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2012

BIOTECHNOLOGY

Paper - II

Series

D

Time : 150 Minutes

Max. Marks : 300

INSTRUCTIONS

1. Please check the Test Booklet and ensure that it contains all the questions. If you find any defect in the Test Booklet or Answer Sheet, please get it replaced immediately.
2. The Test Booklet contains 150 questions. Each question carries **two** marks.
3. The Test Booklet is printed in four (4) Series, viz. **A B C D**. The Series, **A** or **B** or **C** or **D** is printed on the right-hand corner of the cover page of the Test Booklet. Mark your Test Booklet Series **A** or **B** or **C** or **D** in Part C on side 1 of the Answer Sheet by darkening the appropriate circle with Blue/Black Ball point pen.

Example to fill up the Booklet Series

If your Test Booklet Series is **A**, please fill as shown below :

If you have not marked the Test Booklet Series at Part C of side 1 of the Answer Sheet or marked in a way that it leads to discrepancy in determining the exact Test Booklet Series, then, in all such cases, your Answer Sheet will be invalidated without any further notice.

No correspondence will be entertained in the matter.

4. Each question is followed by 4 answer choices. Of these, you have to select one correct answer and mark it on the Answer Sheet by darkening the appropriate circle for the question. If more than one circle is darkened, the answer will not be valued at all. Use Blue/Black Ball point pen to make heavy black marks to fill the circle completely. Make **no** other stray marks.

e.g. : If the answer for Question No. 1 is Answer choice (2), it should be marked as follows :



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Example : If the Paper Code is 027, and Roll No. is 95640376 fill as shown below :

Paper Code

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●	0	0
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7	7	●
8	8	8
9	9	9

Roll No.

9	5	6	4	0	3	7	6
0	0	0	0	●	0	0	0
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	●	3	3
4	4	4	●	4	4	4	4
5	●	5	5	5	5	5	5
6	6	●	6	6	6	6	●
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8	8	8	8	8	8	8	8
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6. Please get the signature of the Invigilator affixed in the space provided in the Answer Sheet. An Answer Sheet without the signature of the Invigilator is liable for *invalidation*.
7. The candidate should **not** do rough work or write any irrelevant matter in the Answer Sheet. Doing so will lead to *invalidation*.
8. Do **not** mark answer choices on the Test Booklet. Violation of this will be viewed seriously.
9. Before leaving the examination hall, the candidate should hand over the original OMR Answer Sheet (top sheet) to the Invigilator and carry the bottom sheet (duplicate) for his/her record, failing which disciplinary action will be taken.
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1. Which one of the following is an engineered enzyme?
 - (1) Thiol - β lactamase
 - (2) Amino peptidase
 - (3) Photolyase
 - (4) Nitrate reductase
2. The best example for recombinant protein is
 - (1) HbsAg
 - (2) CT - B
 - (3) Insulin
 - (4) tpA
3. The best method of gene silencing is
 - (1) T-DNA
 - (2) RNA(i)
 - (3) Antisense RNA
 - (4) Both (2) and (3)
4. The best solution for human genetic diseases is
 - (1) Correction of genes
 - (2) Gene knock out
 - (3) Silencing of diseased genes
 - (4) Gene therapy
5. Transposon was first discovered by
 - (1) Mc clintock
 - (2) Watson
 - (3) Hatch
 - (4) Muller
6. What is the software followed for erection of dendrogram?
 - (1) Clustal W
 - (2) PAM
 - (3) BLOSUM
 - (4) FASTA

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7. In DNA finger printing which DNA is used

- (1) Microsatellite DNA
- (2) Genomic DNA
- (3) Cytoplasmic DNA
- (4) Z – DNA

8. Gene is identified based on

- (1) ORF
- (2) DNA seq
- (3) cDNA
- (4) Split gene

9. The amino that is coded by a single codon is

- (1) Proline
- (2) Methionine
- (3) Isoleucine
- (4) Phenylalanino

10. What is a pharmacophore?

- (1) Primer design
- (2) Lead compound
- (3) Drug binding site
- (4) Chemical library

11. For comparison of sequences, the following method is employed

- (1) BLOSUM
- (2) Global alignment
- (3) Local alignment
- (4) Multiple sequence analysis

12. The following is an example of metabolic engineering

- (1) SCP
- (2) Edible vaccine
- (3) Haploids
- (4) Dihaploids

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13. Which gene is used for viral resistance in plants?
- (1) Coat protein gene
 - (2) rRNA genes
 - (3) Proviral genes
 - (4) Late order genes
14. Which is the precursor for biodegradable plastics?
- (1) PHB
 - (2) α -Tocopherol
 - (3) ALA
 - (4) Phytosterol
15. Shikonin is a
- (1) Primary metabolite
 - (2) Secondary metabolite
 - (3) Intermediary metabolite
 - (4) Key metabolite
16. In molecular breeding experiments, the following method is employed
- (1) SCAR
 - (2) PCR
 - (3) Southern blotting
 - (4) Microarray
17. For mass scale propagation of endangered plants, which method will be employed?
- (1) Callus culture
 - (2) Cell suspension culture
 - (3) Micropropagation
 - (4) Mericlone
18. Mention an important industrial enzyme from barley
- (1) Amylase
 - (2) Lipase
 - (3) Isomerases
 - (4) Phenolic acid oxidase

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19. A transgene is not expressed because of

- (1) Co-suppression
- (2) Methylation
- (3) Exon and intron
- (4) Lack of promotor

20. Vinblastin is produced by

- (1) Vinca rosea
- (2) Vernonia cineria
- (3) Verticillium
- (4) Vallisneria

21. Apoptosis is a mode of

- (1) Preventing pathogen invasion further
- (2) Self destruction of cells
- (3) Cell proliferation
- (4) Cell differentiation

22. Embryonic stem cells are

- (1) Totipotent
- (2) Virulent
- (3) Actively dividing
- (4) Avirulent

23. The first animal to be cloned was

- (1) Sheep
- (2) Cat
- (3) Zebra
- (4) Jelly fish

24. Which instrument is very much needed for Animal cell culture experiment?

- (1) CO₂ incubator
- (2) Cell culture racks
- (3) Orbital shaker
- (4) Animal cell culture kit

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25. To get uniformly by dividing cells, the following requirement is necessary

- (1) Growth medium
- (2) Maintenance of buffer pH
- (3) Requirement of carbon source
- (4) Cell synchronization

26. Protein – protein interaction can be studied by

- (1) Southern hybridization
- (2) Western hybridization
- (3) Yeast two hybrid system
- (4) South Western blotting

27. Biogas plant is .

- (1) An anaerobic process
- (2) Aerobic process
- (3) Microaerobic process
- (4) Full of acidic reactions

28. All heavy metal tolerant plants contain

- (1) High genomic DNA
- (2) Phytochelators
- (3) Cells with a strong adsorbance
- (4) High donan equilibrium

29. Acid rain is due to

- (1) SO₂
- (2) CH₄
- (3) N₂
- (4) O₃

30. Waste management can be effectively carried out through

- (1) Incineration
- (2) Dumping sites
- (3) Vermicomposting
- (4) Decomposing

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31. Any mutation of a smaller magnitude can be overcome by

- (1) DNase
- (2) RNase
- (3) Cre-Lox
- (4) Photolyase

32. Proof reading of DNA synthesis is carried out mostly by

- (1) Polymerase I
- (2) Polymerase II
- (3) Polymerase III
- (4) Ligase

33. Mapping of genome is carried out by

- (1) Short gun cloning
- (2) ORF
- (3) Replication
- (4) Gene Finder

34. Which of the following gene is employed for herbicide tolerance?

- (1) EPSPS
- (2) BET
- (3) CAT
- (4) GUS

35. Golden rice is popular as a source for

- (1) Starch
- (2) Protein
- (3) Essential amino acid
- (4) β -Carotene

36. HBs Ag has been cloned successfully in

- (1) Tomato
- (2) Mango
- (3) Banana
- (4) Cucumber

37. GUY's 13 Ab was cloned for the first time using the following vector

- (1) *Agrobacterium tumefaciens*
- (2) *Agrobacterium rhizogens*
- (3) CaMV
- (4) Microinjection

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38. Delayed fruit ripening has been created using the following technology
- (1) Antisense technology
 - (2) Gene silencing
 - (3) Gene knock out
 - (4) Gene splicing
39. To avoid transgene escape, the following technology is in Vogue
- (1) Recombinant DNA
 - (2) Gene knock out
 - (3) Transplastome
 - (4) Cloning
40. To study thousands of gene expression at a time, the following technology is employed
- (1) Micro array
 - (2) Gene sequencing
 - (3) Southern blotting
 - (4) 2DE
41. Split gene is most common in
- (1) Bacteria
 - (2) Fungi
 - (3) Virus
 - (4) Eukaryotes
42. According to the current findings of human genome project, the coding sequence percentage is
- (1) 1%
 - (2) 1.5%
 - (3) 3%
 - (4) 5%
43. The molecular differentiation of prokaryotes from Eukaryotes is that the prokaryotes lack
- (1) Cell wall
 - (2) Electron transport system
 - (3) Plasmids
 - (4) Introns
44. To find out the validity of population data, which of the following statistical analysis you will employ
- (1) Standard error
 - (2) Standard deviation
 - (3) t-test
 - (4) Probability distribution

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45. Prokaryotes can be distinguished from Eukaryotes by the characteristic absence of
- (1) ribosomes
 - (2) polymerases
 - (3) glycolytic pathway
 - (4) split genes
46. *Pseudomonas* is well known for specific degradation of
- (1) Fatty acid
 - (2) Lipid
 - (3) Protein
 - (4) Alkane
47. Which one of the following is a microbial pathogen?
- (1) *Pseudomonas putida*
 - (2) *Pseudomonas aeruginosa*
 - (3) *Bacillus subtilis*
 - (4) *Bacillus amyloliquefaciens*
48. 16S rRNA is commonly used in
- (1) Genome analysis
 - (2) Proteome analysis
 - (3) Molecular taxonomy
 - (4) Metabolomics
49. Heat labile compounds are sterilized using
- (1) Cryopreservation
 - (2) Filtration
 - (3) Steaming
 - (4) Optimum temperature
50. *Spirulina* can be grown using the following medium
- (1) Autotrophic medium
 - (2) Heterotrophic medium
 - (3) Myxotrophic medium
 - (4) Auxotrophic medium
51. The growth curve of a culture is generally
- (1) Sigmodial
 - (2) Non-sigmodial
 - (3) Hyperbolic
 - (4) Straight curve
52. "Little leaf" disease is caused by
- (1) Green bacteria
 - (2) Purple bacteria
 - (3) Sulfur bacteria
 - (4) *Mycoplasma*

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53. Archea is characterized by

- (1) Hyperbolic growth curve
- (2) Anaerobiosis
- (3) Slow growth
- (4) Growth in extreme environments

54. For DNA replication, which one of the following is necessary?

- (1) Ligase
- (2) DNA Polymerase
- (3) RNA – dependent DNA polymerase
- (4) Sigma factor

55. The final phase of development of virus depends on

- (1) Middle order genes
- (2) Early order genes
- (3) Late order genes
- (4) Viral replicase

56. SV40 is a

- (1) Microbial virus
- (2) Plant virus
- (3) Animal virus
- (4) Cyanophage

57. HIV is a

- (1) Single stranded RNA virus
- (2) Double stranded RNA virus
- (3) Single stranded DNA virus
- (4) Double stranded DNA virus

58. Prions are

- (1) Infective form of virus
- (2) Dormant form of virus
- (3) Single stranded RNAs
- (4) Infective protein particles

59. Upon infection bacteriophages are known to produce in culture

- (1) Plaques
- (2) Extracellular enzymes
- (3) Hydrolases
- (4) Pigmentation

60. Which one of the following is a DNA virus?

- (1) Charan phage
- (2) Lambda phage
- (3) Cyanophage
- (4) Bacteriophage

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61. B - Carotene is present in

- (1) Carrot
- (2) Beet root
- (3) Onion
- (4) Raddish

62. The principle pigment in photosynthesis is

- (1) Chlorophyll "a"
- (2) Carotene
- (3) Xanthohyll
- (4) Phycocyanin

63. Which one of the following is an example of isoprenoid compound

- (1) B-Carotene
- (2) Kaempferol
- (3) Anthocyanin
- (4) Flavonoid.

64. The HPLC employs the following principle

- (1) Partition chromatography
- (2) Reverse phase
- (3) Retention time
- (4) All of the above

65. Which of the following is used in nucleic acid sequencing?

- (1) Dideoxynucleotide
- (2) DNase
- (3) 5 - F uracil
- (4) Methylation

66. Conformational structure of a protein molecule is determined by

- (1) S - containing amino acid
- (2) Heterocyclic amino acids
- (3) Ions present in the cytosol
- (4) Amino acid sequence

67. The colorimetric principle is based on

- (1) Lambert's law
- (2) Beer's law
- (3) Beer Lambert's law
- (4) Cotton law

68. For protein hybridization studies, the following blotting technique is used

- (1) Southern blotting
- (2) Western blotting
- (3) Northern blotting
- (4) North Western blotting

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69. Radioactivity can be measure by

- (1) GM counter
- (2) Cytophotometer
- (3) X-ray radiation
- (4) Cyclotron

70. What is the light source in electron microscope?

- (1) Actinic light
- (2) UV light
- (3) Fluorescent light
- (4) Electron gun

71. The approximate speed of an ultracentrifuge is

- (1) 1,000 rpm
- (2) 10,000 rpm
- (3) 20,000 rpm
- (4) 1,00,000 rpm

72. Which one of the following can be used for structural analysis of proteins

- (1) VIS spectrophotometer
- (2) UV spectrophotometer
- (3) NMR
- (4) Ultracentrifuge

73. The latest instrument for all analysis of proteins is

- (1) MALDI – TOF
- (2) SDS – PAGE
- (3) Centrifugation
- (4) FPLC

74. Which of the following cycles was first discovered using radioactive carbon

- (1) Glyoxylate cycle
- (2) Citric acid cycle
- (3) Calvin cycle
- (4) Hatch and Slack

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75. Geiger Muller counter works on the following principle

- (1) Filtration
- (2) Ionization
- (3) Diffusion
- (4) Quenching

76. Elemental analysis can be made using

- (1) Colorimeter
- (2) Atomic Absorption Spectrophotometer
- (3) X-ray diffraction
- (4) Autoanalyzer

77. Autoradiography reveals

- (1) Radioactivity
- (2) Intensity of radioactivity
- (3) Pattern of distribution of radioactivity as seen in a X-ray film
- (4) Utilization of tracer compound

78. Photolyase is involved in

- (1) Splitting of H₂O molecule
- (2) Breaks the pyrimidine dimers
- (3) Chloroplast electron transport
- (4) Photophosphorylation

79. Which one of the following is a postranscriptional modification

- (1) TATA box
- (2) Antisense RNA
- (3) RNA(i)
- (4) Polyadenylation

80. Methylation is involved in

- (1) Gene expression
- (2) Gene silencing
- (3) Gene protection
- (4) Gene splicing

81. The back bone of DNA strand is

- (1) Hydrogen bond
- (2) Two strands of nucleotides
- (3) Phosphodiester bond
- (4) Net negative charge

82. Eukaryotic Protein Synthesis takes place on

- (1) 70S ribosome
- (2) 80S ribosome
- (3) 35 S ribosome
- (4) 40 S ribosome

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83. Which of the following enzymes is involved in post-translational modification of proteins
- (1) Carboxylase
 - (2) Dehydrogenase
 - (3) Kinases
 - (4) Methylase
84. Which one of the following is an allosteric enzyme
- (1) ATCase
 - (2) Phosphatase
 - (3) Amylase
 - (4) SDH
85. Protein is an integral part of
- (1) Enzymes
 - (2) Membrane
 - (3) Apoenzyme
 - (4) Nucleoprotein
86. One of the best examples of interaction between nuclear genome and mitochondrial genome is
- (1) Cytochrome oxidase
 - (2) Photolyase
 - (3) PEP case
 - (4) Malic enzyme
87. Which one of the following is a tumor-suppressor gene
- (1) MYC
 - (2) p53
 - (3) CAT
 - (4) EPSPS
88. Antisense Technology is involved in
- (1) Gene silencing
 - (2) Gene knock out
 - (3) Both (1) and (2)
 - (4) RNA – RNA hybridisation
89. Which one of the following is a non-protein enzyme?
- (1) ECOR – 1
 - (2) Hind III
 - (3) Ribozyme
 - (4) RNA (i)
90. Gene can be disrupted by insertion of
- (1) T-DNA
 - (2) Cre / Lox
 - (3) Methylation
 - (4) Restriction enzyme

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91. Inverted microscope is used to study

- (1) Organelles
- (2) Membranes
- (3) Cell wall
- (4) Growth and differentiation of cells.

92. Harvesting of sunlight light energy is carried out by

- (1) Leucoplast
- (2) Chromoplast
- (3) Amyloplast
- (4) Chloroplast.

93. RUBP case is synthesized by

- (1) Chloroplast
- (2) Mitochondria
- (3) Nucleus
- (4) Chloroplast and Nucleus.

94. Transport of macromolecular proteins generally involves

- (1) Membrane pores
- (2) Donan equilibrium
- (3) Active transport
- (4) Transit peptide.

95. Hydrolysis of NADH_2 / NADPH_2 generates

- (1) One ATP
- (2) Two ATPs
- (3) Three ATPs
- (4) Two ATPs and One GTP.

96. In any abiotic stress responses which of the following molecule is produced

- (1) IAA
- (2) GA_3
- (3) ABA
- (4) Cytokines.

97. NADPH_2 is generated by

- (1) Mitochondria
- (2) Chloroplast
- (3) Peroxisomes
- (4) Glyoxysomes.

98. What is S-phase in meiosis?

- (1) Synthetic phase
- (2) Surface protein
- (3) Sigma factor
- (4) Sterility.

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99. Crossing over takes place in

- (1) Pachytene
- (2) Diplotene
- (3) Diakinesis
- (4) Leptotene.

100. LEA protein is mostly synthesized against the following stress

- (1) Dehydration
- (2) Salinity
- (3) Cold
- (4) Flooding.

101. Which of the following is called the second messenger in plants?

- (1) CaM
- (2) Ca^{2+}
- (3) Mg^{2+}
- (4) K^+

102. Rhizogenesis can be induced by

- (1) NAA
- (2) IAA
- (3) GA
- (4) 2,4-D

103. In animal cell culture and development, which of the following is predominantly used

- (1) CO_2
- (2) SO_2
- (3) N_2
- (4) CH_3

104. Arabidopsis is most commonly used in molecular biology experiments because Arabidopsis has

- (1) A small genome
- (2) Tiny plant
- (3) A short duration of life span
- (4) No intron.

105. Somaclone arises due to variation in

- (1) Ploidy
- (2) Protein
- (3) Plastids
- (4) 2,4-D concentration.

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106. Haploids are obtained invitro through culturing of

- (1) Pollen
- (2) Callus
- (3) Meristem
- (4) Zygote.

107. Single fertilization is most common in

- (1) Lorchanthus
- (2) Cuscuta
- (3) Orchids
- (4) Vallisneria

108. In live stock improvement, the common practice followed is

- (1) Improvement in livestock feed
- (2) Invitro fertilization
- (3) Microinjection
- (4) Spheroplast fusion.

109. Buffer is a

- (1) Weak acid
- (2) Mixture of salts
- (3) Weak acid and its salt
- (4) Weak acid and alkali.

110. The two DNA strands are held by strong

- (1) Hydrogen bonds
- (2) Disulphide bonds
- (3) Covalent bonds
- (4) Hydrophobic bonds.

111. Which of the following is the most transportable form of sugar in plants

- (1) Glucose
- (2) Fructose
- (3) Sucrose
- (4) Insulin

112. Which one of the following is an imino acid

- (1) Glycine
- (2) Proline
- (3) Lysine
- (4) Glutamic acid.

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113. Transport proteins are generally called

- (1) Transit peptide
- (2) Tripeptide
- (3) Mucopolypeptides
- (4) Peptidyl glycon

114. Starch contains the following bonds

- (1) $1 \rightarrow 4$
- (2) $1 \rightarrow 6$
- (3) $1 \rightarrow 4$ and $1 \rightarrow 6$
- (4) $3 \rightarrow 5$

115. The proteins that traverse through the membrane is called

- (1) Membrane protein
- (2) Transmembrane protein
- (3) Globular protein
- (4) Hydrophobic protein

116. The predominant lipid in membrane is

- (1) Sulpho lipid
- (2) Galacto lipid
- (3) Glyco lipid
- (4) Phospho lipid

117. The characteristic property of membrane is

- (1) Diffusion
- (2) Ion exchange
- (3) Ion conduction
- (4) Selective permeability

118. Chloroplast contains the following ribosome

- (1) 50 S
- (2) 80 S
- (3) 70 S
- (4) 60 S

119. Secondary metabolites are contributed by a metabolic pathway called

- (1) TCA
- (2) Calvin
- (3) Glyoxylate
- (4) Shikimate

120. Non Watson – Crick base pairing is seen in

- (1) A – DNA
- (2) B – DNA
- (3) Z – DNA
- (4) C – DNA

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121. How is a pure colony culture obtained?

- (1) Serial dilution
- (2) Choosing specific medium
- (3) By picking up specific individual colonies
- (4) By changing the nutrient composition

122. Which one of the following does not have immune system?

- (1) Plants
- (2) Sheep
- (3) Poultry animals
- (4) Chimpanzee

123. Which of the following enzyme is widely used in industries?

- (1) Amylase
- (2) Protease
- (3) Ligninase
- (4) Chitinase

124. Amylase requires for its action

- (1) Acidic pH
- (2) Neutral pH
- (3) Alkaline pH
- (4) Buffer

125. Enzymes can be purified using the following

- (1) Mannitol
- (2) Sorbitol
- (3) Ammonium sulfate and dialysis
- (4) Sucrose

126. Which of the following is an isoenzyme?

- (1) Amylase
- (2) SDH
- (3) Glucose oxidase
- (4) Peroxidase

127. RUBP case is located in

- (1) Chloroplast
- (2) Mitochondrion
- (3) Cytosol
- (4) Chromoplast

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128. Which one of the following is a bifunctional enzyme?

- (1) Cytochrome oxidase
- (2) Catalases
- (3) RUBP Case
- (4) Nitrate reductase

129. The protein part of the enzyme is called

- (1) Apoenzyme
- (2) Co-enzyme
- (3) Holoenzyme
- (4) Cofactor

130. Which of the following is an essential requirement of N_2 ase?

- (1) Mo
- (2) Mo Fe
- (3) Mn
- (4) Zn

131. Higher k_m value of the enzyme indicates

- (1) Higher affinity for the substrate
- (2) Lower affinity for the substrate
- (3) No affinity for the substrate
- (4) Saturation of the enzyme with the substrate

132. Competitive inhibition can be overcome by increasing the concentration of

- (1) Inhibitor
- (2) Substrate
- (3) Metalions
- (4) Ammonium sulfate

133. Which enzyme inhibition is irreversible?

- (1) Competitive
- (2) Non-Competitive
- (3) Uncompetitive
- (4) KCN – coupled cytochrome oxidase

134. The property of an allosteric enzyme is

- (1) acts on complex substrates
- (2) shows intermediate product inhibition
- (3) gets inhibited by end product accumulation
- (4) acts on a variety of substrates

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135. Which is the polymer commonly used for enzyme immobilization?

- (1) Calcium alginate
- (2) PEG
- (3) Polyurethane foam
- (4) Polyacrylamide

136. The application of immobilized enzyme is

- (1) Reuse of the enzyme
- (2) To get pure end products
- (3) High concentration of substrates can be used
- (4) To avoid enzyme inhibition

137. Which one of the following gases causes global warming?

- (1) Methane
- (2) H_2
- (3) CO
- (4) SO_2

138. The biodiesel is most preferred fuel because

- (1) It is an inexhaustible fuel
- (2) It does not contribute to SO_2 pollution
- (3) It is biodegradable
- (4) No lead is present

139. The potability of water can be checked by

- (1) Testing its pH
- (2) Testing its hardness
- (3) Testing for coliform bacteria
- (4) Testing its conductivity

140. Which is the best method for large scale decontamination of soil?

- (1) Ion exchange
- (2) Chemical methods
- (3) Bioremediation
- (4) Ex-situ treatment

141. Superbug was created for clean up of

- (1) Heavy metal contaminant
- (2) Water effluent
- (3) Air pollutants
- (4) Hydrocarbon spillages

142. The best method of treating sewage effluent is

- (1) Physical method
- (2) Chemical method
- (3) Filtration
- (4) Trickling filter

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143. Solid waste contaminants can be recycled for
- (1) Biogas and manure production
 - (2) Hydrogen production
 - (3) SCP production
 - (4) Fatty acid formation
144. The commonly used vector in plant transformation studies is
- (1) PBR³²²
 - (2) Bifunctional vector
 - (3) *Agrobacterium rhizogens*
 - (4) CaMV
145. The most commonly used animal vector is
- (1) Charan phage
 - (2) Lambda phage
 - (3) M13 phage
 - (4) SV40
146. In direct method of gene transfer, the following method is used
- (1) Sphaeroplast fusion
 - (2) Particle gun bombardment
 - (3) Electroporation
 - (4) PEG – Mediated
147. In C-DNA synthesis, which of the following enzymes plays a key role?
- (1) DNA polymerase
 - (2) DNA replicase
 - (3) RNA polymerase
 - (4) Reverse transcriptase
148. In library construction which method is most frequently used
- (1) Shot gun cloning
 - (2) Fusion of protoplast
 - (3) Chromosome walking
 - (4) Cloning of mutants
149. Expression of a cloned gene is determined by
- (1) Gene product
 - (2) Gene sequence
 - (3) Protein sequence
 - (4) Promotor sequence
150. In protein engineering which of the following method is very popular
- (1) Site directed mutagenesis
 - (2) UV irradiation
 - (3) Gamma irradiation
 - (4) Chemical mutagens

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