60114

ROLL No. | | | | | |

TEST BOOKLET No. 241

TEST FOR POST GRADUATE PROGRAMMES

BIOTECHNOLOGY

Time: 2 Hours

Maximum Marks: 450

INSTRUCTIONS TO CANDIDATES

1. You are provided with a Test Booklet and an Optical Mark Reader (OMR) Answer Sheet to mark your responses. Do not soil the Answer Sheet. Read carefully all the instructions given on the Answer Sheet.

2. Write your Roll Number in the space provided on the top of **this page**.

3. Also write your Roll Number, Test Code, and Test Subject in the columns provided for the same on the **Answer Sheet**. Darken the appropriate bubbles with a **Ball Point Pen.**

4. The paper consists of 150 objective type questions. All questions carry equal marks.

5. Each question has four alternative responses marked **A, B, C** and **D** and you have to **darken** the bubble fully by a **Ball Point Pen** corresponding to the correct response as indicated in the example shown on the Answer Sheet.

6. Each correct answer carries 3 marks and each wrong answer carries 1 minus mark.

7. Space for rough work is provided at the end of this Test Booklet.

8. You should return the Answer Sheet to the Invigilator before you leave the examination hall. However, you can retain the Test Booklet.

9. Every precaution has been taken to avoid errors in the Test Booklet. In the event of any such unforeseen happenings, the same may be brought to the notice of the Observer/Chief Superintendent in writing. Suitable remedial measures will be taken at the time of evaluation, if necessary.

SEAL

60114

BIOTECHNOLOGY

1. Proteins having equal positive and negative charges are called

(A) Positron
(B) Cation
(C) Anion
(D) Zwitterion

2. Which of the following amino acid gives yellow colour with ninhydrin?

(A) Glycine
(B) Histidine
(C) Phenylalanine
(D) Proline

3. The cholesterol associated with the risk of atherosclerosis and coronary heart disease is called

(A) LDL
(B) HDL
(C) VLDL
(D) IDL

4. The normal range for prothrombin time is

(A) 10-14 sec
(B) 14-18 sec
(C) 8-12 sec
(D) 4-14 sec

5. The antigen presenting cells have on their surface a special molecule called

(A) MHC Class molecule
(B) Cytokines
(C) CD4 cells
(D) CD8 cells

6. Which of the following is an autoimmune disorder?

(A) Rheumatoid arthritis
(B) AIDS
(C) Dengue fever
(D) Sickle cell anemia

7. A Hybridoma cell secretes

(A) Antibody
(B) Antigen
(C) Cytokine
(D) Plantibody

8. Hypersensitivity reaction is mediated by

(A) IgM
(B) IgE
(C) IgG
(D) IgA

9. A tissue transplantation between two individuals belonging to two different species is called

(A) allograft
(B) autograft
(C) xenograft
(D) isograft

10. Which one of the following is high energy currency of the cell?

(A) ATP
(B) GTP
(C) CTP
(D) Cyclic AMP

11. Which of the following is called 'The Book of Life'?

(A) Arabidopsis genome
(B) Human genome
(C) Chloroplast genome
(D) Mitochondrial genome

12. Phospho-diester bond is commonly observed in

(A) Proteins
(B) Lipids
(C) Carbohydrates
(D) DNAs

13. Light activation of enzymes is commonly observed in

(A) Mitochondrion
(B) Chloroplast
(C) Peroxisome
(D) Glyoxisome

14. Amitosis is of common occurrence in

(A) Animals
(B) Plants
(C) Bacteria
(D) Lichen

15. Which of the following is a storage polysaccharide in plants?

(A) Glycogen
(B) Starch
(C) Cellulose
(D) Callose

16. Independent, genetic elements found in bacterial cells are called

(A) Plasmids (B) Plastids
(C) Proplastids (D) Chromosomes

17. Programmed cell death is called

(A) Necrosis (B) Apoptosis
(C) Lesion (D) Gene knock out

18. Purification of atmospheric air is done by

(A) Animals (B) Plants
(C) Microbes (D) Symbionts

19. Which of the following is non-biodegradable?

(A) Fats (B) Herbicides
(C) Oil (D) Plastics

20. Virus-free plants can be obtained from the following culture

(A) Protoplast (B) Root
(C) Meristem (D) Pollen

21. The half- life of Tritium is

(A) 12.3 years (B) 14.5 days
(C) 100 years (D) 1400 years

22. Which one of the following grows remarkably well in polluted waters?

(A) *Ottelia sp.* (B) *Pistia sp.*
(C) *Vallisneria sp.* (D) Water hyacinth

23. The most polluted river in India is

(A) Cauvery (B) Ganga
(C) Godaveri (D) Yamuna

24. The smog is the combination of

(A) fog and coal combustion
(B) fog and oil combustion
(C) fog, coal and oil combustion
(D) coal and oil combustion

25. S-bond is usually formed between two

(A) aromatic amino acids
(B) acidic amino acids
(C) cysteine amino acids
(D) methionine amino acids

26. Compounds that have the same structural formula but differing in 3-dimensional arrangements of atoms are called

(A) Sterio isomers
(B) Structural isomers
(C) Epimers
(D) Photoisomers

27. The major cell wall polysaccharide in plants is

(A) Cellulose
(B) Starch
(C) Glycogen
(D) Chitin

28. Which one of the following is a quarternary protein?

(A) Myoglobin
(B) Collagen
(C) Silk
(D) Haemoglobin

29. Sickle cell anaemia is due to the change of GAA to

(A) GUU
(B) GUA
(C) GAU
(D) GAG

30. Which one of the following is an inactive enzyme?

(A) Pepsinogen
(B) Trypsin
(C) Elastase
(D) Chymotrypsin

31. Which of the following enzymes functions at high temperature?

(A) L-Amylase
(B) RuBPCase
(C) Multifunctional enzyme
(D) *Taq* DNA polymerase

32. The light reaction of photosynthesis yields

(A) H_2
(B) CO_2
(C) H_2O
(D) O_2+ATP +$NADPH_2$

33. Chlorosis is generally attributed to the following element

(A) K
(B) Na
(C) Mg
(D) Zn

34. Which of the following is called a ripening hormone?

(A) Auxin
(B) Gibberellin
(C) Cytokinin
(D) Ethylene

35. The predominant pigment involved in the root nodule fixation of nitrogen is

(A) Flavonoids
(B) Anthocyanins
(C) Carotenoids
(D) Leghaemoglobin

36. Which of the following is a dormancy breaker?

(A) IAA
(B) 2,4-D
(C) GA_3
(D) Florigen

37. Dehydrins are formed in response to

(A) Light stress
(B) Heavy metal stress
(C) Salt stress
(D) Water stress

38. In SDS-PAGE to initiate the polymerisation reaction, the following compound is used

(A) Ammonium persulphate (B) Ethidium bromide
(C) Ammonium sulphate (D) Ammonium nitrate

39. Sephadex is used in

(A) Gel filtration
(B) PAGE
(C) Adsorption chromatography
(D) Ion-exchange chromatography

40. Radioactive damage can be detected in the field by

(A) GM Counter (B) Scintillation counter
(C) Auto radiography (D) Half-life meter

41. Glycerol is produced commercially by

(A) Saponfication of fats
(B) Reduction of fatty acids
(C) Oxidation of pyruvic acid
(D) Dehydrogenation of glyceradehyde

42. Cancer can be diagnosed by

(A) MRI scan (B) Biosensor
(C) NMR spectroscopy (D) IR scan

43. Which of the following transgenic plants is a β-carotene producer?

(A) Rice (B) Tomato
(C) Potato (D) Carrot

44. Which of the following is a nucleic acid database?

(A) Swiss-PROT (B) PHYLIB
(C) DDBJ (D) PROT

45. Citric acid is commercially produced using

(A) *Aspergillus niger*
(B) *Clostridium acetobutylicum*
(C) *Saccharomyces cerevisiae*
(D) *Micrococcus glutamicus*

46. Proteases are obtained from

(A) *Bacillus subtilis*
(B) *Penicillium roquefortii*
(C) *Aspergillus oryzae*
(D) *Aspergillus niger*

47. Which one of the following is an ozone depleting chemical?

(A) CO
(B) CO_2
(C) CFCs
(D) CH_4

48. Biodiesel is chemically defined as

(A) Glycerol
(B) Triglycerides
(C) Fatty acids
(D) Alkyl esters of long chain fatty acids

49. The primary product of photorespiration is

(A) Glycolate
(B) Lactic acid
(C) Pyruvic acid
(D) Succinic acid

50. If ΔG is negative, it is then called

(A) Exergonic
(B) Endergonic
(C) Isothermic
(D) Gibbs free energy

51. Immune disfunction is the primary cause for

(A) Diabetes
(B) Jaundice
(C) AIDS
(D) Arthritis

52. Which one of the following plant species represents energy plantation?

(A) *Leucaena glauca* (B) *Morus alba*
(C) *Erthrina indica* (D) *Ficus religiosa*

53. Electrically charged particles with unpaired electrons are called

(A) Oxides (B) Free radicals
(C) Zwitterions (D) Positrons

54. Which of the following is an antioxidant?

(A) Succinate (B) Isoprene
(C) Vitamin E (D) Malate

55. Dipole movement is commonly observed in

(A) H_2O (B) $CHCl_3$
(C) EtOH (D) $CH_3COCOOH$

56. Frederic Sanger who won Nobel Prize twice discovered

(A) Automatic sequencing
(B) 2,3,dideoxynucleotide method for DNA sequencing
(C) Capillary gel sequencing
(D) Labelling of 3-end of DNA with 32P

57. The National Centre for collection and maintenance of microbial cultures is situated at

(A) CCMB, Hyderabad (B) IARI, New Delhi
(C) IMTECH, Chandigarh (D) NBRI, Lucknow

58. The first case of life patenting was done by

(A) Ananda Chakrabarthy (B) Milstein and Kohler
(C) Cocking E.C. (D) Rolfe

59. The genetic manipulation of a cell leading to overproduction of a particular metabolite is called

(A) Metabolic Engineering
(B) Metabolic manipulation
(C) Metabolic derangement
(D) Metabolic Physiology

60. Which of the following is the weakest bond?

(A) Hydrogen bond
(B) Ionic bond
(C) Covalent bond
(D) Electrovalent bond

61. Kreb`s cycle is an example of

(A) Catabolic pathway
(B) Anabolic pathway
(C) Amphibolic pathway
(D) Anaplerotic pathway

62. What denotes a nanometer?

(A) 10^{-6} meter
(B) 10^{-7} meter
(C) 10^{-8} meter
(D) 10^{-9} meter

63. DNA replication proceeds in this direction

(A) 3'→5'
(B) 5'→3'
(C) 3'→3'
(D) 5'→5'

64. DNA finger printing has an important application in

(A) Mutagenesis
(B) Gene amplification
(C) Forensics
(D) Gene screening

65. What happens to a person who receives a wrong type of blood?

(A) All the arteries dilate
(B) All the arteries constrict
(C) The red blood cells agglutinate
(D) The spleen and lymph nodes deteriorate

66. Chaperons are used for

(A) Post-translational protein folding
(B) Post-transcriptional splicing
(C) Chain termination
(D) Translocation of peptidyl t-RNA

67. Luciferase is isolated from

(A) Fire-fly
(B) Pisces
(C) Bacteria
(D) Fungi

68. Raman Effect was discovered in

(A) 1930
(B) 1935
(C) 1940
(D) 1928

69. LEA gene is involved in

(A) Water stress resistance
(B) Photoregulation
(C) Light reactions
(D) Insect resistance

70. The corresponding keto acid for aspartic acid is

(A) Oxaloacetate
(B) Pyruvate
(C) α-Ketoglutarate
(D) Malate

71. One of the following is not a direct precursor for purine biosynthesis

(A) Aspartate
(B) Glutamate
(C) Glycine
(D) Cysteine

72. Penicillin is an inhibitor of

(A) SDH
(B) Glycoprotein peptidase
(C) Protein synthesis
(D) Nucleic acid synthesis

73. Protein kinases can be regulated by

(A) ATP
(B) cAMP
(C) gGMP
(D) Calmodulin

74. Cybrids possess

(A) Cytoplasmic genes from one parent and nuclear genome from both
(B) Nuclear genome from only one parent but cytoplasmic genes from both
(C) Nuclear genome and cytoplasmic genes from one parent only
(D) Cytoplasmic genes from both parents

75. Which of the following statements is false?

(A) The pKa of acetic acid is lower than ammonium ion
(B) pKa can be determined experimentally
(C) pKa of amino acid is independent of the R groups
(D) The buffering capacity of any reagent is dependent on the pKa

76. Which of the following is not a peptide hormone?

(A) Oxytocin
(B) Bradykinin
(C) Vasopressin
(D) Epinephrine

77. Binding of oxygen to haemoglobin follows

(A) Sigmoidal binding curve
(B) Parabolic binding curve
(C) Hyperbolic binding curve
(D) Linear binding curve

78. During organ transplant, tissue rejection may be due to

(A) Donor's class I MHC proteins
(B) Donor's class II MHC proteins
(C) Blood group
(D) Donor's Tc receptors

79. Which of the following antibody molecule is a pentamer?

(A) IgG
(B) IgM
(C) IgA
(D) IgD

80. The technique for producing monoclonal antibodies was developed by

(A) Georges Köhler and Cesar Milstein
(B) Linus Pauling
(C) Robert Corey
(D) Hershey and Chase

81. The fibrous protein molecule having a triple helical structure is

(A) α-Keratin
(B) Silk Fibroin
(C) Collagen
(D) Haemoglobin

82. Semiconservative DNA/Chromosome replication using ^{14}N was demonstrated by

(A) Messelson
(B) Messelson and Stahl
(C) Tylor
(D) Hershey and Chase

83. AZT (Azidothymidine), an antiretroviral drug

(A) Interferes with reverse transcription
(B) Inhibits viral proteases
(C) Inhibits DNA replication
(D) Inhibits protein synthesis

84. Which of the following inhibits the formation of contractile microfilament?

(A) Colcemid
(B) Cytochalasin-B
(C) Staurosporin
(D) Rifamycin

85. Molecular chaperons are involved in

(A) Protein folding
(B) Protein synthesis
(C) Autophagy
(D) Phagocytosis

86. Paracrine signalling

(A) Targets only nearby cells
(B) Targets cells located at distant sites
(C) Acts within the same cell
(D) Requires cell-cell contact

87. Which of the following is not a component of the extracellular matrix?

(A) Fribronectin
(B) Laminin
(C) Vimentin
(D) Collagen

88. Integrins are

(A) Protein fibres that form the cytoskeleton
(B) Transmembrane receptors
(C) Enzymes that break down extracellular matrix proteins
(D) Proteins that inhibit blood clotting

89. Yield coefficient in fermentation represents

(A) Total biomass or product produced
(B) Conversion efficiency of a substrate into product
(C) Conversion rate of a substrate into biomass or product
(D) Production time of biomass or product

90. High biological oxygen demand in water body indicates

(A) Chemical pollution
(B) Organic pollutants
(C) High phototroph
(D) Pressure of heterotrophs

91. Which of the following is not a direct consequence of green-house gas effect?

(A) Increase in sea level
(B) Rainfall
(C) Tsunami
(D) Global warming

92. Which of the following tissues converts pyruvate to lactate most efficiently?

(A) Liver
(B) Muscle
(C) Brain
(D) Kidney

93. *Cis-trans* isomerisation of the peptide bond preceding an amino acid X is known to be critical in the folding of proteins. The amino acid X is

(A) Glycine
(B) Isoleucine
(C) Histidine
(D) Proline

94. The surfactant Triton X-100 commonly used to solubilise membrane protein is

(A) Cationic
(B) Anionic
(C) Ampiphilic
(D) Hydrophilic

95. Which one of the following is single strand specific nuclease?

(A) Z nuclease
(B) S5 nuclease
(C) S1 nuclease
(D) DNase

96. Haemozoin is a toxin, which is produced in human blood during

(A) Plasmodium infection
(B) Leishmanial infection
(C) Trypanosomal infection
(D) Entamoebahystolytica infection

97. All of these reagents are used in PCR except

(A) *Taq* polymerase
(B) Restriction enzymes
(C) Oligonucleotides
(D) Deoxynucleoside triphosphate

98. Heat shock proteins originally described as proteins formed under stress. Now, it is also known that they

(A) act as molecular chaperons and help in protein-folding
(B) degrade ubiquitin tagged proteins
(C) are protein-tyrosine kinases
(D) are GTPase activating proteins

99. At which of the following stages is a cell at 4N condition?

(A) Prophase
(B) Anaphase
(C) Interphase
(D) Metaphase

100. Which of the following is most likely to be the mechanism for evolution of multigene families?

(A) Endosymbiosis
(B) Gene duplication
(C) Horizontal gene transfer
(D) Vertical gene transfer

101. Anthrax is caused by

(A) Virus
(B) Bacterium
(C) Protozoa
(D) Helminthes

102. The primary lymphoid organs are

(A) Thymus, liver
(B) Liver, bone marrow
(C) Bone marrow, spleen
(D) Thymus, bone marrow

103. Enzyme alcohol dehydrogenase belongs to class

(A) Oxidoreductases
(B) Transferases
(C) Hydrolases
(D) Lyases

104. Which of the following is an epimer of glucose?

(A) Ribose
(B) Fructose
(C) Cellulose
(D) Galactose

105. Chromosome constitution in case of Turner's syndrome is

(A) XX, XXY
(B) XO, XY
(C) XX, XO
(D) XX, XW

106. Shine-Dalgarno sequence is the

(A) Ribosomal RNA binding site
(B) Protein binding site
(C) Nucleic acid binding site
(D) None of the above

107. The cytokine secreted in response to viral infection is

(A) Interleukin
(B) Interferon
(C) CSF
(D) GM-CSF

108. A CsCl gradient will separate DNA molecules by

(A) Ionic strength
(B) Resorption
(C) Buoyant density
(D) Molecular size

109. Cellular proteins destined for secretion are sorted and packaged in

(A) Endoplasmic Reticulum
(B) Trans-Golgi Complex
(C) Endosomes
(D) Peroxisome

110. Which of the following fails to develop thymus?

(A) Knock-out mice
(B) Beige mice
(C) Swiss Mice
(D) Nude mice

111. Retting is a process of biodegradation involving

(A) degradation of cellulose
(B) degradation of pectin and starch
(C) degradation of lignin
(D) degradation of retinol

112. Glycosylation of proteins occurs in

(A) ER
(B) Golgi
(C) Mitochondria
(D) Nucleus

113. Elevated levels of RBCs and low affinity of haemoglobin for Oxygen is an adaptation for

(A) High altitudes
(B) Poles
(C) Low altitudes
(D) Marine

114. Which of the following amino acids has the maximum number of codons?

(A) Leucine
(B) Proline
(C) Tryptophan
(D) Glutamic acid

115. The first dimension of separation of proteins for two-dimensional electrophoresis is based on

(A) Molecular mass
(B) Isoelectric point
(C) Conformation
(D) Number of sub-units

116. Pulse-field gel electrophoresis is used for separation of

(A) Centromeres
(B) Telomeres
(C) DNA
(D) Chromosomes

117. A change in the pattern of gene expression without a change in the DNA sequence is called

(A) Chemical carcinogen
(B) Epigenetic
(C) Mutagenesis
(D) Tumor progression

118. Unit of distance between genes on the chromosomes is

(A) Picometer
(B) Morgan
(C) Centimorgan
(D) Nanometer

119. Screening bacterial colonies using X-gal and IPTG is by

(A) α- complementation (B) β- complementation
(C) δ- complementation (D) γ- complementation

120. The placenta in humans is derived from the

(A) Embryo only (B) Uterus only
(C) Endometrium and embryo (D) Endometrium only

121. Which of the following disease is transmitted by a protein?

(A) Creutzfeldt-Jakob Disease
(B) Alzheimer's disease
(C) Lymphocytic chloriomeningitis
(D) Encephalitis

122. Which of these is not used for the estimation of protein?

(A) Lowry method (B) Bradford's method
(C) Biuret method (D) DNSA method

123. When an enzyme is assayed in the presence of a compound in increasing concentrations, it is found that Km of the enzyme increase without any change in its Vmax. The compound is a

(A) Competitive inhibitor of the enzyme
(B) Uncompetitive inhibitor of the enzyme
(C) Allosteric inhibitor of the enzyme
(D) None of the above

124. Which of the following enzyme is used to clear blood clots that occur during myocardial infarction?

(A) Glucokinase (B) Streptokinase
(C) Aexokinase (D) Proteinkinase

125. Barr bodies in female is an example of

(A) Heterochromatisation (B) Chromosomal aberration
(C) Chromosomal degeneration (D) Euchromatisation

126. How many grams of NaOH (mol.wt. 40) are to be dissolved to prepare 50 ml of 10mM solution?

(A) 0.04 (B) 0.2
(C) 0.4 (D) 0.02

127. The gland that produces melatonin hormone is

(A) Thyroid (B) Adrenal
(C) Pineal (D) Pituitary

128. Ovalbumin is synthesised in

(A) Liver (B) Ovary
(C) Oviduct (D) Kidney

129. The structure of complete enzyme (holoenzyme) of RNA polymerase includes

(A) $\alpha\alpha'\beta_2\sigma$ (B) $\alpha_2\beta\beta'$
(C) $\alpha_2\beta\beta'\sigma$ (D) $\alpha\beta\beta'\sigma$

130. Haemoglobin carries how many molecule of oxygen?

(A) 1 (B) 2
(C) 3 (D) 4

131. Mammal in which development of embryo doesn't take place inside the mother's body is

(A) Monotrems (B) Hippocampus
(C) Platypus (D) Kangaroo

132. Which one of the following is a conjugated protein?

(A) Prolamine
(B) Histamine
(C) Glutelins
(D) Haemoglobin

133. Pernicious anaemia is due to the lack of absorption of

(A) Iron
(B) Vitamin B12
(C) Vitamin C
(D) Vitamin E

134. Natural killer cells play an important role in the destruction of

(A) Tumour cells
(B) CD4 cells
(C) Memory cells
(D) MHC class I molecules

135. Which of the following molecules is called oxygen protectant in root nodules?

(A) Chlorophyll
(B) Phycoerythrin
(C) Phycobillins
(D) Leghaemoglobin

136. Comparative analysis of the total data can best be represented by

(A) Pie- diagram
(B) binomial distribution
(C) normal distribution
(D) three dimensional diagram

137. 'Cos' site is present in

(A) Plasmid
(B) Cosmid
(C) Bacteriophage
(D) Cyanophage

138. *Lac* repressor

(A) is a DNA binding protein
(B) is induced by exposure of a bacterial cell to lactose
(C) uses the same promoter as the *lac* Z gene
(D) inactivates the inducer

139. The chance of getting a male child at delivery is termed

(A) Frequency
(B) Probability
(C) Variance
(D) Test of significance

140. Okasaki fragments are involved in

(A) Lagging strand of DNA
(B) Leading strand of DNA
(C) Reverse transcriptase
(D) Transcription

141. Which is the most abundant RNA in cell?

(A) mRNA
(B) tRNA
(C) rRNA
(D) Antisense RNA

142. Different cell types from a lymphocyte population can be separated by which of the following techniques?

(A) Density gradient centrifugation
(B) Affinity chromatography
(C) Flow cytometry
(D) Gel filtration

143. Half-life of a radioactive material is 50 days. How many half lives it will take to become 12.5% of its original amount?

(A) 1
(B) 2
(C) 3
(D) 4

144. The gene regulatory element is called

(A) Suppressor
(B) Inducer
(C) Promoter
(D) Donor

145. IPR is related to

(A) International trade
(B) Intellectual patent
(C) Bilateral agreement
(D) International Piracy

146. Ds elements are

(A) Non-autonomous elements
(B) Sites of chromosome union
(C) Similar to Ac elements
(D) Transpose by a non replicative mechanism

147. What is the typical size of a Ct genome?

(A) 1.5 Kb (B) 15 Kb
(C) 150 Kb (D) 1500 Kb

148. Hydrogen cyanide is present in

(A) Paddy (B) Tapioca
(C) Papaya (D) Apple

149. Electron microscope was invented by

(A) Ernest Ruska (B) de Brogile
(C) Marton (D) Anton Van Leeuwenhoek

150. The character that appears in F_1 is called

(A) Recessive (B) Dominant
(C) Incomplete dominance (D) None of the above

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SPACE FOR ROUGH WORK

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SEAL