

Registration NO. :

Centre of Exam. :

Name of Candidate:

**S A U**  
**Entrance Test for M.Phil/Ph.D. (Biotechnology)**

**[Sample Paper]**

*Time : 3 hours*

*Maximum Marks : 70*

---

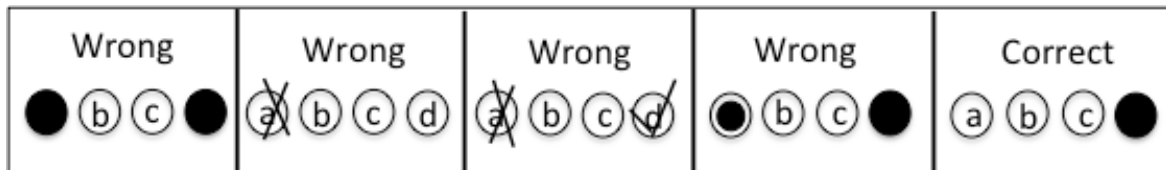
**INSTRUCTIONS FOR CANDIDATES**

*Candidates must read carefully the following instructions before attempting the question paper:*

- (i) Write your Name and Registration Number in the space provided for the purpose on the top of this Question Paper and in the Answer Sheet.
- (ii) This Question Paper has Two Parts.
- (iii) Part-A has 20 questions of **1** mark each. Please attempt all the questions of Part-A.
- (iv) Part-B has 100 questions out of which please attempt 50 questions only. Each question carries **1** mark.
- (v) **One fourth of marks assigned to any question will be deducted for wrong answers in both Part—A and Part—B.**
- (vi) *PLEASE DO NOT ATTEMPT MORE THAN 50 QUESTIONS IN PART-B. IF YOU ATTEMPT MORE THAN 50 QUESTIONS, ONLY THE FIRST 50 WILL BE EVALUATED.*
- (vii) **Please darken the appropriate Circle of Question Paper Series Code on the Answer Sheet in the space provided.**
- (viii) Answer written by the candidates inside the Question Paper will not be evaluated.
- (ix) Pages at the end have been provided for Rough Work.
- (x) Simple calculators are allowed. Mobile Phones are **NOT** allowed.
- (xi) Return the Question Paper and the Answer Sheet to the Invigilator at the end of the Entrance Examination.
- (xii) **DO NOT FOLD THE ANSWER SHEET.**

## INSTRUCTIONS FOR MARKING ANSWERS IN THE OMR SHEET

1. Use only Blue/Black Ballpoint Pen (do not use Pencil) to darken the Circle.
2. Please darken the whole Circle.
3. Darken ONLY ONE CIRCLE for each question as shown below in the example :



4. Once marked, no change in the answer is allowed.
5. Please do not make any stray marks on the Answer Sheet.
6. Please do not do any rough work on the Answer Sheet.
7. Mark your answer only in the appropriate space against the number corresponding to the question.
8. **Ensure that you have darkened the appropriate Circle of Question Paper Series Code on the Answer Sheet in the space provided.**

### Part ---A

1. A peptide bond is formed between
  - a) Amine and carboxyl groups
  - b) Carbonyl and hydroxyl groups
  - c) Amine and hydroxyl groups
  - d) Aldehyde and amine groups
  
2. Which of the following enzymes does not participate in glycolysis?
  - a) Pyruvate dehydrogenase
  - b) Phosphofructokinase
  - c) Pyruvate kinase
  - d) Lactate dehydrogenase
  
3. An immunoglobulin molecule has:
  - a) Two identical light chains and two identical heavy chains
  - b) Two different light chains and two different heavy chains
  - c) Two different light chains and two identical heavy chains
  - d) Four identical protein chains
  
4. Which one of the followings is DNA virus?
  - a) Adenovirus
  - b) Flavivirus
  - c) Lentivirus
  - d) Orthomyxovirus
  
5. Which one of the following techniques does not involve electrophoresis for separation of biomolecules?
  - a) Southern Blotting
  - b) Northern Blotting
  - c) Western Blotting
  - d) Dot Blotting
  
6. Feedback inhibition of an enzyme is caused by
  - a) Enzyme
  - b) Substrate
  - c) Product
  - d) Intermediate product
  
7. Chitin is a:
  - a) Polysaccharide
  - b) Nitrogenous Polysaccharide
  - c) Lipoprotein
  - d) Protein

8. Excessive bleeding from an injury is due to the deficiency of
  - a) Vitamin K
  - b) Vitamin B
  - c) Vitamin C
  - d) Vitamin A
  
9. Typhoid is caused by a species of
  - a) Streptococcus
  - b) Salmonella
  - c) Staphylococcus
  - d) Mycobacterium
  
10. After entering a T cell, HIV must first generate
  - a) mRNA
  - b) ssDNA
  - c) dsDNA
  - d) dsRNA
  
11. A vector borne disease among the followings is
  - a) Scurvy
  - b) Influenza
  - c) Tuberculosis
  - d) Kala-azar
  
12. A dividing and undifferentiated mass of cells is called
  - a) Callus
  - b) Embryo
  - c) Explant
  - d) Zygote
  
13. The first transgenic crop was
  - a) Pea
  - b) Tobacco
  - c) Flax
  - d) Cotton
  
14. Using SDS polyacrylamide gel electrophoresis we can
  - a) test for their biological activity of proteins after separation by SDS polyacrylamide gel electrophoresis.
  - b) Proteins are solubilized but not denatured when separated by SDS polyacrylamide gel electrophoresis.
  - c) SDS polyacrylamide gel electrophoresis separates proteins on the basis of charge.
  - d) SDS polyacrylamide gel electrophoresis separates proteins on the basis of size.

15. Which of the following statements about the functions of cell membranes is not correct?
- a) Cell membranes maintain the shape of cells.
  - b) Cell membranes retain the contents of cells.
  - c) Cell membranes are impermeable to most molecules.
  - d) Cell membranes are permeable to most inorganic ions.
16. Which of the following reactions is required for proofreading (i.e. correcting replication errors) during DNA replication by DNA polymerase III?
- a) 3' - 5' exonuclease activity
  - b) 5' - 3' exonuclease activity
  - c) 3' - 5' endonuclease activity
  - d) 5' - 3' endonuclease activity
17. How does the mismatch repair system distinguish between the parental (i.e. correct) DNA strand and the newly synthesised strand containing the mismatched base?
- a) Thymine in the parental strand of the helix is methylated at GATC.
  - b) Thymine in the new strand of the helix is methylated at GATC.
  - c) Guanine in the parental strand of the helix is methylated at GATC.
  - d) Guanine in the new strand of the helix is methylated at GATC.
18. How many different transfer RNA molecules are present in a cell (not including those present in the mitochondria)?
- a) 64
  - b) 61
  - c) 20
  - d) More than 20, less than 61
19. The protein which inhibits blood clotting is
- a) Thrombin
  - b) Plasmin
  - c) Antithrombin
  - d) Tissue plasminogen activator
20. The normal immunological role of the CD8<sup>+</sup> T-cell is to:
- a) Help B-lymphocytes to develop into plasma cells.
  - b) Kill virus infected cells.
  - c) Secrete antibodies.
  - d) kill bacteria

## Part -B

21. What percentage of the human genome is accounted by the protein encoding regions ?
- A. 1
  - B. 2
  - C. 3
  - D. 5
22. An acid with a pK of 8.0 is present in a solution of pH6.0. The ratio of deprotonated to the protonated form of the acid would be:
- A. 0.001
  - B. 0.01
  - C. 0.1
  - D. 1.0
23. One of the following diseases is not connected to misfolded protein:
- A. Huntington
  - B. Alzheimer
  - C. Krohn's
  - D. Parkinson
24. One of the following reagents can be used to determine the N-terminus amino acid in proteins:
- A. DANSyl chloride
  - B. Cyclohexanedione
  - C. Ellman reagent
  - D. Iodoacetamide
25. A bifunctional reagent useful in coupling proteins is:
- A. Dicyclohexylcarbodiimide (DCC)
  - B. Glutaraldehyde
  - C. Para chloro mercury benzoate (PCMB)
  - D. Cyanogen bromide
26. The semi conservative mechanism of DNA replication was suggested by the results of the experiments of:
- A. Hershey and Chase
  - B. Watson and Crick
  - C. Meselson and Stahl
  - D. Cohen and Boyer

27. The sequence recognized by the restriction enzyme Eco R1 is:
- A. 5'-GAATTC-3'
  - B. 5'-GCGC-3'
  - C. 5'-GGATCC-3'
  - D. 5'-GTATTC-3'
28. The  $P_{50}$  for the binding of  $O_2$  by Hb is:
- A. 1 torr
  - B. 15 torr
  - C. 26 torr
  - D. 100 torr
29. In an enzyme catalyzed reaction,  $V_{max}$  is a function of:
- A.  $K_1$
  - B.  $K_{-1}$
  - C.  $K_{cat}$
  - D.  $K_m$
30. One of the following is not a post-translational modification:
- A. Phosphorylation of Serine
  - B. Phosphorylation of Tyrosine
  - C. Sulphation of Tyrosine
  - D. Glycosylation of Asparagine
31. An  $\omega$ -3 fatty acid means:
- A. There is a double bond at the  $\gamma$ -carbon next to carboxyl group
  - B. There are 3 double bonds in the fatty acid
  - C. There is a double bond on the 3<sup>rd</sup> carbon from the non-carboxyl end
  - D. The double bond wherever it is is trans in configuration.
32. One of the following membrane proteins does not use  $\alpha$  helices to span the membrane:
- A. Bacteriorhodopsin
  - B. Porin from E. coli
  - C. G-protein coupled receptors
  - D. Glycophorin A of RBC
33. One of the following is not a second messenger:
- A. cAMP
  - B.  $IP_3$
  - C. Nitric oxide
  - D. Calmodulin

34. The intermediate formed in the conversion of 3- phosphoglyceric acid to 2-phosphoglyceric acid is:
- A. 1,2- BPG
  - B. 2,3-BPG
  - C. 1,3-BPG
  - D. 2,2-BPG
35. Acetyl CoA enters TCA cycle in the first reaction where it adds across oxaloacetic acid to form citric acid. In which of the subsequent cycles , does its carboxyl group get removed (i.e. decarboxylated)?
- A. 1
  - B. 2
  - C. 3
  - D. 4
36. Cyanide causes death by inhibiting mitochondrial electron transport at:
- A. NADH oxidase step (complex I)
  - B. Succinate dehydrogenase step (complex II)
  - C. Cytochrome C oxidase step (complex III)
  - D. Cytochrome a-a<sub>3</sub> oxidase (complex IV)
37. Prostaglandins are biosynthesized from:
- A. Palmitoleic acid
  - B. Linolenic acid
  - C. Arachidonic acid
  - D. Linoleic acid
38. Urea excreted by Ureotelic organisms comes mostly from:
- A. Urea cycle
  - B. Degradation of uric acid
  - C. Nitric acid synthase (NOS) action on Arginine
  - D. Degradation of Uracil
39. One of the following secondary metabolites is not an acetogenin:
- A. Rubber
  - B. Cholesterol
  - C. Diterpenes
  - D. Acetoacetic acid
40. How many pairs of chromosome does *Drosophila melanogaster* possess?
- A. 16 pairs
  - B. 20 pairs
  - C. 4 pairs
  - D. 6 pairs



41. Which of the following is used for the human cancer related experiments as an *in vivo* model?
- A. Bacteria
  - B. Yeast
  - C. *Drosophila melanogaster*
  - D. Zebrafish
42. A component of animal cell membranes that functions to stiffen the membrane and thus regulate its fluidity is;
- A. Cholesterol.
  - B. Cellulose
  - C. Pectin
  - D. Carbohydrates
43. Which of the following statement is incorrect regarding transport protein?
- A. They are present in cell membrane
  - B. They serve to carry polar molecule across the hydrophobic cell membrane
  - C. They are required to transport amino acids across the cell membrane
  - D. They are required to transport hydrophobic steroids across the cell membrane
44. How does the protein from cytosol transport to the endoplasmic reticulum?
- A. Gated transport
  - B. Transmembrane transport
  - C. Vesicular transport
  - D. ATP-gated channel
45. Intermediate filaments are found in;
- A. Mitotic spindle
  - B. Centrosomes
  - C. Cilia
  - D. Desmosomes
46. Which of the following CKI inhibit cyclinD-CDK4/6 complex?
- A. INK4 family of inhibitor
  - B. CIP1 family of inhibitor
  - C. TGF $\beta$
  - D. Cell division cycle phosphatase (CDC25)
47. Which of the following processes occur only in S phase of the cell cycle?
- A. Organelle replication
  - B. Cell growth
  - C. DNA replication
  - D. Chromosomes segregation
48. Most of the protein kinases;
- A. Bind cAMP
  - B. Add phosphate groups to their substrate proteins
  - C. Polymerize amino acids
  - D. Bind cGMP

49. During the muscle contraction hydrolysis of the ATP results in the change of;
- Conformation of actin
  - Conformation of myosin
  - Structure of the myofibrils
  - Structure of the sarcoplasmic reticulum
50. Which of the enzyme inhibit activity of cAMP?
- Adenylyl cyclase
  - Phospholipase C- $\beta$
  - Phosphodiesterase
  - Protein Kinase A
51. Replication occurs during which phase of cell cycle?
- G<sub>0</sub> phase
  - G<sub>1</sub> phase
  - S phase
  - M phase
52. When the distance between the -10 and -35 elements in the promoter is increased by 10 bases, it will
- have no effect on transcription
  - reduce the rate of transcription
  - increases the efficiency of transcription
  - fails to initiate transcription
53. When a mutation is introduced in the inducer-binding domain of the lac repressor, no amount of allolactose is capable of inducing the lac operon. In such cells,  $\beta$ -galactosidase gene can be induced by
- Growing the cells in a glucose-free media
  - Using synthetic inducers such as IPTG
  - Co-transfecting the cells with a plasmid containing *lacI*<sup>+</sup> gene
  - Introducing more lactose transporters on the plasma membrane
54. Which among the following is an example of natural amino acid?
- Hydroxyproline
  - Pyrrolysine
  - Gamma-aminobutyric acid
  - Phosphoserine
55. Depurination refers to
- Breakage of the phosphodiester bond
  - Incorporation of hypoxanthine in the DNA
  - Deamination of adenine/guanine residues
  - Breakage of the N-glycosidic bond

56. Stop codons, in prokaryotes, are recognized by/through
- A. terminator tRNA (contain no amino acid)
  - B. release factors
  - C. ribosome recycling factor
  - D. mRNA secondary structures (hairpin loop)
57. During the isolation of DNA from plant tissues, what type of detergent best serves the purpose:
- A. Non-ionic detergent
  - B. Anionic detergent
  - C. Cationic detergent
  - D. Zwitterionic detergent
58. Topoisomerases assist in replication through
- A. Identifying the origin of replication
  - B. relaxing the double stranded DNA
  - C. creating single strand by melting DNA
  - D. joining the short Okazaki fragments after replication
59. Amino acids that are capable of stabilizing the structure of DNA within the cell include
- A. Glutamine and aspartate
  - B. Histidine and lysine
  - C. Phosphoserine and phosphothreonine
  - D. Acetylated lysine
60. A peptide bond is formed within which site of the ribosome?
- A. P site
  - B. A site
  - C. E site
  - D. 30S subunit
61. Which genetic locus is rearranged first during the ontogeny of B cells?
- A. Gamma chain
  - B. Mu chain
  - C. Kappa chain
  - D. Lambda chain
62. For flow cytometric analysis of T and B cell populations, which mixture of antibodies you may use?
- A. anti-CD19-FITC, anti-IgG-FITC
  - B. anti-CD3-FITC, anti-TCR-PE
  - C. anti-TNF-PE, anti-CD19-FITC
  - D. anti-IgG-FITC, anti-CD3-PE

63. Which of the following membrane lipids are generally expressed in the inner side of the lipid bi-layer in a healthy lymphocyte?
- A. Phosphatidyl serine
  - B. Phosphatidyl choline
  - C. Cholesterol
  - D. Phosphatidyl inositol
64. Which of the following molecules may have no effector role in cell mediated cytotoxicity?
- A. TNF
  - B. FasL
  - C. Perforin
  - D. CD25
65. Activated T helper cells were stained with anti-CD4 antibody. The antibody would stain:
- A. CD4 molecules expressed on cell membrane
  - B. CD4 molecules in cytoplasm
  - C. CD4 molecules on membrane as well as in cytoplasm
  - D. CD4 molecules inside nucleus
66. Which one of the following is an ideal condition for optimal translation initiation in expression vector for *E. coli* ?
- A. An A-U rich sequence of 6-11 nucleotides between Ribosome binding site and initiation codon
  - B. A G-C rich sequence of 6-11 nucleotides between Ribosome binding site and initiation codon
  - C. More than 20 nucleotide gap between Ribosome binding site and initiation codon
  - D. No gap between Ribosome binding site and initiation codon
67. The larger poison claws of centipede are
- A) Mandibles
  - B) Maxillepedes
  - C) Maxillae
  - D) Telson
68. The organ of Jacobson in amphibians is for
- A. Smell
  - B. Taste
  - C. Pressure
  - D. Temperature
69. Which one of the followings is activated by phosphorylation?
- A. Glycogen synthase
  - B. Acetyl CoA carboxylase
  - C. HMG CoA reductase
  - D. Mitogen-activated protein kinase (MAPK)

70. Which of the following is not a major function of ER?
- A. Co-translational translocation of the proteins
  - B. Glycosylation of the proteins
  - C. Storing of calcium ions
  - D. Sulfation of tyrosine
71. Which of the following proteins does form ring around clathrin coated vesicle to pinch off endocytic vesicles?
- A. Dynamin
  - B. Adaptin
  - C. Rab GTPase
  - D. t-SNARE
72. Which of the following transport system is responsible for the acidic environment of the lysosomes?
- A. P-type of ion pump
  - B. V-type of ion Pump
  - C. F-type of ion Pump
  - D. ABC transporter
73. Which of the following molecules forms extracellular cross-linked fibrils of great tensile strength?
- A. Collagen
  - B. Fibronectin
  - C. Laminin
  - D. Integrins
74. Which of the following protein is inactivated by phosphorylation?
- A. Growth factor
  - B. p53
  - C. Retinoblastoma protein
  - D. Mitogen-activated protein kinase
75. Proteasomes are responsible for the degradation of all of the following EXCEPT
- A. Cyclin B during anaphase
  - B. Securin at anaphase
  - C. Proteins targeted to lysosomes
  - D. Cyclin E during G2 phase
76. Which of the following pairs of is cyclin and cyclin dependent kinase is involved in M-phase of cell cycle?
- A. E/CDK2
  - B. B/CDK1
  - C. A/CDK1
  - D. A/CDK2

77. The beadlike unit of chromatin structure is the
- Nucleosome
  - Kinetochores
  - Solenoid
  - Scaffold
78. In glycoproteins, the carbohydrate moiety always gets attached through which of the following amino acids?
- Glutamine or arginine
  - Aspartate or glutamate
  - Tryptophan or phenylalanine
  - Asparagine, threonine or serine
79. Fluorescent tubulin is microinjected into the cytoplasm of a mammalian cell in interphase. Which of the following best describes where the fluorescent tubulin will first be incorporated?
- In the centromeres
  - Throughout the length of the existing microtubules
  - At the distal tips of microtubules
  - At the plus ends of microfilaments
80. 1000 $\mu$ L of 10M acetic acid was added to 100mL of 0.1M sodium acetate of pH 8.9. What would be the new pH? (Given pK of acetic acid is 4.76).
- 8.9
  - 4.76
  - 2.8
  - 5.76
81. Which of the following is not an extracellular matrix protein?
- Laminin
  - Fibronectin
  - Vitronectin
  - Cyclin
82. A heptapeptide had 3 lysines, 2 alanines, one tyrosine and one residue of phenylalanine. Trypsin digestion of the peptide gave a tripeptide and a tetrapeptide. The probable sequence of amino acids in the peptide would be:
- KAYAKFK
  - KYKAAKF
  - YKAAFKK
  - KYAAKFK
83. The allosteric ligand responsible for the sigmoidal shape of the O<sub>2</sub>- binding curve of Hb is:
- 1,3-bisphosphoglyceric acid
  - 2,3-bisphosphoglyceric acid
  - 1,2-bisphosphoglyceric acid
  - Glyceraldehyde-3-phosphate

84. HMG CoA is an intermediate in the biosynthesis of:
- A. Leucine
  - B. Cholesterol
  - C. Vitamin A
  - D. Ubiquinone
85. The mass of a peptide was found to be exactly 18 less than that of its Tryptic digest. It is possible that:
- A. The peptide was cyclic with a trypsin sensitive site.
  - B. The peptide had its N-terminus blocked.
  - C. The peptide had at least two Lysine residues in tandem.
  - D. The peptide was cyclic and had a lysine at the N-terminus.
86. In glycoproteins, the reducing end of the glycan moiety is always :
- A. Galactose
  - B. N-acetyl Galactosamine
  - C. N-acetyl Glucosamine
  - D. N-acetyl neuraminic acid
87. Adenylate cyclase converts ATP into:
- A. Adenosine 1'-2' cyclic monophosphate
  - B. Adenosine 2'-3' cyclic monophosphate
  - C. Adenosine 3'-5' cyclic monophosphate
  - D. Adenosine 1'-4' cyclic monophosphate
88. Which of the following phenotype defines T-regulatory cells?
- A. CD3+, CD4+
  - B. CD4+, CD8+
  - C. CD8+, CD25+
  - D. CD4+, CD25+
89. Which one of the following is a wrong statement?
- A. Megakaryocytes differentiate into erythrocytes
  - B. Erythroblasts differentiate into reticulocytes
  - C. Reticulocytes get converted into erythrocytes
  - D. Myeloid line of differentiation generates granulocytes
90. Lethally irradiated mouse with H-2b haplotype can be reconstituted with:
- A. Bone marrow from H-2k mice
  - B. Bone marrow from [H-2b xH2k] F1 mice
  - C. Thymocytes from H-2b mice
  - D. Bone marrow from [H-2kx H-2d] F1 mice

91. Which of the following receptors participate in LPS activation?
- A. TLR8
  - B. TLR4
  - C. TLR 3
  - D. CD18
92. Which one of the following is not a chemotactic agent?
- A. IL8
  - B. formyl-methionine-leu-phe
  - C. FAS
  - D. C5a
93. How many hyper variable zones are there on immunoglobulin heavy chain constant domain?
- A. 3
  - B. 2
  - C. 1
  - D. None
94. Which of the following heavy chain gene segment is nearest to the J-genes in heavy chain genetic locus
- A. Alpha chain
  - B. Gamma chain
  - C. Epsilon chain
  - D. Mu chain
95. Second genetic rearrangement of immunoglobulin locus results in-
- A. Change in isotype of the antibody
  - B. Generation of soluble form of antibodies
  - C. Generation of membrane bound form of antibodies
  - D. Linking of heavy and light immunoglobulin chains
96. A naïve mature B cell may display following receptor molecules
- A. IgG, IgA
  - B. IgA, IgM
  - C. IgM, IgD
  - D. IgD, IgE
97. In hybridoma generation, salvage pathway enzymes are missing in-
- A. Myeloma cells
  - B. T cell-myeloma hybrids
  - C. B-cells
  - D. B-cell-Myeloma hybrids



98. How many protein chains are there in C1q complement molecule?  
A. 12  
B. 14  
C. 16  
D. 18
99. MHC class II restriction is observed in presentation of  
A. soluble protein antigens  
B. endogenous viral antigens  
C. endogenous tumor antigens  
D. lipid antigens of pathogens
100. Which of the following molecules have two Ig like domains?  
A. MHC class I alpha chain  
B. MHC class II complex  
C. Gamma heavy chain  
D. Mu heavy chain
101. Immediate hypersensitivity is mediated by  
A. IgG  
B. IgE  
C. IgA  
D. IgD
102. CD3 complex does not have the following component  
A. Alpha chain  
B. Gamma chain  
C. Delta chain  
D. Epsilon chain
103. Signaling through TLR4 receptor does not involve the following molecule:  
A. MyD88  
B. NFkB  
C. TRIF  
D. G proteins
104. During the extravasation of neutrophil, which of the following receptor ligand interactions is important?  
A. Integrin b2 – ICAM  
B. Fc receptor and antibody  
C. TNFa-TNF receptor  
D. CTLA4 – B7.1

105. Which of the following four interactions is the strongest?
- A. IgG - FcRg
  - B. MHC I molecule – T cell receptor
  - C. IgE – FcεR-1
  - D. IgE – FcεR-2
106. CRISPR-Cas9 system is involved in
- A. Protection of bacteria from viral infections
  - B. Protection of virus inside bacteria
  - C. Protection of mammals against helminthic infections
  - D. Protection from DNA damage
107. An immunoglobulin domain has the following feature
- A. one beta sheet and an alpha helix
  - B. two alpha helices
  - C. two beta sheets
  - D. lack of hydrophobic side chains in the antigen binding site
108. Similar genes within the same organism that have different functions are referred to as:
- A. homologs
  - B. orthologs
  - C. paralogs
  - D. homogenous
109. Substitution matrices are used to calculate:
- A. Percentage identity of an alignment
  - B. Percentage similarity of an alignment
  - C. Overall score of an alignment
  - D. Gap penalty of an alignment
110. An internal node of a phylogenetic tree with three branches; one to an ancestor and the other two to descendants represents which branching pattern:
- A. Multifurcating
  - B. Bifurcating
  - C. Polytomous
  - D. Unrooted partial resolution
111. A phylogenetic tree can be best defined as:
- A. A graphical representation of several species
  - B. A graphical output of several genes
  - C. A graphical representation of local sequences of multiple gene alignments
  - D. A graphical representation of multiple sequence alignments
112. The eukaryotic predators of the microscopic world are:
- A. viruses
  - B. algae
  - C. cyanobacteria
  - D. protists

113. The sympathetic nervous system:
- A. Is always excitatory.
  - B. Innervates only those tissues exposed to environment.
  - C. Has short pre-ganglionic and long post-ganglionic fibres.
  - D. Is part of the somatic nervous system.
114. Which of the following is not directly triggered by exposed collagen in an injured vessel?
- A. Initial vascular spasm
  - B. Platelet aggregation
  - C. Activation of clotting cascade
  - D. Activation of plasminogen
115. When the corpus luteum degenerates, one of the following events does not occur:
- A. Levels of estrogen and progesterone rapidly decline in the blood.
  - B. Endometrium sloughs off.
  - C. Blood levels of gonadotropins decrease.
  - D. Corpus albicans starts to form.
116. One of the following is not the function of Seminal vesicles:
- A. Providing fructose
  - B. Secreting prostaglandins
  - C. Secreting fibrinogen
  - D. Increase motility of sperms
117. Which of the following is not involved in muscle relaxation?
- A. No ATP
  - B. Reuptake of  $Ca^{++}$  by endoplasmic reticulum
  - C. No more action potential
  - D. Removal of acetyl choline at the end plate by acetyl choline esterase
118. Benign tumors are typically
- A. Metastatic
  - B. Invasive
  - C. Anaplastic
  - D. Encapsulated
119. Breast cancer is almost always a
- A. Sarcoma
  - B. Lipocarcinoma
  - C. Carcinoma
  - D. Hepatoma
120. Hypoxia can cause increased
- A. angiogenesis due to decreased basement membrane production
  - B. angiogenesis due to increased VEGF expression
  - C. invasiveness due to decreased VEGF expression
  - D. invasiveness due to decreased protease expression