**Ph.D. COMMON ENTRANCE TEST**

**SUBJECT- MOLECULAR MEDICINE**

**Roll No:**

**PART B**

**Duration: 60 minutes Maximum Marks: 45**

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| **Instructions:**   1. **This entrance test question paper is not to be taken out of the examination hall** 2. **Part B Question paper consists of Section A and Section B** 3. **Section A consists of 25 MCQs carrying 1 Mark each. Put a tick (√) mark against the correct answer in the box given.** 4. **Section B consists of Descriptive questions carrying 5 marks each. Restrict your answer to 500 words. Additional plain sheets have been attached to the question paper to answer Section B** |

**SECTION – A**

**Answer the following by ticking (√) against the correct answer in the box given: 25 X 1 = 25**

1. What is the primary purpose of a phylogenetic tree in bioinformatics?
2. Predicting protein structures
3. Analyzing gene expression
4. Studying evolutionary relationships
5. Identifying functional domains in proteins
6. What is the primary function of Krebs cycle?
7. ATP synthesis
8. Carbon fixation
9. Electron transport
10. Nutrient Breakdown
11. Which process involves the transfer of genetic material between bacterial cells through direct cell-to-cell contact?
12. Conjugation
13. Transformation
14. Transduction
15. Replication
16. What is the function of Microbial flagella?
17. Photosynthesis
18. Motility
19. Cell division
20. DNA replication
21. What is the significance of the microbiome in human health?
22. Energy production
23. Nutrient absorption
24. Microbial diversity
25. Disease prevention
26. Which of the following statistical tests is used to compare the means of two independent groups?
27. t-test
28. Chi-square test
29. ANOVA
30. Paired t-test
31. Apoptosis plays a role in cancer by:
32. Promoting uncontrolled cell growth
33. Inhibiting DNA repair mechanisms
34. Controlling cell growth and preventing tumor development
35. Enhancing tumor angiogenesis
36. Interactions between cancerous cells and normal cells primarily involve:
37. Suppression of tumor growth by normal cells
38. Activation of oncogenes in normal cells
39. Immune responses and tumor microenvironment alterations
40. Induction of apoptosis in normal cells
41. Dysregulation of the cell cycle in cancer leads to:
42. Controlled cell growth and differentiation
43. Uncontrolled cell proliferation and impaired cell cycle checkpoints
44. Enhanced DNA repair mechanisms
45. Reduced cell apoptosis
46. The tumor microenvironment includes:
47. Only tumor cells
48. Only blood vessels
49. Stromal cells, blood vessels, and extracellular matrix
50. Cancer cells and normal cells only
51. What distinguishes cancer cells from normal cells?
52. Limited cell division
53. Altered metabolism
54. Controlled growth signals
55. Intact DNA repair mechanisms
56. Gap junctions facilitate communication between cells by:
57. Directly linking the cytoplasm of adjacent cells
58. Modulating cell adhesion
59. Regulating neurotransmission
60. Controlling hormonal release
61. Hematopoiesis refers to:
62. Regulation of cell communication
63. Regulation of blood cell formation
64. Cellular transportation mechanisms
65. Intercellular signaling pathways
66. Light-mediated signaling in plants involves the utilization of:
67. Chemical messengers for intercellular communication
68. G-protein coupled receptors
69. Chlorophyll and other photoreceptors
70. Second messengers like cAMP
71. Which statement accurately represents the role of second messengers in cell signaling?
72. Second messengers directly bind to DNA to initiate gene expression
73. They amplify and transmit signals initiated by cell surface receptors
74. Second messengers act as hormone transporters in the bloodstream
75. They regulate the cell cycle by directly controlling protein synthesis
76. Bacterial chemotaxis primarily refers to:
77. The movement of bacteria toward light sources
78. Bacteria responding to chemical gradients in their environment
79. Reproduction of bacteria in response to changes in temperature
80. Bacteria's ability to change shape in response to mechanical stimuli
81. The interaction between cell surface receptors and hormones primarily occurs at the:
82. Extracellular matrix
83. Cytosol of the cell
84. Plasma membrane
85. Nucleus of the cell
86. To which of the following options do individual respondents, focus groups, and panels of respondents belong?
87. Primary data sources
88. Secondary data sources
89. Itemised data sources
90. Pointed data sources
91. …………… are insoluble in water.
92. Sugar
93. Salt
94. Fats
95. Ethanol
96. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are enzymes capable of introducing transient single-strand or double-strand breaks into the DNA.
97. Topoisomerases
98. Ligases
99. Primases
100. Helicases
101. If mRNA codon is 5'-AUG-3', then the tRNA anticodon will be \_\_\_\_\_\_\_\_\_.
102. 5'-UAC-3'
103. 5'-GUA-3'
104. 3'-CAU-5'
105. 3'-UAC-5'
106. Nucleosome consists of histone proteins \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
107. H1, H2, H3, H4
108. H1, H2A, H2B, H4
109. H2A, H2B, H3, H4
110. H1, H2A, H2B, H3
111. Chiasma formation occurs in \_\_\_\_\_\_\_\_\_ stage of Prophase I during Meiosis.
112. Leptotene
113. Pachytene
114. Zygotene
115. Diplotene
116. Which type of immunity involves the production of antibodies by the immune system?
117. Cellular immunity
118. Innate immunity
119. Passive immunity
120. Humoral immunity
121. What does the term "BLAST" stand for in the context of bioinformatics?
122. Basic Local Alignment Search Tool
123. Biological Sequence Annotation and Search Tool
124. Bioinformatics Learning and Analysis Support Tool
125. Base Level Alignment and Sorting Toolkit
126. Which of the following is the general formula of Carbohydrates?
127. (C4H2O)n
128. (C6H2O)n
129. (CH2O)n
130. (C2H2O)n COOH
131. Authenticity of a research finding is its:
132. Originality
133. Validity
134. Objectivity
135. All of the above
136. Which of the following is the simplest form of carbohydrates?
137. Carboxyl groups
138. Aldehyde and Ketone groups
139. Alcohol and Carboxyl groups
140. Hydroxyl groups and Hydrogen groups
141. Metastasis refers to:
142. The primary tumor site
143. The spread of cancer cells to distant organs
144. The initial stage of cancer development
145. In situ carcinoma formation
146. Which of the following is not a naturally occurring stem cell?
147. Embryonic Stem cells
148. Hematopoietic Stem cells
149. Mesenchymal stem cells
150. induced pluripotent stem cells

**SECTION – B**

**Answer any four of the following: 5 X 4 = 20**

1. Discuss the principles of biomolecule separation using organic solvents based on polarity.
2. Explain how gap junctions function in enabling direct intercellular communication

and the significance of this communication method.

1. Describe the tumor microenvironment and its influence on cancer development and progression.
2. Classify Stem cells and elaborate on Embryonic Stem cells.
3. Elaborate the Central dogma in detail. Add a note on antisense technology.
4. Enlist the various research ethics and explain any two in detail.

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