

Code No.

**T – 2114**

**Entrance Examination for Admission to the P.G. Courses in the  
Teaching Departments, 2024.**

**CSS**

**BIOTECHNOLOGY**

**General Instructions**

1. The Question Paper is having 100 Objective Questions, each carrying one mark.
2. The answers are to be (✓) 'tick marked' **only** in the "**Response Sheet**" provided.
3. **Negative marking** : **0.25 marks** will be deducted for each wrong answer .

**Time : 2 Hours**

**Max. Marks : 100**

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

Choose appropriate answer from the options in the questions.

**(100 × 1 = 100 marks)**

1. Which of the following is meant by the statement that glucose and mannose are epimers?
  - A. One is an aldose and the other is a ketose
  - B. One is a pyranose and the other is a furanose
  - C. They differ only in the configuration about one carbon atom
  - D. They are mirror images of each other

**DO NOT WRITE HERE**

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2. Which of the following enzymes plays a direct role in the biosynthesis of collagen?
- A. Prolyl hydrolase
  - B. Tyrosine hydrolase
  - C. Choline oxidase
  - D. Monoamine oxidase
3. Which of the following does not make direct use of a pH or proton gradient?
- A. Mitochondrion
  - B. Chloroplast
  - C. Bacterial flagellum
  - D. Protozoan cilium

4. The source of oxygen for O<sub>2</sub> production during photosynthesis by higher plants is
- A. CO<sub>2</sub>
  - B. HCO<sub>3</sub><sup>-</sup>
  - C. H<sub>2</sub>O
  - D. ATP
5. The rate-limiting step of fatty acid synthesis is catalyzed by
- A. Acetyl CoA carboxylase
  - B. ATP-citrate lyase
  - C. Malic enzyme
  - D. Thiolase
6. Which of the following is not involved in the processing of mRNA precursors in eukaryotic cells?
- A. Capping of the 5' end
  - B. Addition of poly A
  - C. Excision of introns
  - D. Transport of the pre-mRNA to the cytoplasm
7. Ribosome is involved in all the following except
- A. Peptide bond formation
  - B. Aminoacylation of tRNA
  - C. Binding of aminoacyl tRNA to mRNA
  - D. Binding of mRNA at an initiation codon
8. Starting material for immobilized-enzymes-method-production of β-lactam antibiotics is
- A. Fatty acids
  - B. Nucleosides
  - C. Nucleotides
  - D. Amino acids
9. Distinct disadvantage of alcohol to disinfect *M tuberculosis* is that
- A. It is relatively inactive in presence of organic matter
  - B. It is relatively inactive in presence of inorganic matter
  - C. It may not be in appropriate concentration all the time
  - D. None above
10. Phenols demonstrate virucidal action due to
- A. Alteration of ssDNA
  - B. Alteration of phage transducing ability
  - C. Structural alterations to phages
  - D. All the above

11. Bacitracin is a polypeptide antibiotic and got its name
- Since it was isolated from *Bacillus subtilis*
  - Since it was isolated from *Bacillus subtilis* out of a fracture of a person named 'Tracy'
  - It is a trivial name
  - It is traceable in *Bacillus subtilis*
12. The major target of antifungal action is probably
- Plasma membrane
  - Ribosomes
  - DNA
  - Structural and functional proteins
13. Toxins are implicated as major pathogenic mechanism in all the following bacterial diarrhoea except
- Vibrio cholerae*
  - Shigella sp.*
  - Vibrio parahaemolyticus*
  - Staphylococcus aureus*
14. Epstein Barr (EB) virus has been implicated in the following malignancies except
- Hodgkin's diseases
  - Non-Hodgkin's lymphoma
  - Nasopharyngeal carcinoma
  - Multiple myeloma
15. Which of the following is transmitted through rat urine?
- Leptospira*
  - Listeria*
  - Ligeonella*
  - Mycoplasma*
16.  $\gamma$ - $\delta$  Receptors are
- MHC-Class I
  - MHC – Class II
  - B cell receptors
  - T cell receptors
17. Role of Cytochrome C in apoptosis is
- It activates Mitochondria
  - It activates ETC
  - It activates caspases
  - it activates ATP- ADP translocase

18. The secondary structure of proteins is
- A. The local three-dimensional structure
  - B. Two-dimensional structure
  - C. Structure without conformational flexibility
  - D. None of the above
19. In the TATA binding protein-DNA complex formation the DNA shall be in
- A. A form
  - B. B form
  - C. Z form
  - D. A-B chimera
20. It is generally accepted that in distantly related proteins
- A. Structure is more conserved than sequence
  - B. Sequence is more conserved than structure
  - C. No generalization is possible
  - D. Both sequence and structure are conserved
21. The first protein (peptide) synthesized in laboratory
- A. oxytocin
  - B. insulin
  - C. TSH
  - D. glucagon
22. Milk is a colloid in which
- A. A gas is dispersed in liquid
  - B. A liquid is dispersed in liquid
  - C. A solid is dispersed in liquid
  - D. None of the above
23. PDB stands for
- A. Primary data base
  - B. Protein data base
  - C. Protein data bank
  - D. Primary data bank
24. DBGET is a
- A. Database
  - B. Website
  - C. Data submission tool
  - D. Data retrieval tool

25. Global similarity between two sequences is determined by
- A. Needleman-Wursch algorithm
  - B. Smith-Waterman algorithm
  - C. Chou-Fasman rule
  - D. Fourier transform
26. The conversion of pyruvate to oxaloacetate is likely to require which of the following co-enzymes?
- A. Biotin
  - B. Vitamin B<sub>12</sub>
  - C. Thiamine pyrophosphate
  - D. Pyridoxal phosphate
27. Which of the following hormones initiates biological actions by crossing the plasma membrane and then binding to a receptor?
- A. Glucagon
  - B. Estradiol
  - C. Insulin
  - D. Norepinephrine
28. The structural membrane proteins are characterized in case of that they
- A. Don't transport small molecules
  - B. Exist only by beta sheets
  - C. Show prosthetic carbohydrate groups on the cytoplasmic side
  - D. Have a hydrophobic trans-membrane domain
29. Which of the following takes place during oxidative phosphorylation in mitochondria?
- A. Protons are pumped from the matrix to the intermembrane space
  - B. Protons are pumped from the intermembrane space to the matrix
  - C. Electrons are pumped from the matrix to the intermembrane space
  - D. Electrons are pumped from the intermembrane space to the matrix
30. In watery solutions proteins conformation is decided by two factors: A maximum of the number of hydrogen bonding and
- A. A minimum of entropy by the formation of a watery shell around the protein
  - B. A rotation of polar amino acid residues out against the outer shell off the protein
  - C. Minimization of hydrophobic interactions
  - D. Maximization of ion interaction

31. An enzyme that catalyzes the reaction  $A \leftrightarrow B$  changes the
- A. Heat of reaction
  - B. Equilibrium constant
  - C. Entropy of reaction
  - D. Rate of both the forward and reverse reactions
32. The major mechanism of turnover of molecular components of the plasma membrane occurs through
- A. Endocytosis of patches of membrane
  - B. Recovery of specific components by selective receptors
  - C. Expulsion of integral molecules into the extracellular medium
  - D. The concerted action of multifunctional enzyme complexes
33. Diacylglycerol activates which of the following enzymes?
- A. Protein kinase A
  - B. Protein kinase C
  - C. MAP kinase
  - D. Tyrosine kinase
34. Cellular proteins destined for secretion are sorted and packaged in the
- A. Lysosomes
  - B. Endosomes
  - C. Endoplasmic reticulum
  - D. *Trans* Golgi network
35. Which of the following leads to formation of polytene chromosomes?
- A. Nondisjunction of chromatids during meiosis
  - B. Sister chromatid exchange
  - C. Recombination between adjacent chromosome segments
  - D. Repeated replication without separation of chromatids
36. Which of the following is true about a circular double-stranded DNA genome that is determined by chemical means to be 21 percent adenosine
- A. The genome is 10.5% guanosine
  - B. The genome is 21% guanosine
  - C. The genome is 29% guanosine
  - D. The genome is 58% guanosine

37. The classical model of transcriptional control described by Jacob and Monod, a repressor protein binds to
- A. An enhancer
  - B. An AUG sequence
  - C. An operator
  - D. A ribosome binding site
38. Which of the following redox reactions would be expected to proceed as written?
- A.  $\text{Malate} + \text{NAD}^+ \rightarrow \text{oxaloacetate} + \text{NADH} + \text{H}^+$
  - B.  $\text{Acetoacetate} + \text{NADH} + \text{H}^+ \rightarrow \beta\text{-hydroxybuterate} + \text{NAD}^+$
  - C.  $\text{Pyruvate} + \beta\text{-hydroxybuterate} \rightarrow \text{lactate} + \text{acetoacetate}$
  - D.  $\text{Malate} + \text{pyruvate} \rightarrow \text{oxaloacetate} + \text{lactate}$
39. Plants and some bacteria differ from animals in that plants and some bacteria can
- A. Form polymers from glucose
  - B. Use carbon dioxide to increase their biomass
  - C. Produce NADH via reductive reactions
  - D. Synthesize glutamate and aspartate
40. Elevation of intracellular inositol triphosphate results in release of  $\text{Ca}^{2+}$  from which of the following organelles?
- A. Peroxisome
  - B. Lysosome
  - C. Nucleus
  - D. Smooth endoplasmic reticulum
41. All of the following are true about heterotrimeric G proteins except
- A. They bind either GDP or GTP
  - B. They phosphorylate proteins
  - C. They have GTPase activity
  - D. They act as binary switches
42. The completion of the S phase of the cell cycle of a mammalian cell is marked by all of the following except
- A. Histone content of the cell is doubled that of cells in  $G_1$
  - B. In replicated DNA, newly incorporated bases are paired with parental bases
  - C. Sister chromatids disjoin from one another
  - D. Each replicated chromosome has four telomeres



43. 'Zinc fingers' are important in cellular regulation because they are
- A. At the catalytic site of many kinases
  - B. A structural motif in many DNA-binding proteins
  - C. Structures with high redox potential
  - D. Characteristic of palindromic stretches of unique-sequence DNA
44. Which of the following types of bonds or interactions are least likely to be involved in stabilizing the three-dimensional folding of most proteins?
- A. Hydrogen bonds
  - B. Ester bonds
  - C. Disulfide bonds
  - D. Hydrophobic interactions
45. In animals, an enzyme unique to gluconeogenesis is
- A. Enolase
  - B. Aldolase
  - C. Phosphoglyceromutase
  - D. Fructose 1,6-bisphosphatase
46. Approximately how many moles of ATP will be generated as a result of the oxidation of one mole of  $\text{FADH}_2$  in an actively respiring mitochondrion?
- A. 0
  - B. 2.0
  - C. 3.0
  - D. 4.5
47. The amino acid sequence of a novel membrane protein contains four immunoglobulin-like domains and six fibronectin-like repeats. It is most likely a
- A. Cell adhesion molecule
  - B. Hormone-responsive ion channel
  - C. G protein
  - D. Transcription factor
48. All of the following components of a retrovirus are encoded by the viral genome except
- A. Envelope lipids
  - B. Viral RNAs
  - C. Matrix proteins
  - D. Capsid proteins
49. Some viruses have increased the coding potential of their genome by
- A. Integrating into the host genome
  - B. Using host ribosomes for translation
  - C. Using alternative splicing sites
  - D. Using a degenerate triplet code

50. All of the following processes occur in mitochondria of mammalian cells except
- A. Fatty acid biosynthesis
  - B. Protein synthesis
  - C. DNA synthesis
  - D. Citric acid cycle
51. Which of the following elements plays an important role in biological nitrogen fixation?
- A. Zinc
  - B. Molybdenum
  - C. Copper
  - D. Manganese
52. Plague is caused by
- A. *Yersinia pestis*
  - B. *Leishmania donovani*
  - C. *Trichinella spiralis*
  - D. *Salmonella typhimurium*
53. The lac operon is an example of
- A. Arabinose operon
  - B. Inducible operon
  - C. Repressible operon
  - D. Overlapping gene
54. Antigens are present
- A. Inside the nucleus
  - B. On cell surface
  - C. Inside the cytoplasm
  - D. On nuclear membrane
55. In bacteria mesosomes are the site of
- A. Protein synthesis
  - B. Photosynthesis
  - C. Respiration
  - D. Nitrogen fixation
56. Phytochrome gets activated in
- A. Green light
  - B. Blue light
  - C. Red light
  - D. Yellow light
57. *Saccharomyces cerevisiae* is used in the industrial production of
- A. Butanol
  - B. Citric acid
  - C. Ethanol
  - D. Tetracycline

58. Carbon monoxide is a pollutant because
- A. It reacts with O<sub>2</sub>
  - B. It inhibits glycolysis
  - C. It reacts with hemoglobin
  - D. It makes nervous system inactive
59. Which base is responsible for hot spots of spontaneous point mutations?
- A. Guanine
  - B. 5-methylcytosine
  - C. Adenine
  - D. 5-bromouracil
60. Calcitonin is a thyroid hormone which
- A. Elevates potassium level in blood
  - B. Lowers calcium level in blood
  - C. Elevates calcium level in blood
  - D. No effect on potassium or calcium
61. Which of the following pesticides is an acetylcholine esterase inhibitor?
- A. Aldrin
  - B. D-DT
  - C. Endosulfan
  - D. Malathion
62. The supersonic jets cause pollution by thinning of
- A. CO<sub>2</sub> layer
  - B. SO<sub>2</sub> layer
  - C. O<sub>2</sub> layer
  - D. O<sub>3</sub> layer
63. The water potential and osmotic potential of pure water are
- A. 100 and zero
  - B. Zero and zero
  - C. 100 and 200
  - D. Zero and 100
64. What is Agent Orange?
- A. A biodegradable insecticide
  - B. A weedicide containing dioxin
  - C. Colour used in lamp
  - D. Colour used in paints
65. Restriction endonucleases are
- A. Synthesized by bacteria
  - B. Present in mammalian cells
  - C. Used for in vitro DNA synthesis
  - D. Used in genetic engineering

66. The following is not true about DNA synthesis:
- A. It requires DNA polymerase
  - B. Reverse transcriptase enzymes are involved
  - C. Moves in a 5'---> 3' direction
  - D. Cytarabine inhibits DNA synthesis
67. With regard to DNA molecules:
- A. They contain adenine, cytosine, guanine and uracil bases
  - B. They can be detected with Western blotting
  - C. They cannot be detected with Southern blotting
  - D. They are denatured at temperature of 100°C
68. G-proteins :
- A. Can be mutated in tumour cells
  - B. They are inactivated by cholera toxins
  - C. Mediate the action of glucocorticoid hormone
  - D. Bind to DNA to regulate gene transcription
69. The following is true about gluconeogenesis:
- A. It occurs in liver
  - B. It is inhibited by glucagon
  - C. It occurs in adipose tissue
  - D. It is stimulated by insulin
70. With regard to membrane receptors for hormones:
- A. They are not glycoproteins
  - B. They are important for hormones made up of steroid
  - C. Those for insulin exhibit an intrinsic protein kinase activity
  - D. Glucagon uses calcium as a second messenger
71. With regard to histones, the following is not true:
- A. The amino acid composition of histones show great variability amongst different human races
  - B. Mitochondria do not contain histones
  - C. They are essential for the formation of stable DNA
  - D. They are basic proteins

72. In the regulation of genes, the following is not true:
- A. More than 90% of the base sequences in human DNA have not known function
  - B. Exons are the part of the gene that code for amino acids found in the final proteins
  - C. Splicing cut out the mRNA coded by introns
  - D. Introns usually begins with the nucleotide sequence GT
73. Thromboxane  $A_2(TXA_2)$ :
- A. Does not require lipoxygenase for its production
  - B. Is not derived from the membrane phospholipid
  - C. Its production is not decreased by non-steroidal anti-inflammatory drugs
  - D. Does not cause platelet aggregation
74. In the eye lens:
- A. Pentose phosphate pathway metabolizes 30% of the available glucose
  - B. The capsule is not made up of type IV collagen
  - C. Most metabolism is not carried out in the anterior pole
  - D. Anaerobic glycolysis is not the main source of energy
75. The following is not true about the oxidation of glucose:
- A. Glycolysis produces 3% of the energy ultimately obtained from glucose
  - B. Glucose does not enter the Kreb's cycle as pyruvate
  - C. Glycolysis occurs within the mitochondria
  - D. The first stage of glycolysis involves phosphorylation of glucose to 1,6 – fructose biphosphate
76. \_\_\_\_\_ made the protocol of keeping tissues and organs alive outside animal body
- A. H G Khorana
  - B. Sidney Ringer
  - C. A Waksman
  - D. Linus Pauling

77. Pyramid of biomass in pond ecosystem is
- A. Upright
  - B. Spindle shaped
  - C. Straight
  - D. Inverted
78. The enzymes with slight variation unstructure, but the same catalytic action called
- A. Holoenzyme
  - B. Isoenzyme
  - C. Apoenzyme
  - D. Coenzyme
79. Which of the following is not a herbicide?
- A. Collego
  - B. Devine
  - C. Biochon
  - D. None
80. The optimum temperature for wine- fermentation of fruit juice is
- A. 10°F
  - B. 110°F
  - C. 120°F
  - D. 68°F
81. Volume of urine is regulated by
- A. Aldosterone
  - B. Aldosterone and ADH
  - C. Aldosterone, ADH and testosterone
  - D. ADH
82. Receptors of pain are known as
- A. Rheoreceptors
  - B. Algesireceptors
  - C. Tangoreceptors
  - D. Mehanocerptors
83. Wine yeast is
- A. *Saccharomyces cerevisiae*
  - B. *S. ellipsoids*
  - C. *Cryptococcus*
  - D. None of the above
84. The branch of science dealing with death is called
- A. Thanatology
  - B. Teratology
  - C. Toxicology
  - D. Tricology

85. The antibiotic gentamycin is produced from  
A. *Micromonosperma purpurea*      B. *Streptomyces griseus*  
C. *Penicillium notatum*              D. None above
86. Cell organelle related to photorespiration is  
A. Peroxisome                              B. Ribosome  
C. Lysosome                                 D. Lyposome
87. Aerobic respiration produces more energy than fermentation because fermentation involves  
A. Alcohol production                  B. Formation of CO<sub>2</sub> and H<sub>2</sub>O  
C. Incomplete oxidation of food      D. Formation of acid
88. The best source of Vit C among the following is  
A. *Glycine max*                              B. *Arachis hypogeal*  
C. *Embllica officinalis*                  D. *Mangifera indica*
89. An antiserum would contain  
A. Antigens                                 B. Antibodies  
C. Leucocytes                               D. RBCs
90. A condition of failure of kidney to form urine is  
A. Creatinine                                B. Hematuris  
C. Anuria                                     D. Ketouria
91. Insulin is secreted by  
A. Spleen  
B.  $\alpha$ -cells of islets of langerhans of pancreas  
C.  $\beta$ -cells of islets of langerhans of pancreas  
D. Mucosa of oesophagus
92. The virus that infects bacteria are called  
A. Mycophage                                B. Bacteriophage  
C. HIV                                         D. Retrovirus

93. The chemicals that are produced by host plants due to infection as a defense reaction to pathogen are called
- A. Phytotoxins  
B. Toxins  
C. Phytotrons  
D. Phytoalexins
94. Anti-viral substance is
- A. Antigen  
B. Antibody  
C. Interferon  
D. Antibiotic
95. Which one of the following is biodegradable?
- A. PVC  
B. Asbestos  
C. Sewage  
D. Polythene
96. Treatment with alloxan destroys
- A. Stilt cells  
B.  $\beta$  - cells of langerhans  
C. Sertoli cells  
D. Cells of leudig
97. Polygenic genes show
- A. Similar genotypes  
B. Different phenotypes  
C. Different karyotypes  
D. Different genotypes
98. The enzyme responsible for the reduction of molecular nitrogen to ammonia in legume root nodules
- A. Nitrogenase  
B. Nitrate reductase  
C. Nitrite reductase  
D. Amminase
99. Okazaki fragments form
- A. Leading strand  
B. Lagging strand  
C. Non-sense strands  
D. Sense strand
100. The drug belladonna is obtained from
- A. Atropa  
B. Opium  
C. Rauwolfia  
D. Solanum



ANSWER SHEET

1	A	B	C	D	E	26	A	B	C	D	E	51	A	B	C	D	E	76	A	B	C	D	E
2	A	B	C	D	E	27	A	B	C	D	E	52	A	B	C	D	E	77	A	B	C	D	E
3	A	B	C	D	E	28	A	B	C	D	E	53	A	B	C	D	E	78	A	B	C	D	E
4	A	B	C	D	E	29	A	B	C	D	E	54	A	B	C	D	E	79	A	B	C	D	E
5	A	B	C	D	E	30	A	B	C	D	E	55	A	B	C	D	E	80	A	B	C	D	E
6	A	B	C	D	E	31	A	B	C	D	E	56	A	B	C	D	E	81	A	B	C	D	E
7	A	B	C	D	E	32	A	B	C	D	E	57	A	B	C	D	E	82	A	B	C	D	E
8	A	B	C	D	E	33	A	B	C	D	E	58	A	B	C	D	E	83	A	B	C	D	E
9	A	B	C	D	E	34	A	B	C	D	E	59	A	B	C	D	E	84	A	B	C	D	E
10	A	B	C	D	E	35	A	B	C	D	E	60	A	B	C	D	E	85	A	B	C	D	E
11	A	B	C	D	E	36	A	B	C	D	E	61	A	B	C	D	E	86	A	B	C	D	E
12	A	B	C	D	E	37	A	B	C	D	E	62	A	B	C	D	E	87	A	B	C	D	E
13	A	B	C	D	E	38	A	B	C	D	E	63	A	B	C	D	E	88	A	B	C	D	E
14	A	B	C	D	E	39	A	B	C	D	E	64	A	B	C	D	E	89	A	B	C	D	E
15	A	B	C	D	E	40	A	B	C	D	E	65	A	B	C	D	E	90	A	B	C	D	E
16	A	B	C	D	E	41	A	B	C	D	E	66	A	B	C	D	E	91	A	B	C	D	E
17	A	B	C	D	E	42	A	B	C	D	E	67	A	B	C	D	E	92	A	B	C	D	E
18	A	B	C	D	E	43	A	B	C	D	E	68	A	B	C	D	E	93	A	B	C	D	E
19	A	B	C	D	E	44	A	B	C	D	E	69	A	B	C	D	E	94	A	B	C	D	E
20	A	B	C	D	E	45	A	B	C	D	E	70	A	B	C	D	E	95	A	B	C	D	E
21	A	B	C	D	E	46	A	B	C	D	E	71	A	B	C	D	E	96	A	B	C	D	E
22	A	B	C	D	E	47	A	B	C	D	E	72	A	B	C	D	E	97	A	B	C	D	E
23	A	B	C	D	E	48	A	B	C	D	E	73	A	B	C	D	E	98	A	B	C	D	E
24	A	B	C	D	E	49	A	B	C	D	E	74	A	B	C	D	E	99	A	B	C	D	E
25	A	B	C	D	E	50	A	B	C	D	E	75	A	B	C	D	E	100	A	B	C	D	E

## **ROUGH WORK**

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