Section – B
Biotechnology

Max. Marks 100

Roll No. (In figures)_____

Roll No. (In words)_____

Signature of the candidate _____

Signatures of invigilators. 1. _____ 2._____

Attempt all 50 questions, each question carries 02 marks. There is no negative marking. Please mark the correct answer as A/B/C/D at appropriate place, on the right hand side of the question, in blue or black.

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1. Bacterial genomes is prevented by its own endonucleases by-
   (A) Methylation at restriction sites
   (B) Immune mechanism
   (C) Nuclease resistant genome
   (D) Are not much effective on bacterial genome

   [ ]

2. The difference which distinguish prokaryotic cell from eukaryotic is-
   (A) ER
   (B) Mesosome
   (C) Nuclear Membrane
   (D) Plasma membrane

   [ ]

3. Holiday junction is observed during:
   (A) Mitosis
   (B) Interphase
   (C) Recombination
   (D) DNA Repair

   [ ]

4. Presence of AIDS virus cannot be detected by-
   (A) ELISA
   (B) Western blotting
   (C) Northern Blot
   (D) Assay of full-length ds DNA [ ]

5. Which part of translational modification of proteins does not occur in lumen of ER
   (A) Glycosylation
   (B) Ubiquitnation
   (C) Conformation folding & formation of quaternary structure

(D) Formation of Disulphide bonds [ ]

6. Which one of the following is correct for structure of cell wall of fungi and Bacteria?
   (A) Both have glycopeptides
   (B) Both are made up of N-acetylglucasamine
   (C) Both are made up of murin
   (D) Both are made up of chitin [ ]

7. Among the following which is true cell according cell theory-
   (A) Virus
   (B) Monerans
   (C) Protestans
   (D) Bacteria [ ]

8. The outer part of cytoplasm is usually termed as-
   (A) Plasmasol
   (B) Plasmagel
   (C) Nucleoplasm
   (D) Protoplasm [ ]

9. Polyribosome are seen in-
   (A) Bacteria
   (B) Fungi
   (C) Angiosperms
   (D) Mammals [ ]

10. Which of the following is correct with regard to aneuploidy?
   (A) Inversion
   (B) 2n + 1
   (C) All aneuploid individuals die before birth.
   (D) 4n [ ]

11. Which of the following is an example of a hydrophobic material?
   (A) Paper
   (B) Sugar
   (C) Pasta
   (D) Wax [ ]

12. Among the following which is longest cell-
   (A) Hemp
   (B) Ramie
   (C) Jute
   (D) Nerve fibre [ ]

13. The percentage amount of Integral protein of plasma membrane is-
   (A) 40 %
   (B) 50 %
   (C) 60 %

(D) 70 % [ ]

14. Post translation modification of secretary proteins occurs in:
    (A) RER
    (B) SER
    (C) Mitoco ndria
    (D) Nucleus [ ]

15. How you can separate Gram + ve bacteria from Gram –ve bacteria-
    (A) Presence of Techoic Acid
    (B) Absence of periplasmic Space
    (C) Exotoxin Produced
    (D) All of the above [ ]

16. Number of antigen functional binding site in human Immunoglobin-M are-
    (A) 2
    (B) 5
    (C) 10
    (D) 20 [ ]

17. Lymphokines that recruit the macrophages for Phagocytosis are secreted by-
    (A) T-cells
    (B) B-cells
    (C) Complement system
    (D) MHC [ ]

18. Which among the following act as bridge between cell mediated and humoral immunity-
    (A) T-cytoxic cells
    (B) T-suppressor cells
    (C) B-cells
    (D) T-helper cells [ ]

19. A researcher made an interesting observation about a protein made by the rough ER and eventually used to build a cell's plasma membrane. The protein in the membrane was actually slightly different from the protein made in the ER. The protein was probably changed in the
    (A) Golgi apparatus.
    (B) Smooth ER.
    (C) Mitochondrion.
    (D) Nucleus. [ ]

20. Mark the incorrect statement: Ribozyme and Abzyme are
    (A) Both enzymes
    (B) Both proteins
    (C) RNA and protein respectively
    (D) Able to hydrolyse phosphodiester and peptide bonds respectively [ ]

21. DNA sequencing is done on a sequencing gel, which is
    (A) SDS-PAGE
    (B) Urea-PAGE

(C) Native PAGE
(D) Agarose [ ]

22. Which one of the following electrophoresis dependents least on the charge of the protein?
(A) Free zone capillary electrophoresis
(B) Gel electrophoresis
(C) SDS-polycrylamide gel electrophoresis
(D) Isoelectric focusing [ ]

23. Which one of the following DNA polymerase is essential for both the replication and repair of DNA?
(A) DNA polymerase I
(B) DNA polymerase II
(C) DNA polymerase III
(D) DNA polymerase d [ ]

24. A mixture separated on HPLC gives clearly defined peaks whereas in a manually run column the peaks tend to blend into each other. This is primarily because
(A) The small size of the packing material used in the HPLC column
(B) The better control of flow in HPLC
(C) The use of high pressure in HPLC
(D) The use of better detection systems in HPLC [ ]

25. In an enzyme reaction the reaction velocity becomes more than double when the substrate concentration is doubled. This is possible when the equation governing the kinetics is
(A) Michelis-Menton Kinetics
(B) Micheils-Menton Kinetics with substrate inhibition
(C) Michelis-Menton Kinetics with product inhibition
(D) Hill Equation [ ]

26. Blocking action of enzyme through blocking its active site is
(A) Allosteric inhibition
(B) Feedback inhibition
(C) Competitive inhibition
(D) Non-competitive inhibition [ ]

27. Sodium Dodecyl Sulphate (SDS) is used while separating proteins by polyacrylanide gel electrophoresis because
(A) It helps in solubilization of proteins thereby making it easier to separate
(B) It binds to proteins and confers uniform negative charge density thereby making them move during electrophoresis
(C) Decreases the surface tension of the buffer used for electrophoresis
(D) Stabilizes the proteins
[ ]

28. Kwashiorkor is:
(A) The most common form of protein-calorie malnutrition in the INDIA.
(B) Characterized by a thin, wasted appearance.
(C) An adequate intake of total calories but a specific deficiency of protein.
(D) An adequate intake of total protein but a deficiency of the essential amino acids.
[ ]

29. Enzymes are described as catalysts, which means that they
    (A) Provide activation energy for the reactions they facilitate.
    (B) Change the rate of a reaction without being consumed by the reaction
    (C) Stabilize molecules in the transition state.
    (D) Elevate the EA barrier so the molecules will not spontaneously degrade. [ ]

30. A plot of enzyme velocity against temperature for an enzyme indicates little activity at 0 degrees celsius and 45 degrees celsius, with peak activity at 35 degrees celsius. The most reasonable explanation for the low velocity at 0 degrees celsius is that at this temperature
    (A) The hydrogen bonds that define the enzyme's active site are unstable.
    (B) At low temperatures the substrate becomes an allosteric regulator.
    (C) The enzyme was denatured.
    (D) There is too little activation energy available.
    [ ]

31. Chaperone proteins:
    (A) All require ATP to exert their effect.
    (B) Cleave incorrect disulfide bonds, allowing correct ones to subsequently form.
    (C) Guide the folding of polypeptide chains into patterns that would be thermodynamically unstable without the presence of chaperones.
    (D) Of the hsp70 class are involved in transport of proteins across mitochondrial and endoplasmic reticulum membranes. [ ]

32. Proteins may be separated according to size by:
    (A) Isoelectric focusing.
    (B) Polyacrylamide gel electrophoresis.
    (C) Ion-exchange chromatography
    (D) Molecular exclusion chromatography. [ ]

33. Changes in protein conformation can be detected rapidly by:
    (A) Ultraviolet absorbance spectroscopy.
    (B) Fluorescence emission spectroscopy
    (C) Optical rotatory dispersion.
    (D) All of above. [ ]

34. In all enzymes the active site:
    (A) Contains the substrate-binding site.
    (B) is contiguous with the substrate-binding site in the primary sequence.
    (C) Contains a metal ion as a prosthetic group.
    (D) Contains the amino acid side chains involved in catalyzing the reaction. [ ]

35. The transport system that maintains the Na+ and K+ gradients across the plasma membrane of cells:
    (A) Involves an enzyme that is an atpase.
    (B) Moves Na+ either into or out of the cell.
    (C) Is an electrically neutral system.
    (D) In the membrane, hydrolyzes ATP independently of the movement of Na+ and K+ [ ]

36. In the Cori cycle:
    (A) Only tissues with aerobic metabolism (i.e., mitochondrial o2) are involved.
    (B) A three-carbon compound arising from glycolysis is converted to glucose at the expense of energy from fatty acid oxidation.
    (C) Glucose is converted to pyruvate in anaerobic tissues this pyruvate returns to the liver, where it is converted into glucose.
    (D) The same amount of atp is used in the liver to synthesis glucose as it is released during glycolysis, leading to no net loss on whole-body energy balance. [ ]

37. A common target for antibiotics in bacteria is
    (A) Microsomes
    (B) Mesosomes
    (C) Ribosomes
    (D) None of the above [ ]

38. When a muscle contracts, what is happening to the Ca++ levels inside and outside the cell?
    (A) High amounts of cytosolic Ca++ are released to the extracellular space
    (B) Ion channels open to allow extracellular Ca++ to flow into the cell
    (C) Ca++ from the nucleus is released to the cytoplasm and this triggers contraction.
    (D) Ca++ ions attach stoma and this causes muscle contraction [ ]

39. Which of these integral proteins is an active transporter?
    (A) Kv channel
    (B) GLUT4
    (C) Na/K ATPase
    (D) Aquaporin [ ]

40. Which statement about enzyme catalyzed reactions is NOT true?
    (A) Enzymes form complexes with their substrates.
    (B) enzymes lower the activation energy for chemical reactions.
    (C) Enzymes change the k eq for chemical reactions.
    (D) many enzymes change shape slightly when substrate binds.
    [ ]

41. In Griffith's experiments, a harmless variant of *S. pneumoniae* became pathogenic when mixed with a heat-killed pathogenic variant as a result of
    (A) Conjugation
    (B) Transduction
    (C) Mutation
    (D) Transformation [ ]

42. Chargaff found that for DNA
    (A) The ratio of A to C is close to 1:1 and the ratio of G to T is close to 1:1
    (B) The ratio of A to T is close to 1:1 and the ratio of G to C is close to 1:1
    (C) The ratio of A to G is close to 1:1 and the ratio of T to C is close to 1:1
    (D) A + T = G + C
    [ ]

43. Consider the following processes:

a. Generation of cytotoxic T –cells

b. Stimulation of interferon release

c. Formation of bursin

d. Release of opsin

Which of the above are the functions in mammalian tissues performed by interleukin (T-cell growth factor) which is secreted by certain activated T-Lymphocytes?

(A) a and b only

(B) a and c only

(C) b and c only

(D) c and d only

[ ]

44. Who discovered Polymerase Chain Reaction (PCR) ?

(A) James Watson
(B) David Baltimore
(C) Kary Mullis
(D) F. Crick [ ]

45. A free living nitrogen-fixing *Cyanobacterium* which can also form symbiotic association with the water fern *Azolla* is

(A) Tolypothrix
(B) Chlorella
(C) Nostoc
(D) Anabaena [ ]

46. The initiator codon in eukaryote is-

(A) AUG
(B) GUG
(C) CUG
(D) UUU [ ]

47. 9 + 2 fibrillar arrangement is present in

(A) Bacterial flagella
(B) Bacterial Fimbriae
(C) Eukaryotic flagella
(D) T4 bacteriaophage

[ ]

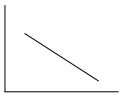
48. Bacterial sporulation is induced in response to

(A) Starvation of nutrients
(B) Change in temperature
(C) Change in pH

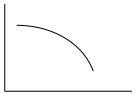
(D) Change in light intensity [ ]

49. When all the original material collected by the author who described a new species, is lost, the specimen designated to serve as nomenclatural type is
    (A) Neotype
    (B) Lecotype
    (C) Isotype
    (D) Holotype [ ]

50. The correct graphical representation of a bacteria growing exponentially under depleting nutrient condition is

(A) 

(B) 

(C) 

(D) 

[ ]