

Code No.

L – 4026

**Entrance Examination for Admission to the P.G. Courses in the Teaching
Departments, 2021**

CSS

BIOTECHNOLOGY

General Instructions

1. The Question Paper is having two Parts — Part 'A' Objective type (60%) & Part 'B' Descriptive type (40%).
2. Objective type questions which carry 1 mark each are to be (✓) 'tick marked' in the response sheets against the appropriate answers provided.
3. 8 questions are to be answered out of 12 questions carrying 5 marks each in Part 'B'.
4. **Negative marking** : 0.25 marks will be deducted for each wrong answer in Part 'A'.

Time : 2 Hours

Max. Marks : 100

To be filled in by the Candidate									
Register Number	in Figures								
	in words								

PART – A

(Objective Type)

Choose appropriate answer from the options in questions. **One mark each.**

(60 × 1 = 60 marks)

1. The circulatory level of oestrogen is derived mainly from

a) Gonadotrophs	b) Thecal granulosa cells
c) Endometrial epithelia	d) Leydig cells

DO NOT WRITE HERE

2. Which of the following is root promoting hormone?

- a) Ethylene
- b) Auxins
- c) Abscisic acid
- d) None of these

3. The essential element for synthesis of auxin is

- a) Sulphur
- b) Zinc
- c) Pottassium
- d) Sodium

4. Which one of the following protozoan parasites belongs to the phylum *Apicomplexa*?
- a) *Toxoplasma gondii* b) *Leishmania donovani*
c) *Entamoeba histolytica* d) *Trichomonas vaginalis*
5. In the feedback regulation of an enzyme, the end product binds to the
- a) active site of the enzyme b) allosteric site of the enzyme
c) enzyme-substrate complex d) substrate
6. Viral capsids are made up of morphological subunits called capsomeres. One of the common capsomeres is icosahedral. The icosahedron is a regular polyhedron with
- a) 16 triangular facets and 12 vertices
b) 20 triangular facets and 12 vertices
c) 16 triangular facets and 16 vertices
d) 20 triangular facets and 16 vertices
7. Which of the following feature(s) should be present in a protein to generate strong immune response (antibody production) in an animal?
- I. At least one B-cell epitope
II. At least one T-cell epitope
III. Proteolytic cleavage site(s)
- a) I b) II and III
c) I and III d) I, II and III
8. When bacteria are grown in glucose-depleted media containing high concentration of lactose, expression of *lac* operon genes is activated by
- a) the binding of *lac* repressor in the operator site and cAMP-CAP complex in the CAP site
b) the dissociation of bound *lac* repressor from the operator site and binding of cAMP-CAP complex in the CAP site.
c) the dissociation of bound *lac* repressor only from the operator site.
d) the dissociation of both bound *lac* repressor from operator site and cAMP-CAP complex from CAP site.

9. Pyramid of energy in a forest ecosystem is
- a) always inverted
 - b) dumb-bell shaped
 - c) spindle shaped
 - d) always upright
10. The total number of genetically different types of gametes that will be produced by a heterozygous plant carrying the genotypes AABbCc is
- a) 2
 - b) 4
 - c) 3
 - d) 6
11. The number of cycles required for complete degradation of Palmitic acid (16 Carbon) by β -oxidation is
- a) 3
 - b) 6
 - c) 8
 - d) 7
12. Which ion is required for association of ribosome subunits?
- a) Ca_{2+}
 - b) Mg_{2+}
 - c) Zn_{+}
 - d) K_{+}
13. In the C_4 pathway, carbon dioxide is concentrated in
- a) pith
 - b) mesophyll cells
 - c) endodermis
 - d) bundle sheath cells
14. The beta oxidation of a saturated odd chain fatty acid in final thiolytic step yields
- a) one molecule of acetyl CoA
 - b) two molecules of acetyl CoA
 - c) one molecule of acetyl CoA and one molecule of propionyl CoA
 - d) one molecule of acetyl CoA and one molecule of succinyl CoA
15. A cell with 46 chromosomes undergoing meiosis will have
- a) 92 chromatids at metaphase I and 46 chromatids at metaphase II
 - b) 23 chromosomes at metaphase I and 23 chromosomes at metaphase II
 - c) 92 chromatids at metaphase I and 23 chromatids at metaphase II
 - d) 23 chromatids at metaphase I and 23 chromatids at metaphase II

16. Find out the CORRECT sequence of taxonomic hierarchy.
- a) Family Phylum Class Order
 - b) Phylum Order Class Family
 - c) Class Phylum Family Order
 - d) Phylum Class Order Family
17. Which one of the following statements is TRUE for polymerization of actin and microtubules?
- a) Actin requires ATP while microtubules require GTP
 - b) Actin requires GTP while microtubules require ATP
 - c) Both Actin microtubules and requires ATP
 - d) Both actin and microtubules require GTP
18. Commensalism is an interaction between two species, in which
- a) both the species are harmed
 - b) both the species benefit
 - c) one species benefits and the other remains unaffected
 - d) one species benefits and the other is harmed
19. A dominant gene **B** is responsible for the wild type body color of *Drosophila*, its recessive allele **b** produces black body color. A test cross of a wild type female gave 52 black and 58 wild type in the F_1 . If the wild type F_1 females are crossed with black F_1 males, what would be the expected genotypic ratio in the F_2 .
- a) Heterozygous wild : Homozygous black = 1:1
 - b) Homozygous wild: Heterozygous black = 1:1
 - c) Homozygous wild: Heterozygous wild: Homozygous black = 1:2:1
 - d) All heterozygous black
20. Which one of the following events does NOT occur in fungi during mitosis?
- a) Segregation of chromosomes
 - b) Replication of the genetic material
 - c) Formation of spindle fibres
 - d) Disintegration of nuclear envelope

21. The number of high energy phosphate bonds needed for the formation of aminoacyl-tRNA is _____.
- a) 3
 - b) 2
 - c) 4
 - d) 5
22. Pure IgG antibody was run on an SDS-PAGE under reducing condition. How many bands would you see after staining with Coomassie blue?
- a) 4
 - b) 2
 - c) 1
 - d) 6
23. Radial symmetry is the characteristic feature of which of the following phyla?
- a) Arthropoda
 - b) Mollusca
 - c) Cnidaria
 - d) Echinodermata
24. In ecotone, some spec
- a) sibling species
 - b) endemic species
 - c) edge species
 - d) rare species
25. DMSO is
- a) Chelating agent
 - b) Fusing agent
 - c) Mutagen
 - d) Cryoprotectant
26. Molybdenum is involved in plant metabolism in
- a) Translocation of solutes
 - b) Tryptophan synthesis
 - c) Nitrate reduction
 - d) ABA synthesis
27. In insects, like *Drosophila*, the action of the genes which determines the initial course of development.
- a) zygote
 - b) larval
 - c) paternal
 - d) imaginal
28. An important evidence in favor of organic evolution is the occurrence of
- a) Homologous organs only
 - b) Analogous and vestigial organs
 - c) Homologous and vestigial organs
 - d) Homologous and analogous organs

29. The difference between plasma and serum is that plasma
- does not contain fibrinogen
 - has more water
 - contains fibrinogen
 - contains RBC
30. The width of a DNA molecule is
- 1.5 Å
 - 3.4 Å
 - 20 Å
 - 22 Å
31. Optical isomers of all amino acids exist except
- Glycine
 - Arginine
 - Alanine
 - Hydroxy proline
32. Respiratory center is located in
- Hypothalamus
 - Medulla oblongata
 - Cerebrum
 - Cerebellum
33. The molecular formulae of deoxyribose sugar and ribose sugar respectively are
- $C_5H_{10}O_4$ and $C_5H_{10}O_6$
 - $C_5H_{10}O_4$ and $C_5H_{10}O_5$
 - $C_5H_{10}O_5$ and $C_5H_{10}O_4$
 - $C_5H_{10}O_5$ and $C_6H_{10}O_4$
34. Which is the source of energy for initiation of translation?
- ATP
 - GTP
 - CTP
 - cAMP
35. Which of the following statements regarding transcriptomes is incorrect?
- Transcriptome analysis provides information on changes in gene expression patterns in cancerous cells.
 - A transcriptome is influenced by both synthesis and degradation of RNA molecules.
 - The composition of a transcriptome is influenced by alternative splicing pathways
 - A transcriptome represents the entire DNA and RNA content of a cell.
36. Which of the following is a thermostable polymerase?
- Taq polymerase
 - Vent polymerase
 - Pfu polymerase
 - All of the above

37. The combination of which of the following soils is best for plant growth
- | | |
|---------------------------|---------------------------|
| a) Clay, sand and gravel | b) Humus, clay and gravel |
| c) Sand, humus and gravel | d) Humus, sand and clay |
38. Lipids are soluble in
- | | |
|------------|--------------------|
| a) Ethanol | b) Water |
| c) Oxygen | d) CO ₂ |
39. An essential building block of phosphatidic acid and phosphatidylcholine (two phospholipids) is
- | | |
|---------------|-------------|
| a) glycerol. | b) glucose. |
| c) adenosine. | d) lysine. |
40. The vagus nerve is the cranial nerve numbering
- | | |
|-------|------|
| a) 6 | b) 3 |
| c) 10 | d) 7 |
41. All of the following are involved in various steps of Electron transport chain except
- | | |
|----------------|--------|
| a) NADP | b) NAD |
| c) Co Enzyme Q | d) CoA |
42. The retina is an outgrowth of
- | | |
|------------------|-----------------|
| a) Mesencephalon | b) Diencephalon |
| c) Telencephalon | d) Pons |
43. Q and P genes are linked and are 20 map units apart. In the cross Qp/qp × qp/qp what fraction of the progeny will be QP/qp?
- | | |
|--------|-------|
| a) 10% | b) 5% |
| c) 2% | d) 4% |
44. Which of the following is used for measuring rate of transpiration?
- | | |
|----------------------|--------------|
| a) Porometer | b) Osmometer |
| c) Moll's experiment | d) Potometer |

45. Botulism affects
- a) nervous system
 - b) heart
 - c) respiratory system
 - d) muscle
46. "Cleistogamous flowers are autogamous because"
- a) These flowers do not open at all.
 - b) There is no chance of cross — pollen landing on the stigma.
 - c) These flowers have exposed anthers and stigma.
 - d) These flowers are wind pollinated.
47. Betelnut is
- a) Drupe
 - b) Berry
 - c) Nut
 - d) Caryopsis
48. Which of these cells cannot convert glucose to CO₂ aerobically?
- a) Liver cells
 - b) WBC
 - c) RBC
 - d) Unstriated muscle cells
49. Genome is
- a) Genes on nuclear DNA
 - b) Nuclear DNA + mitochondrial DNA
 - c) Nuclear DNA + chloroplast DNA
 - d) Nuclear DNA + Mitochondrial DNA + Chloroplast DNA
50. Heavy dust can cause
- a) Leaf blights
 - b) Loss of chlorophyll
 - c) Closure of stomata
 - d) All of the above
51. The height of students of a class is a
- a) Quantitative variable
 - b) Discrete variable
 - c) Absolute Variable
 - d) Continuous variable
52. Pick out the vector used in human Genome project
- a) Phagemid vector
 - b) Yeast artificial chromosomes
 - c) Cosmid vectors
 - d) Yeast episomal plasmids

53. Electron microscope gives magnification up to
- a) 100 X
 - b) 2000 X
 - c) 20,00,000 X
 - d) 2,00,000 X
54. Embryo axis is also called as
- a) Tegman
 - b) Tiller
 - c) Tigellum
 - d) Scutellum
55. β -oxidation takes place in
- a) Nucleus
 - b) Endoplasmic reticulum
 - c) Mitochondrion
 - d) Cytoplasm
56. Which of the following suggests whether a population is evolving or not?
- a) Degree of evolution
 - b) Genetic drift
 - c) Hardy Weinberg equation
 - d) Proportion between acquired variations
57. Fly Base is a
- a) Biodiversity database
 - b) Model organism database
 - c) Insect database
 - d) Biomolecular database
58. FACS is
- a) Fluorescence-Activated Cell Sorter
 - b) Fluorescence-Associated Cell Sorter
 - c) Fluorescence-Added Cell Sorter
 - d) Fluorescent-Antibody Cell Sorter
59. In CRISPR- CAS9, CAS9 is an
- a) DNA guided RNA endonuclease
 - b) RNA endonuclease
 - c) DNA guided DNA endonuclease
 - d) RNA guided DNA endonuclease
60. The global seed vault is in
- a) Anartica
 - b) Norway
 - c) Denmark
 - d) Siberia

ANSWER SHEET — PART — A

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
6	A	B	C	D	E
7	A	B	C	D	E
8	A	B	C	D	E
9	A	B	C	D	E
10	A	B	C	D	E
11	A	B	C	D	E
12	A	B	C	D	E
13	A	B	C	D	E
14	A	B	C	D	E
15	A	B	C	D	E
16	A	B	C	D	E
17	A	B	C	D	E
18	A	B	C	D	E
19	A	B	C	D	E
20	A	B	C	D	E

21	A	B	C	D	E
22	A	B	C	D	E
23	A	B	C	D	E
24	A	B	C	D	E
25	A	B	C	D	E
26	A	B	C	D	E
27	A	B	C	D	E
28	A	B	C	D	E
29	A	B	C	D	E
30	A	B	C	D	E
31	A	B	C	D	E
32	A	B	C	D	E
33	A	B	C	D	E
34	A	B	C	D	E
35	A	B	C	D	E
36	A	B	C	D	E
37	A	B	C	D	E
38	A	B	C	D	E
39	A	B	C	D	E
40	A	B	C	D	E

41	A	B	C	D	E
42	A	B	C	D	E
43	A	B	C	D	E
44	A	B	C	D	E
45	A	B	C	D	E
46	A	B	C	D	E
47	A	B	C	D	E
48	A	B	C	D	E
49	A	B	C	D	E
50	A	B	C	D	E
51	A	B	C	D	E
52	A	B	C	D	E
53	A	B	C	D	E
54	A	B	C	D	E
55	A	B	C	D	E
56	A	B	C	D	E
57	A	B	C	D	E
58	A	B	C	D	E
59	A	B	C	D	E
60	A	B	C	D	E

BIOTECHNOLOGY

PART – B

(Descriptive Type)

Answer **any eight** questions.

(8 × 5 = 40 Marks)

1. What is molecular pharming?
2. Describe the structure and mechanism of action of a prokaryotic cilium/ flagellum.
3. What are the different micro RNA's? What are its possible applications?
4. What are the advances in the techniques for gene therapy?
5. Describe the steps in preparation of yoghurt.
6. What are biosensors? Describe their uses?
7. What is DNA finger printing? What are its uses?
8. Write a note on application of Biotechnology in wildlife conservation.
9. Describe the role of ribosome in protein synthesis.
10. Describe the uses of Green fluorescent protein.
11. What is the mechanism of inactivation of the X chromosome?
12. What is the basis of production of genetically modified crops?

