



**ARMY WELFARE EDUCATION SOCIETY**  
**WRITTEN TEST PAPER FOR TEACHERS SELECTION: 09 DEC 2012**  
**PART-'B' : Biotech (PGT) : SUBJECT CODE : (P41)**  
**GENERAL INSTRUCTIONS**

1. DO NOT open this booklet until you are asked to do so.
2. FILL SCHOOL CODE, REGN NUMBER ON OMR ANSWER SHEET CAREFULLY AND SIGN ON THE RIGHT BOTTOM CORNER OF OMR SHEET.
3. Total duration of the test is 2 Hours and Maximum Marks are 120.
4. There are total 100 questions. All questions are objective type-multiple choices. All questions carrying equal marks.
5. DO NOT write anything on this question booklet.
6. After the test, please return this booklet along with OMR-Answer sheet to the invigilator.
7. You are not allowed to leave the examination hall before 1300h.

**Instructions for filling the OMR Sheet**

8. Read instructions printed on the OMR Sheet carefully before answering. Each item has four choices; A, B, C and D. Each choice is denoted by a circle. Shade the appropriate circle using Blue/Black Pen. Be absolutely sure of your option before shading the circle since you are not permitted to erase your response once shaded. More than one response will make your answer invalid. There is NEGATIVE MARKING for wrong answer.

**Rough Work**

9. For any rough work use the separate sheet provided along with the text booklet. DO NOT do any rough work on the answer sheet or any other paper.



**PAPER - B**  
**WRITTEN TEST PAPER FOR SELECTION OF TEACHERS : CSB 2013**  
**BIOTECH(PGT) : SUBJECT CODE : P41**

1. In Eukaryotes RNA Polymerases I,II,III respectively transcribe for-
  - a. mRNA, tRNA, rRNA respectively.
  - b. tRNA, rRNA, mRNA respectively
  - c. rRNA, mRNA, tRNA respectively.
  - d. mRNA, rRNA, tRNA. respectively
2. A bond formed between a covalently bound donor H atom with some positive charge and a negatively charged, covalently bound acceptor atom is-
  - a. Ionic bond..
  - b. Hydrophobic bond..
  - c. Covalent bond.
  - d. Hydrogen bond..
3. Thermodynamic stability of DNA double helix structure is due to-
  - a. Hydrogen bonds between any two nitrogen bases
  - b. Electron cloud interaction ( $\pi$ - $\pi$ ) between complementary bases in helical stack
  - c. The phosphodiester bond between adjacent nucleotides.
  - d. The glycosidic bond between pentose sugar and the nitrogen base.
4. Ethidium bromide is used as a stain in visualising DNA during gel electrophoresis because-
  - I. It intercalates between stacked base pairs and fluoresces when exposed to UV.
  - II. It decreases the twist of the helix and increases the writhing number of helix affecting its migration through the gel.
  - III. In the presence of non saturating amount of Ethidium negatively supercoiled circular DNA migrates rapidly.
  - a. All the above are true.
  - b. Only I and II are true.
  - c. Only I is true.
  - d. Only II and III are true.
5. In a diploid cell the two copies of a given chromosome one delivered from each parent are called-
  - a. Analogs.
  - b. Paralogs.
  - c. Alleles.
  - d. Homologs.
6. Codon AGG and AGA
  - i. Code for amino acid Arginine
  - ii. Act as stop codon in human mitochondria
  - a. Only i is correct.
  - b. Both i and ii are correct.
  - c. Only ii is correct.
  - d. Both i and ii are incorrect.
7. Which of the following is incorrect-
  - a. Domains are discrete folded sections of native proteins that are stable by themselves.
  - b. A single Domain arises from discontinuous amino acid sequences.
  - c. Combinations of different domains account for a large variety of all known protein structures.
  - d. Specific kinds of domain motifs are often associated with a specific functional activity.
8. Which of the following statement is incorrect-
  - a. Histone proteins are the most abundant proteins associated with prokaryotic DNA.
  - b. DNA of length 147 base pairs is wrapped around histone octamer to form a nucleosome.
  - c. Histone H 1, called linker histone protein is positively charged.
  - d. More than 20% of the amino acids residue in histone proteins are either Lysine or Arginine.
9. The divalent metal ion that attaches to enzyme DNA polymerase during replication of DNA are-
  - a. Ferrous ion..
  - b. Cupric ion.
  - c. Magnesium ion.
  - d. Manganese ion.
10. During replication of DNA, on average once every 20-100 base pairs have been synthesised., DNA polymerase enzyme dissociates from the template DNA. Association with which of the following prevents DNA polymerase from diffusing away-
  - a. Sliding DNA clamp proteins.
  - b. Sliding DNA clip protein.
  - c. Fixed DNA clamp protein.
  - d. Fixed DNA clip protein.
11. One kind of sequence that is particularly prone to mutations is-
  - a. DNA microsatellites.
  - b. DNA macrosatellites.
  - c. All regions of DNA are equally prone.
  - d. The sequence in linker DNA.
12. In 1940's Barbara McClintock discovered that some strains of Maize showed broken chromosomes more frequently. The genetic element responsible for this was-
  - a. Transposones.
  - b. Translocation.
  - c. Transversion.
  - d. Translation.
13. The transcription start site where RNA polymerase starts RNA synthesis is labelled as-
  - a. Initiation site
  - b. +1
  - c. Ori site
  - d. -1
14. In lac operon the inducer is a molecule of-
  - a. Galactose.
  - b. Lactose.
  - c. Allolactose.
  - d. Glucose.
15. Which of the following is an X linked recessive trait-
  - a. Albinism.
  - b. Huntington disease.
  - c. Down's syndrome.
  - d. Colour blindness.
16. The intact prokaryotic ribosome is referred to as 70s ribosome, the larger subunits is 50s and the smaller is called 30s. This apparent discrepancy is because-
  - a. Sedimentation velocity is determined both by shape and size and hence is not measure of mass.
  - b. The mass of intact ribosome becomes lesser as its volume is less.
  - c. S is a unit used to measure size and the size of intact ribosome is lesser.
  - d. All the above are incorrect explanations.
17. During translation In prokaryotes which of the following antibiotic inhibits amino-acyl -t RNA binding to A site of 30 S subunit of ribosome-
  - a. Cycloheximide.
  - b. Tetracycline.
  - c. Puromycin.
  - d. Chloramphenicol
18. During pulse field gel electrophoresis to resolve DNA molecules of the same mass ,which of the following migrates the fastest through the gel-
  - a. Nicked circular DNA.
  - b. Super coiled circular DNA.
  - c. Relaxed linear DNA.
  - d. Super coiled linear DNA.
19. Which of the following microbes is a source of proteases-
  - a. Bacillus subtilis.
  - b. Aspergillus niger.
  - c. E coli.
  - d. Saccharomyces cerevisiae.
20. Bioremediation technologies are used to-
  - a. Make diseased crops free of disease.
  - b. Clear the environment by removing the toxic substances from soil.
  - c. Using biological agents for medical purposes.
  - d. None of the above.
21. The management, quality assurance, the study director, the national compliance monitoring authority are pillars of-
  - a. GMP.
  - b. GLP.
  - c. EPA.
  - d. GRAS.

22. Which of the following is the non-reducing sugar-
- Sucrose.
  - Maltose.
  - Glucose.
  - Lactose.
23. In sickle cell anaemia Glutamine 6 in the  $\beta$  globulin of haemoglobin has been replaced by Valine is a classic example of-
- Nonsense mutation.
  - Missense mutation.
  - Stop mutation.
  - Frame shift mutation.
24. During Southern blotting hybridisation DNA fragments get transfixed to Nitrocellulose sheet by capillary action as-
- The NC membrane is positively charged under Anodic effect.
  - The DNA fragments are soluble in the buffer.
  - The NC membrane has high affinity for DNA.
  - The pores of NC membrane are large enough for DNA fragments.
25. Which of the following statements is incorrect- During Gel filtration chromatography
- Proteins are separated on the basis of their size and shape.
  - The beads used have a variety of different sized pores throughout.
  - Small proteins are eluted more rapidly than the large proteins.
  - Chromatography fractions are collected at different salt concentrations and assayed. for protein of interest.
26. Mark the incorrect statement-
- SDS cancels the charge difference between isozymes.
  - The secondary, tertiary and quaternary structure of protein is eliminated in presence of SDS.
  - SDS ions impart negative charge to the protein molecule.
  - Protein mixture can be resolved in presence of SDS according to the length of individual chains.
27. Yeast alanine t RNA structure was determined by-
- Craig Venter and associates.
  - Paul.C.Zamecnik and associates.
  - Robert W Holley and associates.
  - Watson and Crick.
28. The first experimental evidence that DNA controls amino acid sequences arose from the study of-
- Haemoglobin present in people with sickle cell anaemia.
  - Study of DNA labelled with heavy isotope  $^{15}\text{N}$  tag.
  - X Ray photographs involved in the elucidation of DNA structure.
  - None of the above.
29. The most important molecule containing high energy Sulphur bond is .....This bond acts as the main source of energy for fatty acid biosynthesis.
- ATP.
  - GTP.
  - AMP.
  - Acetyl-CoA.
30. Which of the following statements is true-
- Due to base pair stacking DS DNA duplex absorbs 40% less UV at 260 nm than SS DNA.
  - The higher the percent of A:T base pairs in the DNA higher is its melting point.
  - Lower the salt concentration of the solution greater is the temperature at which DNA denatures.
  - All the above are correct.
31. Which of the following is a non protein enzyme molecule-
- RNAse P.
  - Pepsin.
  - Chymotrypsinogen.
  - Abzymes.
32. Mark the true statement-
- Circular DNA molecules isolated from Bacteria and eukaryotes are usually negatively super coiled.
  - DNA of thermophiles is positively super coiled.
  - Nucleosomes introduce negative supercoiling in eukaryotic nuclear DNA.
  - All the above are correct.
33. Primitive form of life was based entirely on-
- RNA -as it can act as a genetic material as well as enzymatic machinery.
  - DNA- as it acts as the genetic material in all organisms except a few viruses.
  - Proteins- as they are responsible for expression of traits.
  - Carbohydrates-as they are the source of energy.
34. Pseudouridine and Dihydrouridine are-
- Non essential Amino Acids.
  - Isomers of Uridine.
  - Unusual bases found in t-RNA.
  - Point mutations in DNA.
35. In which of the following techniques of protein purification, the protein of interest is tagged onto either its C or N terminal by engineering a Green Fluorescent protein tag into it. It is then eluted through a column of beads coated with specific antibodies-
- Immuno precipitation.
  - Immuno affinity chromatography.
  - Ion exchange chromatography.
  - Gel filtration chromatography.
36. Which of the following is not a model organism used in Biotechnological studies-
- Mus musculus.
  - Ctenocephalides.felis.
  - E.coli.
  - Arabidopsis.
37. Amphoteric substances are-
- Molecules that show both acidic and basic behaviour.
  - Molecules that show basic behaviour.
  - Molecules that show acidic behaviour.
  - Molecules are neutral.
38. In IEF a pH gradient is set across the gel by-
- Salt solution.
  - Buffer.
  - Ampholytes.
  - SDS.
39. Which .of the following can exist in a number of oxidation states and can act as a reservoir of electrons in the water splitting complex during photosynthesis-
- Mn.
  - Mg.
  - Ca.
  - K.
40. The intermediates of Kreb's cycle are important source of precursors for biosynthesis. Kreb's cycle is called \_\_\_\_\_ pathway-
- Anabolic.
  - Catabolic.
  - Parabolic.
  - Amphibolic.
41. A sudden increase in  $\text{CO}_2$  concentration around a leaf will cause-
- Wider opening of stomata.
  - Increase in transpiration.
  - Closure of stomata.
  - Decrease in transpiration due to closure of stomata.
42. Function of Leghaemoglobin during biological  $\text{N}_2$  fixation is to-
- Convert  $\text{N}_2$  to  $\text{NH}_3$ .
  - Convert  $\text{NH}_3$  to Nitrite.
  - Transport  $\text{CO}_2$  for nitrogenase activity.
  - Protect nitrogenase from  $\text{O}_2$  by delivering  $\text{O}_2$  to cytochrome oxidase.in ETC.
43. The formation of erythrocytes in a three to four month old foetus takes place in-
- Liver and spleen.
  - Red bone marrow.
  - Blood plasma.
  - Sarcoplasm.
44. In Angiosperms embryo sac is-
- Microgametophyte.
  - Microsporangium.
  - Megagametophyte.
  - Megasporangium.
45. The Immunoglobulin present in mother's milk is –
- IgA.
  - Ig D.
  - IgE.
  - IgM.

46. Highly ordered cell death in which cells are disassembled very systematically-
- Apomixis.
  - Apoptosis.
  - Necrosis.
  - Phagocytosis.
47. In the immune system interferons are a part of—
- Physiological barrier.
  - Cellular barriers.
  - Physical barriers.
  - Cytokine barriers.
48. Genes of the region that regulate the transfer of T-DNA of T<sub>1</sub> plasmid into the plant cell is-
- exo C region.
  - vir region.
  - cho region.
  - exo locus.
49. GENIE is a software developed for gene prediction in-
- Humans and drosophila.
  - Only humans.
  - Arabidopsis.
  - Only Prokaryotes.
50. Antibodies that function as enzymes are called-
- Ribozymes.
  - Extremozymes.
  - Abzymes.
  - Synzymes.
51. LIGAND is a database search tool that allows -
- Access to literature.
  - Search for combination of enzymes and metabolic enzymes.
  - Access to information on homologous genes.
  - Alignment of sequences.
52. The copy number of some plasmids may be increased by addition of which of these to the culture medium-
- Antibiotic Chloramphenicol.
  - Initiation factor.
  - Elongation factor.
  - All the above.
53. Cloned genes can be obtained as single stranded DNA by using-
- BAC.
  - pUC19.
  - YEpl.
  - M13 filamentous phage.
54. Infection of bacterial cells by bacteriophage Lamda can be detected by-
- The bacteria now resists an antibiotic.
  - A single colony grows on the agar plate.
  - Plaques or lysed cells appear on the plate.
  - Digestion of Bacterial DNA by R.E.
55. A test used to detect allergic reactions-
- RFLP.
  - AFLP.
  - RAST.
  - MAST.
56. During protein synthesis in prokaryotes a Purine rich tract in mRNA, 10 bp upstream of start codon which helps to align ribosomes to AUG is called- -
- Kozak sequence..
  - Shine Dalgarno sequence.
  - Promoter sequence.
  - Anti Shine Dalgarno sequence.
57. Database KEGG has information on –
- Mitochondrial DNA sequences.
  - Metabolic pathways of many microbes.
  - Nucleotide sequences of immunologically important genes.
  - cDNA sequences.
58. The most rapid and convenient immunological assay for transgenic proteins is-
- ELISA.
  - Immunoblotting.
  - Radio immunoprecipitation.
  - Immunohistochemical staining of tissue sections.
59. Which of the following is a source of enzyme Bromelain-
- Figs.
  - Calf pancreas.
  - Papaya.
  - Pineapple stem.
60. Defined set of procedures to be applied for large scale production of microbial products-
- Down stream processing.
  - Scale up.
  - Upstream processing.
  - Fermentation.
61. Baffles are-
- Used like paddles to stir medium.
  - Perforated plate at the bottom of the fermenter to bubble air.
  - A rectangular metal strip on the side of the fermenter to increase turbulence.
  - A type of filter.
62. In a microbial culture the growth stage best suited for the production of secondary metabolites is-
- Lag.
  - Log.
  - Stationary.
  - Death.
63. The amino acid which lacks an alpha Amino group and gives yellow colour with ninhydrin-
- Histidine.
  - Proline.
  - Glycine.
  - Valine.
64. RNA interference is the silencing of specific gene expression in a cell by introducing synthetic strands of-
- DS DNA.
  - SSDNA.
  - DS RNA.
  - SSRNA.
65. In GM plants the transgene expression is not affected by gene silencing when it is integrated into-
- Mitochondrial genome.
  - Chloroplast genome.
  - Nuclear Genome.
  - All the above.
66. If a bacterial cell lacked Restriction Modification system-
- The cell will not be able to replicate its DNA.
  - Unlimited number of recombinant plasmids would be formed..
  - The cell will become pathogenic..
  - The cell will be easily infected and lysed by viruses.
67. Pollen grains are able to tolerate extremes of temperature and desiccation as its exine is made of-
- Sporopollenin.
  - Suberin.
  - Cutin.
  - Callose.
68. A 2N female plant cell is crossed with a 4N male..The ploidy of the endosperm is-
- Tetraploid.
  - Triploid.
  - Pentaploid.
  - Diploid.
69. Denitrification is carried out by-
- Nitrosomonas.
  - Nitrobacter.
  - Nitrococcus.
  - Pseudomonas.
70. Two animal cells are connected by-
- Desmosomes.
  - Plasmodesmata.
  - Plasma membrane.
  - Cell wall.
71. Nissil granules in a nerve cell are now identified as-
- Cell membrane.
  - Fat granules.
  - Rough ER with free Ribosomes.
  - Mitochondria.
72. In Sangers method of DNA sequencing which of the following molecule acts as a chain terminator-
- 2'-dNTPs.
  - 3'- dNTPs.
  - 2'-5'-ddNTPs.
  - 2'-3'- ddNTPs.
73. MALDI is-
- A database search tool.
  - Technique to ionize gaseous protein molecules for mass spectrometry.
  - A buffer solution.
  - Technique of protein sequencing.
74. The three important amino acids in the Active site of enzyme Chymotrypsin are-
- His57,asp102,ser195.
  - His75,asp195,ser105.
  - His57,asp195,ser102.
  - His195,asp75,ser102.
75. In rDNA experiments to prevent relegation of restricted vector DNA, enzyme Alkaline phosphatase-
- Adds a phosphate gp to 5'end of vector DNA.
  - Removes a phosphate gp from 5'end of vector DNA.
  - Adds a phosphate gp to 5'end of vector DNA only in the absense of an alkali.
  - None of the above.

76. The vector which has two types of ori sites one that functions in eukaryotic cells and the other in E.coli is-
- YE<sub>p</sub>.
  - pUC19.
  - pBR322.
  - Cosmid.
77. In which microbial culture the nutrients are supplied at a rate volumetrically equal to that at which cells and product are removed and the culture can be maintained at steady state for long-
- Batch culture.
  - Fed batch culture.
  - Continuous culture.
  - Perfusion culture.
78. Recombinant Insulin was expressed in E.coli. No insulin was isolated from the clear broth from the fermenter. It is because-
- The insulin gene was not expressed.
  - The E.coli cell could not splice the insulin introns.
  - Insulin is an intracellular microbial product the cell pellet should be examined.
  - All the above are correct.
79. In a bacterial culture the initial cell concentration is  $10^8$  cells/ml. After 2 hours it is  $10^{12}$  cells/ml. The specific growth rate of the culture is-
- $4.606 \text{ hr}^{-1}$ .
  - $4.606 \text{ hr}$ .
  - $0.4606 \text{ hr}$ .
  - $46.06 \text{ min}$ .
80. Secondary metabolites are best produced by root or shoot culture and not by transgenic plants as-
- Production of most Secondary metabolites requires manipulation of more than one gene so it is difficult to genetically modify them.
  - Secondary metabolites are commercially not so important that expensive rDNA technique should be used for them.
  - Secondary metabolites can not be expressed in GM plants at all.
  - All the above are false.
81. During photosynthesis the ultimate source of reductant for  $\text{CO}_2$  assimilation is-
- NADPH.
  - NADH.
  - $\text{FADH}_2$ .
  - $\text{H}_2\text{O}$ .
82. Mouse in which a specific gene is made non functional by targeted gene transfer is known as-
- Chimeric mouse.
  - Knockout mouse.
  - Interspecific hybrid mouse.
  - Non of the above.
83. Which of the following type of grafted organ is rejected most vigorously in humans-
- Autograft.
  - Isograft.
  - Allograft.
  - Xenograft.
84. Athletes are banned from using a hormone like recombinant protein which regulates proliferation and differentiation of progenitor cells into erythroblasts-The protein is-
- Factor VIII.
  - EPO.
  - t-PA.
  - OKT3.
85. Addition of which of the following prevents freezing of cell water in cryopreserved animal cells-
- Dimethyl sulfoxide.
  - Calf blood serum.
  - Phenol red.
  - $\text{NaHCO}_3$ .
86. To prevent desiccation of embryos in somatic seeds the embryos are encapsulated in-
- Calcium carbonate.
  - Calcium alginate.
  - Calcium sulphate.
  - Dextran beads.
87. Which of the following is not produced by plants in response to abiotic stresses-
- Osmolytes.
  - LEA proteins.
  - Phytoalexins.
  - Dehydrins.
88. In a type of apomixis called adventitive embryony, the embryos develop directly from –
- Nucellus or integument.
  - Zygote.
  - Synergids or antipodals of the embryo sac.
  - Accessory embryo sacs in the ovule.
89. Hairy roots are induced by transforming plant cells with-
- Agrobacterium tumifaciens.
  - Phytophthora infestans.
  - Alternaria solani.
  - Agrobacterium rhizogenes
90. Plant cells containing nucleus of one species and cytoplasm of both parental species are called-
- Asymmetric hybrids.
  - Somatic embryos.
  - Plasmogens.
  - Cybrids.
91. The molecule that absorbs light energy and changes it into chemical energy is-
- Xanthophyll.
  - Chlorophyll a.
  - Chlorophyll b.
  - Chlorophyll c.
92. Expressed sequence tags (ESTs) are short sequences obtained from :-
- The ends of DNA.
  - The ends of cDNA.
  - 3'end of mRNA.
  - 5'end of mRNA.
93.  $\text{C}_4$  plants use 5 ATP/ $\text{CO}_2$  fixed during photosynthesis.  $\text{C}_3$  plants use 3 ATP/ $\text{CO}_2$ . Still  $\text{C}_4$  plants show better growth rate because-
- OAA is the first product of  $\text{CO}_2$  fixation.
  - They grow mainly in tropical regions.
  - $\text{CO}_2$  is transported to Bundle sheath cells as Malate.
  - They show minimal photo respiratory losses.
94. The restriction enzymes *Tai* I and *Mae* II are neoschizomers because-
- They both recognize 4 bp sequences.
  - They cut at different positions within the same recognition sequences.
  - They both act as dimers.
  - They both recognize within a palindromic DNA sequence.
95. A molecule of Haemoglobin is subjected to gel electrophoresis under the effect of SDS. Number of bands that would appear at the end of the process are-
- 1.
  - 2.
  - 3.
  - 4.
96. At the end of Sanger's technique an autoradiograph of DNA sequencing gel is obtained. The DNA sequence read from the anodic to cathodic end of the gel is-ATGCTAGC. The sequence of the strand to be sequenced is-
- 3'TACGATGC 5'.
  - 5'GCTAGCAT 3'.
  - 3'ATGCTAGC 5'.
  - 5'ATGCTAGC 3'.
97. The phase of cell cycle which involves doubling up of amount of DNA but the number of chromosomes remain unchanged is-
- G1.
  - M.
  - S.
  - No such phase is seen in cell division.
98. A mRNA is 666 nucleotides long including the initiation and termination codons. The number of Amino acids in protein translated from this mRNA is-
- 221.
  - 222.
  - 220.
  - 333.
99. An enzyme made up of proteins and RNA elongates chromosomes by adding TTAGGG sequences to the ends of existing chromosomes is-
- RNA Polymerase.
  - Exonuclease.
  - Isomerase.
  - Telomerase.
100. The National culture collection of India called MTCC is located at-
- Chandigarh.
  - Mumbai.
  - New Delhi.
  - Banglore.