an electron and a(n) _____.**

- (A) loses; proton
- (B) gains; proton
- (C) loses; oxygen atom
- (D) gains; oxygen atom

33. A substrate binds to its enzyme at a location called the _____ site.
- (A) coenzyme (B) substrate
(C) active (D) polypeptide
34. Isozymes are :
- (A) RNA molecules that catalyze metabolic reactions
(B) identical coenzymes that require different metal ions
(C) identical coenzymes located in different parts of the cell
(D) different enzymes that catalyze identical reactions
35. Which of the following statements concerning the effect of pH on enzyme activity is FALSE?
- (A) The pH affects positively-charged amino acids
(B) The pH affects negatively-charged amino acids
(C) The binding capacity of an enzyme is affected by pH
(D) Enzymes are always present at their pH optimum
36. In an ATP molecule, phosphoanhydride bonds link:
- (A) adenine to ribose (B) adenine to a phosphate group
(C) the phosphate groups together (D) ribose to a phosphate group
37. In feedback inhibition, the _____ enzyme in a metabolic pathway is inhibited by the _____.
- (A) last; end product (B) first; cofactor
(C) first; first substrate (D) first; end product
38. Formation of ATP from ADP and phosphate as a result of electron transport occurs in :
- (A) the formation of acetyl CoA (B) fermentation
(C) glycolysis (D) oxidative phosphorylation

39. In respiration, most of the energy in the original glucose molecule is :
- (A) stored in molecules of ADP
(B) stored in molecules of ATP
(C) released in molecules of carbon dioxide
(D) released as heat
40. For every molecule of glucose that begins glycolysis, how many ATP molecules are consumed ?
- (A) 0
(B) 1
(C) 2
(D) 3
41. Under anaerobic conditions, yeasts and most plant cells convert pyruvate to :
- (A) acetyl Co A
(B) lactate
(C) ethanol and carbon dioxide
(D) ATP
42. The pairing of homologous chromosomes is called :
- (A) synapsis
(B) chiasma
(C) crossing-over
(D) recombination
43. Crossing-over occurs during :
- (A) metaphase I
(B) telophase I
(C) metaphase II
(D) prophase I
44. When a particular trait appears in the F₂ generation but not in the F₁ generation, it is an indication that :
- (A) a monohybrid cross is involved
(B) a dihybrid cross is involved
(C) true-breeding plants are involved
(D) the trait is recessive
45. Term of a patent is :
- (A) 7 years and no renewal
(B) 7 years with possibility of renewal
(C) 20 years and no renewable
(D) 20 years with possibility of renewal

- 46. If two genes are linked, then by definition they :**
- (A) are alleles of the same gene
 (B) occur on the same chromosome
 (C) will segregate independently
 (D) will undergo independent assortment
- 47. Polyploidy refers to the :**
- (A) loss of part of a chromosome
 (B) gain of part of a chromosome
 (C) gain or loss of some chromosomes
 (D) gain of a complete set of chromosomes
- 48. Cytoplasmic inheritance in plants involves genes present in the :**
- (A) plastids only
 (B) mitochondria only
 (C) cytosol and plastids
 (D) mitochondria and plastids
- 49. Data obtained by Erwin Chargaff indicated that in DNA the ratio of nucleotides containing _____ to those containing _____ is approximately 1:1.**
- (A) adenine; cytosine
 (B) adenine; thymine
 (C) guanine; thymine
 (D) thymine; cytosine
- 50. When scientists describe the genetic code as redundant, they mean that:**
- (A) it becomes disorganized over time
 (B) many amino acids have more than one codon
 (C) some codons specify stop signals
 (D) it varies with cell type
- 51. Which of the following statements about promoters is FALSE ?**
- (A) They are specific nucleotide sequences of DNA
 (B) They consist of three nucleotides that bind to a codon
 (C) They determine the position where RNA synthesis begins
 (D) They determine which DNA strand is used as a template

52. When DNA is methylated :

- (A) transcription is repressed
- (B) transcription is stimulated
- (C) histone tails bind DNA
- (D) histone tails are released from DNA

53. Interspersed repeated DNA units :

- (A) tend to be smaller than 10 base pairs long
- (B) constitute less than 10 percent of the DNA of most multicellular organisms
- (C) are identical to one another
- (D) are believed to have originated from transposons

54. Suppose a plasmid containing a gene of interest plus the amp^R gene is used to transform E. coli cells. When these cells are placed on a medium containing ampicillin, what will happen ?

- (A) They will die
- (B) They will survive and grow
- (C) They will form blue colonies
- (D) They will glow with a green color

55. When biologists speak of the “fitness” of an organism they are referring to :

- (A) its beauty
- (B) its resistance to disease
- (C) the size of its gene pool
- (D) the number of its surviving offspring

56. Deposition of microbes for the purpose of patenting is covered under :

- (A) Budapest Treaty
- (B) PCT
- (C) European Patent Convention
- (D) Strasbourg Convention

57. Technique used to separate charged molecules based on their mobility in an electric field is known as:

- (A) Ion exchange Chromatography
- (B) Electrophoresis
- (C) Isoelectro-focussing
- (D) Partition chromatography

58. DNA replication is semiconservative was proved by :

- (A) Harshey and Chase
- (B) Meselson and Stahl
- (C) Johansson
- (D) Watson and Crick

59. In gas chromatography, the basis for separation of the components of the volatile material is the difference in :

- (A) Partition coefficients
- (B) Conductivity
- (C) Molecular wt
- (D) Molarity

60. Ion exchange chromatography is based on the :

- (A) Electrostatic attractions
- (B) Electrical mobility of ionic species
- (C) Adsorption chromatography
- (D) Partition chromatography

Panjab University, Chandigarh
CET(UG)-2015

FINAL ANSWERS / KEY

Subject: BIOTECHNOLOGY

Booklet Series Code: A

1	2	3	4	5	6	7	8	9	10
A	D	B	A	C	D	B	B	A	C
11	12	13	14	15	16	17	18	19	20
B	B	C	B	B	A	B	B	D	C
21	22	23	24	25	26	27	28	29	30
A	C	B	D	D	D	B	D	B	A
31	32	33	34	35	36	37	38	39	40
C	A	C	D	D	C	D	D	D	C
41	42	43	44	45	46	47	48	49	50
C	A	D	D	D	B	D	D	B	B
51	52	53	54	55	56	57	58	59	60
B	A	D	B	D	A	B	B	A	A

Note: An 'X' in the key indicates that either the question is ambiguous or it has printing mistake. All candidates will be given credit for this question.