

# S/SO/2013/11 BIOCHEMISTRY

<b>Roll No.</b>						<b>BOOKLET NO.</b>	<b>11208</b>
Candidate should write his/her Roll No. in the box above. ↑						Total No. of Questions : <b>150</b>	
Time : <b>2 Hours</b> ]		No. of Printed Pages : <b>40</b>				[Total Marks : <b>300</b>	

## INSTRUCTIONS FOR CANDIDATES

1. *All* questions are compulsory.
2. *All* questions carry equal marks.
3. The question paper contains **150** questions. The examinee should verify that the requisite number of questions are printed in the question paper, otherwise he should ask for another question paper.
4. The cover page indicates the number of printed pages in the question paper. The examinee should verify that the requisite number of pages are attached in the question paper, otherwise he should ask for another question paper.
5. Read carefully the instructions given on the answer sheet supplied and indicate your answers accordingly.
6. Kindly make necessary entries on the answer sheet only at the places indicated and nowhere else.
7. Examinees should specially pay attention that **2** marks will be awarded for correct answer.
8. Examinees should do all rough work on the space meant for rough work on the last page of the question paper and nowhere else and also not even on the answer sheet.

1. Two sugars which differ from one another only in configuration around a single carbon atom are termed :
- (A) Epimers (B) Anomers  
(C) Optical isomers (D) Stereoisomers
2. Invert sugar is :
- (A) Lactose  
(B) Sucrose  
(C) Hydrolytic products of sucrose  
(D) Fructose
3. A disaccharide linked by  $\alpha$ -1-4-glycosidic linkages is :
- (A) Lactose (B) Sucrose  
(C) Cellulose (D) Maltose
4. Which of the following polysaccharides is *not* a polymer of glucose ?
- (A) Amylose (B) Inulin  
(C) Glycogen (D) Cellulose
5. Many globular proteins are stable in solution in spite they lack in :
- (A) Disulphide bonds (B) Hydrogen bonds  
(C) Ionic bonds (D) Non-polar bonds

6. At neutral pH, a mixture of amino acids in solution would be predominantly :
- (A) Non-polar molecules
  - (B) Positive and monovalent
  - (C) Dipolar ions
  - (D) Hydrophobic
7. Edman's reaction can be used to :
- (A) Determine the number of tyrosine residues in a protein
  - (B) Determine the amino acid sequence of a protein
  - (C) Determine the number of aromatic amino acid residues in a protein
  - (D) Hydrolyse the peptide bonds in a protein
8. Bence-Jones protein is :
- (A) An immunoglobulin
  - (B) A dimer of heavy chains
  - (C) A dimer of light chains
  - (D) A dimer of one heavy and one light chains
9. A fatty acid which is *not* synthesized in the body and has to be supplied in the diet is :
- (A) Palmitic acid
  - (B) Linolenic acid
  - (C) Lauric acid
  - (D) Palmitoleic acid

10. All the following statements describing lipids are true, *except* :
- (A) They usually associate by covalent interactions
  - (B) They are structural components of membranes
  - (C) They are an intracellular energy source
  - (D) They are poorly soluble in water
11. High iodine value of a lipid indicates :
- (A) Polymerization
  - (B) Unsaturation
  - (C) Carboxyl groups
  - (D) Hydroxyl groups
12. Intermediate in the *denovo* synthesis of triacylglycerols include all the following, *except* :
- (A) Fatty acyl CoA
  - (B) Glycerol-3-phosphate
  - (C) CDP diacylglycerol
  - (D) Lysophosphatidic acid
13. In RNA molecule 'Caps' :
- (A) Allow *tRNA* to be processed
  - (B) Are unique to eukaryotic *mRNA*
  - (C) Occur at the 3'end of *tRNA*
  - (D) Allow correct translation of prokaryotic *mRNA*

14. The mean intracellular concentration of ATP in mammalian cell is about :
- (A) 1 mM (B) 2 mM  
(C) 0.1 mM (D) 0.2 mM
15. If the cytosine content of double stranded DNA is 20% of the total bases, the adenine content will be :
- (A) 10% (B) 20%  
(C) 30% (D) 40%
16. The melting temperature of DNA ( $T_m$ ) is :
- (A) Directly proportional to A-T content  
(B) Directly proportional to G-C content  
(C) Not related to base composition at all  
(D) Directly proportional to the length of DNA
17. Deficiency of Vitamin A causes :
- (A) Xerophthalmia (B) Hypoprothrombinemia  
(C) Megaloblastic anemia (D) Pernicious anemia
18. Sulpha drugs interfere with bacterial synthesis of :
- (A) Vitamin E (B) Co-enzyme A  
(C) Lipoate (D) Tetrahydrofolate

19. The deficiency of which one of the following vitamins causes creatinuria ?
- (A) Vitamin E (B) Vitamin K  
(C) Vitamin A (D) Vitamin B<sub>1</sub>
20. Biotin is involved in which of the following types of reactions ?
- (A) Deamination (B) Hydroxylation  
(C) Carboxylation (D) Oxidation
21. A hormone secreted from posterior pituitary is :
- (A) Vasopressin  
(B) Thyrotropic hormone  
(C) Prolactin  
(D) Adrenocorticotrophic hormone
22. Excessive secretion of adrenocorticotrophic hormone causes :
- (A) Myxoedema (B) Cushing's syndrome  
(C) Addison's disease (D) Thyrotoxicosis
23. Which of the following events is *not* triggered by Glucagon in liver ?
- (A) Stimulation of cyclic AMP Production  
(B) Activation of Protein Kinase  
(C) Activation of Glycogen synthase  
(D) Activation of Phosphorylase kinase

24. Which of the following acts directly on the nucleus to produce physiologic effects ?
- (A) Growth hormone                      (B) Ghrelin  
(C) Dopamine                              (D) Estradiol
25. Parathyroid hormone (PTH) is synthesized in :
- (A) Follicular cells of thyroid glands  
(B) Para-follicular cells of thyroid glands  
(C) Chief cells of parathyroid glands  
(D) Oxyphil cells of parathyroid glands
26. Trypsin belongs to the class :
- (A) Hydrolase                              (B) Ligase  
(C) Lyase                                    (D) Transferase
27. The rate of most enzyme catalysed reactions changes with pH. As the pH increases, this rate :
- (A) Reaches a minimum, then increases  
(B) Reaches a maximum, then decreases  
(C) Increases  
(D) Decreases

28. Succinate dehydrogenase is inhibited by malonate is an example of :
- (A) Competitive inhibition
  - (B) Non-competitive inhibition
  - (C) Uncompetitive inhibition
  - (D) Feedback inhibition
29. Reaction mediated by co-enzyme pyridoxal phosphate :
- (A) Acyl transfer
  - (B) Aldehyde transfer
  - (C) Transamination
  - (D) Oxygenation
30. At high substrate concentration the Michaelis-Menten equation  $V = V_{\max} \frac{[S]}{[S] + K_m}$  will be :
- (A)  $V = V_{\max}$
  - (B)  $V = \frac{1}{2}V_{\max}$
  - (C)  $V = [S]V_{\max}/K_m$
  - (D)  $V = [S]K_m/V_{\max}$
31. The enzyme that splits peptide bonds on the carboxyl side of aromatic amino acid residues, is :
- (A) Pepsin
  - (B) Trypsin
  - (C) Chymotrypsin
  - (D) Thermolysin



32. Pyruvate dehydrogenase complex is regulated by :
- (A) Covalent modification                      (B) Allosteric regulation
- (C) Both (A) and (B)                              (D) None of these
33. Allosteric enzymes regulate the formation of products by :
- (A) Feedback inhibition                      (B) Non-competitive inhibition
- (C) Competitive inhibition                      (D) Repression-derepression
34. Covalent modification of an enzyme usually involves phosphorylation/  
dephosphorylation of :
- (A) Hydroxylysine residue                      (B) Hydroxyproline residue
- (C) Proline residue                                  (D) Serine residue
35. Which of the following is a substrate specific enzyme ?
- (A) Hexokinase                                      (B) Thiokinase
- (C) Lactase    (D) Aminopeptidase

36. Frequently employed materials for the adsorption chromatography of proteins include :
- (A) High capacity supporting gel
  - (B) Alumina gel and hydroxyapatite
  - (C) Starch blocks
  - (D) All of the above
37. A cation exchange resin linked to cellulose backbone is :
- (A) CM-Cellulose
  - (B) DEAE-Cellulose
  - (C) Biogel
  - (D) Sephadex
38. The sorting out of molecules according to size and shape may be adapted to protein purification in this technique :
- (A) Adsorption chromatography
  - (B) Gel-filtration chromatography
  - (C) Paper chromatography
  - (D) Thin layer chromatography
39. One of the following is used as a ligand in affinity chromatography :
- (A) Cellulose
  - (B)  $\text{NAD}^+$
  - (C) Polyacrylamide
  - (D) Alcohol

40. In HPLC very high pressure is applied because :
- (A) The separation will be quick
  - (B) The particles in the column are extremely small
  - (C) At atmospheric pressure, the substances resolved will decompose
  - (D) Without pressure the solvent will move in the opposite direction
41. The factors that affect the electrophoretic movement of particles or molecules are :
- (A) Size of the particles
  - (B) Electrical charge on the particles
  - (C) Solubility in the buffer
  - (D) Size of the particles and electrical charge on them
42. In Isoelectric focussing, the following substance(s) are used to give a pH gradient :
- (A) Veronal
  - (B) Tris
  - (C) Polyamino-polycarboxylic acids
  - (D) Phosphate buffer

43. Fractionation of lipoproteins has been done by using :
- (A) Spectrophotometer                      (B) Flame photometer
- (C) Ultracentrifuge                      (D) Polarimeter
44. The sedimentation coefficient is defined as :
- (A) The velocity divided by the centrifugal force
- (B) The velocity divided by the centrifugal field
- (C) The centrifugal force divided by the effective mass of the particle
- (D) The centrifugal field divided by the velocity
45. Natural radioactive elements belong to one of the series containing :
- (A) Uranium                      (B) Thorium
- (C) Actinium                      (D) All of these
46. Which radioactive isotope is used in the treatment of chronic leukemia ?
- (A) Radio phosphorus                      (B) Radio tantalum
- (C) Radio gold                      (D) Radio cesium

47. The equation applying Beer's and Lambert's laws relates absorbance with :
- (A) Concentration of solute and length of the solution column
  - (B) Concentration of solute and height of the solution column
  - (C) Length and heights of solution column
  - (D) Intensities of incident and transmitted lights
48. The molar absorption coefficient of benzene is  $100 \text{ M}^{-1}\text{cm}^{-1}$  at 260 nm. What concentration would give an absorbance of 1.0 in a 1 cm cell at 260 nm ?
- (A) 0.001 M
  - (B) 0.01 M
  - (C) 0.1 M
  - (D) 1.0 M
49. How many proton resonances would you expect to see with ethanol in  $\text{CCl}_4$  ?
- (A) One
  - (B) Two
  - (C) Three
  - (D) Four
50. The half life of  $^{131}\text{I}$  is :
- (A) 4 days
  - (B) 8 days
  - (C) 44 days
  - (D) 88 days

51. For electron microscopy the following is used for staining :
- (A) Osmic acid (B) Oil red O  
(C) Bromophenol blue (D) Aniline phthallate
52. A radioactive isotope has a half life of 20 days. After 40 days, the amount of the left over substance is the following fraction of the initial isotope :
- (A)  $\frac{1}{2}$  (B)  $\frac{1}{3}$   
(C)  $\frac{1}{4}$  (D)  $\frac{1}{8}$
53. Which one of the heaviest particulate component of the cell ?
- (A) Cytoplasm (B) Nucleus  
(C) Mitochondria (D) Golgi apparatus
54. The cellular organelles called 'Suicidal bags' are :
- (A) Nucleolus (B) Golgi bodies  
(C) Ribosomes (D) Lysosomes
55. The Golgi complex :
- (A) Synthesizes proteins  
(B) Produces ATP  
(C) Provides a pathway for transporting chemicals  
(D) Forms glycoproteins

56. The largest particulate of the cytoplasm is :

(A) Lysosomes

(B) Mitochondria

(C) Golgi apparatus

(D) Endoplasmic reticulum

57. The marker enzyme for mitochondrial fraction isolated by centrifugation is :

(A) Glutamate dehydrogenase

(B) Acid phosphatase

(C) Glucose-6-phosphatase

(D) Phospholipase-a

58. The RBC in mammals are generally :

(A) Uninucleated

(B) Binucleated

(C) Multinucleated

(D) Non-nucleated

59. Blood which leaves the liver and moves to the heart has a higher than usual concentration of :

(A) Urea

(B) Bile

(C) Oxygen

(D) Carbon dioxide





64. Sickle cell anaemia is the clinical manifestation of homozygous genes for an abnormal Hb molecule. The mutational event responsible for mutation in the  $\beta$ -chain is :
- (A) Deletion (B) Insertion  
(C) Point mutation (D) Crossing over
65. After releasing  $O_2$  at the tissues, hemoglobin transports :
- (A)  $CO_2$  and protons to the lungs  
(B)  $O_2$  to the lungs  
(C)  $CO_2$  and protons to the tissue  
(D) Nutrients
66. Hypoxic hypoxia could be due to :
- (A) High  $pO_2$   
(B) Low  $pO_2$   
(C) Low  $pCO_2$   
(D) Defective oxygen in atmosphere

67. What is the other name of uriniferous tubules ?
- (A) Cytons (B) Nephridia  
(C) Nephrons (D) Neurons
68. Urinary excretion of proteins in 24 hours urine in normal individual is approximately :
- (A) 5–25 mg (B) 25–50 mg  
(C) 50–100 mg (D) 100–200 mg
69. Paradoxic aciduria may be seen in the following conditions, *except* :
- (A)  $K^+$  deficiency  
(B) Prolonged treatment with steroids  
(C)  $Na^+$  deficiency  
(D) Cushing's syndrome
70. Glucose absorption may be decreased in :
- (A) Oedema (B) Nephritis  
(C) Rickets (D) Osteomalitis

71. Hydrolysis of dietary triacyl glycerol by pancreatic lipase produce :
- (A) Fatty acids and glycerol
  - (B) 2 Monoacyl glycerol and 2 molecules of fatty acids
  - (C) Fatty acids and  $\alpha$ - $\beta$ -diacyl glycerol
  - (D) Glycerol phosphate and fatty acid
72. D-amino acids are absorbed by :
- (A) Active transport
  - (B) In presence of a 'carrier' molecule
  - (C) In presence of sodium ions
  - (D) Passive diffusion
73. The following protein is the first one involved in muscular contraction
- (A) Myosin
  - (B) Actin
  - (C) Calcium-binding troponin
  - (D) Tropomyosin

74. In the process of muscular contraction hydrogen bonds are formed between :
- (A) Troponin and tropomyosin
  - (B) Troponin and actin
  - (C) Tropomyosin and myosin
  - (D) Actin and myosin
75. Which of the following is *not* essential to a reflex arc ?
- (A) Sensory neuron
  - (B) Motor neuron
  - (C) Synapse
  - (D) Cerebrum
76. Chemical substance concerned with transmission of an impulse from one neuron to next neuron or to a muscle is :
- (A) Epinephrine
  - (B) Acetylcholine
  - (C) Acetyethanolamine
  - (D) Insulin
77. Respiratory quotient for mixed diet is :
- (A) 0.70
  - (B) 0.75
  - (C) 0.80
  - (D) 0.85

78. The intake of which food-stuffs result in the greatest specific dynamic action ?
- (A) Carbohydrates (B) Fats  
(C) Proteins (D) Minerals
79. Milk is notoriously deficient in which of the minerals ?
- (A) Calcium (B) Iron  
(C) Phosphorus (D) Potassium
80. Basal metabolic rate is elevated in :
- (A) Hyperthyroidism (B) Undernutrition  
(C) Starvation (D) Hypothyroidism
81. Electron transport chain carriers are located in the mitochondria :
- (A) In mitochondrial matrix  
(B) On the inner surface of the outer mitochondrial membrane  
(C) On the outer surface of the outer mitochondrial membrane  
(D) In the inner mitochondrial membrane

82. In oxidative phosphorylation, the oxidation of one molecule NADPH produces how many ATPs ?
- (A) Zero (B) One  
(C) Two (D) Three
83. Which of the following statements describing cytochrome oxidase is *true* ?
- (A) It is a single cytochrome  
(B) It transfers electrons from CoQ to cytochrome b  
(C) It transfers four electrons and four protons to form H<sub>2</sub>O molecule  
(D) It is inhibited by copper
84. The oxidation and phosphorylation in intact mitochondria is blocked by :
- (A) Puromycin (B) Oligomycin  
(C) Gentamycin (D) Streptomycin
85. Which of the following oxidation-reduction systems has highest redox potential ?
- (A) Fe<sup>3+</sup> cytochrome b/Fe<sup>2+</sup>  
(B) Fe<sup>3+</sup> cytochrome a/Fe<sup>2+</sup>  
(C) Fumarate/succinate  
(D) NAD<sup>+</sup>/NADH

86. Photorespiration takes place in :

- (A) Chloroplast (B) Peroxisome  
(C) Mitochondria (D) All of these

87. Fructose-2, 6-bisphosphate is formed by the action of :

- (A) Phosphofructokinase 1  
(B) Phosphofructokinase 2  
(C) Fructose bisphosphate isomerase  
(D) Fructose-1, 6-bisphosphatase

88. An allosteric enzyme responsible for controlling the rate of TCA cycle is :

- (A) Malate dehydrogenase (B) Isocitrate dehydrogenase  
(C) Fumarase (D) Aconitase

89. Glycogen is converted to glucose-1-phosphate by :

- (A) UDPG transferase (B) Branching enzyme  
(C) Phosphorylase (D) Phosphatase

90. Glycogenin is :

- (A) Intermediate in glycogen breakdown
- (B) Polymer of glycogen molecules
- (C) Protein primer for glycogen synthesis
- (D) Uncoupler of oxidative phosphorylation

91. Gluconeogenesis is decreased by :

- (A) Glucagon
- (B) Epinephrine
- (C) Glucocorticoids
- (D) Insulin

92. Two important byproducts of HMP pathway are :

- (A) NADH and pentose sugars
- (B) NADPH and pentose sugars
- (C) FAD and pentose sugar
- (D)  $\text{FADH}_2$  and pentose sugars

93. Starvation causes a decrease in the rate of :

- (A) Lipogenesis
- (B) Gluconeogenesis
- (C) Lipolysis
- (D) Glycogenolysis



94.  $\beta$ -oxidation of odd-carbon fatty acid chain produces :
- (A) Succinyl-CoA                      (B) Malonyl-CoA
- (C) Acetyl-CoA                        (D) Propionyl-CoA
95. The  $\beta$ -ring of 7-dehydrocholesterol is cleaved to form cholecalciferol by :
- (A) Infrared light
- (B) Dim light
- (C) Ultraviolet irradiation with sunlight
- (D) Light of the tube lights
96. Which of the following regulates lipolysis in adipocytes ?
- (A) Activation of fatty acid synthesis mediated by cAMP
- (B) Glycerol phosphorylation to prevent futile esterification of fatty acids
- (C) Activation of triglyceride lipase as a result of hormone stimulated increases in cAMP levels
- (D) Activation of cAMP production by Insulin

97. The two nitrogen atoms in urea arise from :
- (A) Ammonia and glutamine
  - (B) Glutamine and aspartic acid
  - (C) Glutamine and glutamic acid
  - (D) Ammonia and aspartic acid
98. Which of the following amino acids produce a vasodilator on decarboxylation ?
- (A) Histidine
  - (B) Cysteine
  - (C) Glutamic acid
  - (D) Arginine
99. Lesch-Nyhan Syndrome is caused by a complete deficiency of :
- (A) HGPRTase
  - (B) Xanthine oxidase
  - (C) Glucose-6-phosphatase
  - (D) Glutamyl amidotransferase
100. Homocystinuria is an inherited disorder characterized by :
- (A) Mental retardation
  - (B) Frequent renal stones
  - (C) Paralysis of limbs
  - (D) Ectopia lentis

101. The four nitrogen atoms of purines are derived from :
- (A) Glycine, Ammonia and Aspartate
  - (B) Glycine, Ammonia and Glutamate
  - (C) Ammonia, Aspartate and Glutamate
  - (D) Glycine, Aspartate and Glutamate
102. In humans, the principal catabolic product of pyrimidines is :
- (A) Uric acid
  - (B) Allantoin
  - (C)  $\beta$ -alanine
  - (D) Hypoxanthine
103. Synthesis of GMP from IMP requires the following :
- (A) Ammonia,  $\text{NAD}^+$ , ATP
  - (B) Glutamine,  $\text{NAD}^+$ , ATP
  - (C) Ammonia,  $\text{NADP}^+$ , GTP
  - (D) Glutamine,  $\text{NADP}^+$ , GTP
104. Catabolism of thymidylate gives :
- (A)  $\alpha$ -alanine
  - (B)  $\beta$ -alanine
  - (C)  $\alpha$ -amino isobutyrate
  - (D)  $\beta$ -amino isobutyrate

105. The essential trace element which catalyzes the formation of Hb in the body is :

- (A) Cu (B) Fe  
(C) Mg (D) Mn

106. Iron therapy is ineffective in which of the following conditions ?

- (A) Chronic blood loss  
(B) Inadequate Fe-intake in diet  
(C) Hypochromic anaemia of pregnancy  
(D) Thalassaemia minor

107. Apart from low levels of serum calcium, tetany can result from a decrease of :

- (A) Potassium (B) Bicarbonate  
(C) Phosphate (D) Magnesium

108. Zinc is a constituent of the enzyme :

- (A) Succinate dehydrogenase (B) Carbonic anhydrase  
(C) Aldolase (D) Amylase

109. What is the normal level of  $K^+$  in the serum ?
- (A) 137–148 mEq/L (B) 120–160 mEq/L  
(C) 3.9–5.0 mEq/L (D) 0.3–0.59 mEq/L
110. Molybdenum is a constituent of :
- (A) Hydroxylases (B) Oxidases  
(C) Transaminases (D) Transferases
111. Nicotinic acid is detoxicated in the body with :
- (A) Glucuronic acid (B) Glycine  
(C) Glutamine (D) Cysteine
112. In humans, ammonia is detoxified in liver as :
- (A) Creatinine (B) Uric acid  
(C) Urea (D) Acetic acid

113. The antibiotic which inhibits DNA dependent RNA polymerase is :
- (A) Actinomycin D (B) Mitomycin C  
(C) Streptomycin (D) Puromycin
114. LDH<sub>1</sub> and LDH<sub>2</sub> are elevated in :
- (A) Myocardial infarction (B) Liver disease  
(C) Kidney disease (D) Brain disease
115. Serum acid phosphatase level increases in :
- (A) Metastatic carcinoma of prostate  
(B) Myocardial infarction  
(C) Wilson's disease  
(D) Liver diseases
116. Overflow aminoaciduria is one of the abnormalities observed in patient with :
- (A) Obstructive jaundice (B) Hepatoma  
(C) Nephrotic syndrome (D) Acute hepatic necrosis

117. Relationship between glomerular filtration rate and serum creatinine concentration is :
- (A) Non-existent (B) Inverse  
(C) Direct (D) Indirect
118. When jaundice results from hepatitis, the unconjugated fraction of total serum bilirubin is usually :
- (A) At least 50% (B) More than 50%  
(C) Less than 50% (D) Near about 100%
119. Von Gierke's disease is associated with a deficiency of :
- (A) Glucose-6-phosphate dehydrogenase  
(B) Glucose-6-phosphatase in liver  
(C) Phosphorylase in muscle  
(D) Homogentisic oxidase
120. Which compound is present in synovial fluid ?
- (A) Hyaluronic acid (B) Chondroitin-4-sulphate  
(C) Chondroitin-6-sulphate (D) Heparin

121. An important cause of water intoxication is :

(A) Nephrogenic diabetes insipidus

(B) Renal failure

(C) Gastroenteritis

(D) Fanconi syndrome

122. The antibodies raised against a pure protein will show only one sharp spike on :

(A) Solubility curve

(B) Solvent precipitation

(C) Molecular sieving

(D) Immuno-electrophoresis

123. The portion of the antigen molecule which is recognized by antibody is known as :

(A) Hapten

(B) Epitope

(C) Complement

(D) Variable region

124. Light chains of immunoglobulins are of the following types :

(A) Alpha and Kappa

(B) Alpha and Gamma

(C) Lambda and Delta

(D) Kappa and Lambda



125. Antigens and haptens have the following similarity :
- (A) They have high molecular weights
  - (B) They can elicit immune response by themselves
  - (C) Once an immune response develops, free antigen and free hapten can be recognized by the antibody
  - (D) They can elicit an immune response only in association with some other large molecule
126. Allergic reactions are mediated by :
- (A) IgA
  - (B) IgG
  - (C) IgD
  - (D) IgE
27. Antibody diversity arises from :
- (A) Gene rearrangement
  - (B) Gene amplification
  - (C) Alternative splicing
  - (D) All of these
28. MHC class III proteins include :
- (A) Immunoglobulins
  - (B) Components of complement system
  - (C) T-cells receptors
  - (D) CD4 and CD8 proteins

129. The disease of humans acquired immunodeficiency syndrome is caused by :
- (A) Bacterium (B) Protozoan  
(C) Virus (D) Plasmid
130. Hybridoma cells are selected by culturing them in a medium containing :
- (A) Hypoxanthine, aminopterin and thymine  
(B) Hypoxanthine, aminopterin and thymidine  
(C) Adenine, hypoxanthine and thymine  
(D) Guanine, aminopterin and thymidine
131. Genetic material of tobacco mosaic virus is :
- (A) Single stranded DNA (B) Double stranded DNA  
(C) Double stranded RNA (D) Single stranded RNA
132. The concept 'one gene-one enzyme' was based on the experiments conducted on :
- (A) *E.coli* (B) *Penicillium*  
(C) *Neurospora* (D) *Drosophila*

133. The eukaryotic nuclear chromosomal DNA :
- (A) is a linear and unbranched molecule
  - (B) is not associated with a specific membranous organelle
  - (C) is not replicated semiconservatively
  - (D) is about of the same size as each prokaryotic chromosomes
134. Initiation of protein synthesis begins with binding of :
- (A) 40S ribosomal unit on *mRNA*
  - (B) 60S ribosomal unit
  - (C) Charging of *tRNA* with specific amino acid
  - (D) Attachment of aminoacyl *tRNA* on *mRNA*
35. Sigma and Rho factors are required for :
- (A) Replication
  - (B) Transcription
  - (C) Translation
  - (D) Polymerisation

136. During replication, the template DNA is unwound :
- (A) At one of the ends                      (B) At both the ends
- (C) At multiple sites                        (D) Nowhere
137. Genetic code was unravelled by :
- (A) Ochoa-Niranberg                        (B) Crick-Watson
- (C) Beadle-Tatum                            (D) Sanger-Perutz
138. In biosynthesis of proteins, the chain terminating codons are :
- (A) UGG, UGU and AUG                      (B) UAA, UAG and UGA
- (C) AAU, AAG and GUA                      (D) UAA, AUG and UAG
139. Repressor binds to DNA sequence and regulate the transcription. This sequence is called :
- (A) Attenuator                                (B) Terminator
- (C) Anti-terminator                         (D) Operator

140. Restriction endonucleases :
- (A) Cut RNA chains at specific locations
  - (B) Excise introns from *mRNA*
  - (C) Act as defensive enzymes to protect the host bacterial DNA from DNA of foreign organisms
  - (D) Remove Okazaki fragments
141. Reverse transcriptase activity is present in the eukaryotic :
- (A) DNA polymerase  $\alpha$
  - (B) Helicase
  - (C) Telomerase
  - (D) DNA polymerase II
142. Binding of RNA polymerase holoenzyme to the promoter region of lac operon is facilitated by :
- (A) Catabolite gene activator protein (CAP)
  - (B) CAMP
  - (C) CAP-CAMP complex
  - (D) None of the above

143. In Sanger's method of DNA sequence determination, DNA synthesis is stopped by using :

- (A) 1', 2'-dideoxyribonucleoside triphosphates
- (B) 2', 3'-Dideoxyribonucleoside triphosphates
- (C) 2', 4'-Dideoxyribonucleoside triphosphates
- (D) 2', 5'-Dideoxyribonucleoside triphosphates

144. Lambda phage can be used to clone DNA fragments of the size :

- (A) upto 3 kilobases
- (B) upto 20 kilobases
- (C) upto 45 kilobases
- (D) upto 1,000 kilobases

145. Transgenic animals may be prepared by introducing a foreign gene into :

- (A) Somatic cells of young animals
- (B) Testes and ovaries of animals
- (C) A viral vector and infecting the animals with the viral vector
- (D) Fertilised egg and implanting the egg into a foster mother

146. Twenty cycles of PCR can amplify DNA :
- (A)  $2^{20}$  fold (B)  $20^2$  fold  
(C)  $20 \times 2$  fold (D) 20 fold
147. A particular RNA in a mixture can be identified by :
- (A) Western blotting (B) Eastern blotting  
(C) Northern blotting (D) Southern blotting
148. Immobilized enzymes mean :
- (A) Potentiation of activity (B) Presentation of activity  
(C) Preparation of activity (D) All of these
149. Agrobacterium is very useful in :
- (A) Plant genetic engineering (B) Nitrogen fixation  
(C) Alcohol fermentation (D) Antibiotic production
150. Industrial production of acetic acid uses :
- (A) Green algae (B) Cyanobacteria  
(C) Aerobic bacteria (D) Anaerobic bacteria