Common Entrance Test 2021
Biotechnology

Total Questions: 70   **Time: 90 Minutes**

There will be no negative marks

1. Which of the following properties is common to all cytoskeletal motor proteins like kinesins, dyneins and myosins?
   a. GTPase activity
   b. ATPase activity
   c. Actin binding domain
   d. DNA binding domain

2. Co-transport of nutrients across the intestinal cell membrane is an active process that can move glucose against concentration gradient. The energy requiring step for co-transport involves:
   a. The Na^+K^+ ATPase that pumps Na^+ from the cell into the lumen of the intestine
   b. The permease that allow glucose and Na^+ into the cell requires ATP
   c. The permease that pumps glucose from the cell into the blood requires ATP
   d. The Na^+Ka^+ ATPase that pumps Na^+ from the cell into the blood, maintaining low Na^+ levels in the cell

3. Which of the following organells is surrounded by a single membrane?
   a. Chloroplast
   b. Mitochondria
   c. Peroxisomes
   d. Nucleus

4. Which of the following is not found inside the eukaryotic nucleus?
   a. Nucleolus
   b. Cajal bodies
   c. PML bodies
   d. Centrosomes

5. Vinblastine, a chemotherapeutic agent, inhibits:
   a. Microtubule polymerization
   b. Microtubule depolymerisation
   c. Spindle formation
   d. Actin polarisation

6. Collagen consists of 3 helical chains containing glycine and proline amino acids in each chain. The overall structure of each polypeptide in the collagen molecule is a:
   a. Polyproline I
   b. Polyproline II
   c. Alpha helix
   d. Polyglycine I

7. Conversion of glucose to glucose-6-phosphate require energy. However, critically ill patient are treated with intra-venous infusion of glucose rather than glucose-6-phosphate because:
   a. Glucose 6-phosphate is unable to enter into the cells
   b. Glucose-6-phosphate is degraded very fast
   c. Exogenous glucose-6-phosphate is toxic to the cells
   d. Exogenous glucose-6-phosphate will competitively inhibit endogenous enzymes

8. Which of the following sets of amino acids are not capable of forming hydrogen bonds through their side chains:
   a. Val, Ile, Phe
   b. Trp, Tyr, His
   c. Ser, Thr, Asn
   d. Arg, Lys, Asp

9. Which of the following is correct for competitive inhibition:
   a. K_m increases, V_{max} constant
   b. K_m decreases, V_{max} constant
   c. K_m Constant, V_{max} increases
   d. K_m decreases, V_{max} increases

10. ETC has a potential to produce highly reactive free radicals that can damage the cells. Which one of the following is useful to prevent oxidative damage in cells?
    a. Superoxide molecule
    b. Glutathione peroxidise
    c. Antimycine A
    d. Rotenone

11. Which of the following is the best approach to detoxify methanol toxicity if a person drinks methanol?
    a. Make the patient drink the glucose water
    b. Intravenous injection with steroid
    c. Make the patient drink ethanol
    d. Make the patient drink lemon juice

12. How does aspirin reduce inflammation?
    a. It oxygenates arachidonate
    b. It acetylase prostaglandins
    c. It inhibit the formation of prostaglandins
    d. It inhibits the formation of archidonate

13. The allowed region in the Ramachandran plot for three residues (alanine, glycine and proline) decreases in the order _____
    a. Pro > Gly > Ala
    b. Gly > Ala > Pro
    c. Ala > Pro > Gly
    d. Gly > Pro = Ala

14. Independently folded functional unit of a protein is called a:
    a. Motif
    b. Fold
    c. Domain
    d. Module

15. Hsp70 chaperons are not present in which among the following organelles?
    a. Endoplasmic reticulam
    b. Golgibodies
    c. Nucleus
    d. Mitochondria

16. Which one of the following modification leads to protein degradation?
    a. Methylation
    b. Acetylation
    c. Phosphorylation
    d. Ubiquitination

17. Telomeric DNA does not contain:
    a. G-rich sequences
    b. Quadruplex
    c. T and D loops
    d. AT rich sequences

18. Which of the following is absent in heterogeneous nuclear RNAs (hnRNAs)?
    a. Intron
    b. Polycistronic coding
    c. Polyadenylation at 3' end
    d. 5' cap structure

19. Which of the following doesn't contribute to protein diversity (variant of the same protein)?
    a. RNA editing
    b. RNA splicing
    c. RNA interference
    d. Alternative initiation of translation

20. The linear and circular forms of the same DNA molecule can be distinguished using:
    a. Absorbance at 260 nm
    b. Endonuclease digestion
    c. Viscosity of the solution
    d. Exonuclease digestion

21. Which of the following occurs in both eukaryotic and bacterial transcription?
    a. 5' Cap
    b. Poly A tail
    c. Promoter
    d. RNA-dependent RNA polymerase

22. Transfer of T-DNA from Ti-plasmid to plant cell is mediated by:
    a. MOB-gene
    b. Nif gene
    c. Vir gene
    d. Octopine gene

23. Gene therapy through stem cells may be performed using:
    a. Lentiviral vector
    b. Plasmid vector
    c. Episomal vector
    d. Baculovirus vector

24. Application of molecular biological technique for commercial production of recombinant products in plants is referred as
    a. Transgenic technology
    b. Biotech crop technology
    c. Molecular farming
    d. Recombinant DNA technology

25. Which of the following is associated with co-dominant marker?
    a. AFLP marker
    b. ISSR marker
    c. RAPD marker
    d. SSR marker

26. Which of the following transgenic crops occupies the largest area in the world?
    a. Herbicide tolerant soybean
    b. Herbicide tolerant maize
    c. Insect tolerant cotton
    d. Insect resistance potato

27. In order to develop iron rich rice which of the following genes was used for creating genetically modified plants?
    a. Ferritin
    b. Phytic acid
    c. Phytic acid and Ferritin
    d. Transferrin and Ferritin

28. Which of the following sequences in double stranded DNA is most likely to be recognized as cutting site for restriction enzyme?
    a. AAGG
       TTCC
    b. AGTC
       TCAG
    c. GGCC
       CCGG
    d. ACCA
       TGGT

29. Nude mice refers to:
    a. Mice without skin
    b. Mice without thymus
    c. Knockout mice
    d. Transgenic mice

30. Protein DNA interactions in vivo can be studied by:
    a. Gel shift assay
    b. Southern hybridization
    c. Chromatin immunoprecipitation assay
    d. Fluorescence insitu hybridization

31. The tertiary structure of protein is detected by:
   a. X-ray diffraction/Crystalography
   b. Spectrometry
   c. Electrophoresis
   d. Chromatography

32. Which is the best annotated database?
   a. Genbank
   b. PDB
   c. Prodom
   d. Swissport

33. The virus inserted in genome can be recognized by:
   a. FISH
   b. Northern blot
   c. Microarray
   d. Southern blot

34. Yeast artificial chromosomes contain which of the following elements?
   a. Centromeres only
   b. Telomeres only
   c. Origin of replication only
   d. Centromers, telomers and origin of replication

35. Which of the following is used to make complementary DNA (cDNA) from RNA?
   a. Restriction enzyme
   b. Gene cloning
   c. DNA ligase
   d. Reverse transcriptase

36. Corona virus consists of:
   a. Double stranded DNA genome
   b. Single stranded DNA genome
   c. Single stranded RNA genome
   d. Circular DNA genome

37. Among the following live vaccine is:
   a. Poliomycites
   b. Small pox
   c. Diptheria
   d. Tetanus

38. Which of the following antibiotics do not affect the cell wall synthesis of bacteria?
    a. Penicillin
    b. Ampicillin
    c. Vancomycin
    d. Isonized

39. Which of the following is a inactivated viral vaccine to treat COVID-19 diseases:
    a. Covishield
    b. Covaccine
    c. Sputnik
    d. AZD- 1222

40. Which of the following is not an antigen presenting cell:
    a. T-lymphocyte
    b. B-lymphocytes
    c. Dendritic cell
    d. Macrophage

41. Virus mediated transfer of cellular genetic material from one bacterial cell to another by means of virus particle is called:
    a. Transduction
    b. Transposition
    c. Transformation
    d. Transfection

42. Sickle cell anemia is an example of single nucleotide polymorphism of:
    a. A to T mutation
    b. T to A mutation
    c. G to C mutation
    d. C to G mutation

43. Hemophilia A, a X-linked bleeding disorder is caused due to the lack of function of a gene for:
    a. Factor VIII
    b. Factor IX
    c. Platelets
    d. Fibrinogen

44. A cross between two true breeding lines one with dark blue flowers and one with bright white flowers produces F1 offspring that are light blue. When the F1 progeny are selfed a 1:2:1 ratio of dark blue to light blue to white flowers is observed, what genetic phenomenon is associated with these results?
    a. Epistasis
    b. Incomplete dominance
    c. Co-dominance
    d. Inbreeding depression

45. What is the probability that a male will inherit an X-linked recessive gene from his father?
    a. 0%
    b. 25%
    c. 50%
    d. 100%

46. In the cross AaBbCc x AaBbCc, what is the probability of producing the genotype AABBCC?
    a. 1/4
    b. 1/8
    c. 1/16
    d. 1/64

47. A man of blood group AB marries a woman of blood group A, whose father has blood group O, What different blood groups their children belong to?
    a. A, AB, B
    b. A, AB
    c. AB, O
    d. A, O, B

48. If two heterozygous individuals suffering from an autosomal dominant disorder marry, what is occurrence risk for this disorder in their offspring?
    a. 100%
    b. 75%
    c. 50%
    d. 25%

49. Mitochondria is involved in all of the following except:
    a. ATP production
    b. Apoptosis
    c. TCA cycle
    d. Fatty acid biosynthesis

50. The gene for which of the following would be consider a proto-oncogene?
    a. P^{53}
    b. Rb protein
    c. P^{21}
    d. Ras

51. If a planet existed, whose mass and radius were both half of those of the earth, the acceleration due to gravity at its surface would be
    a. 19.6 ms^{-2}
    b. 4.9 ms^{-2}
    c. 2.45 ms^{-2}
    d. 9.8 ms^{-2}

52. A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at the rate of 10 m/s^2, after what time will it strike ground?
    a. 0.1 s
    b. 1.0 s
    c. 0.2 s
    d. 2.0 s

53. A rocket rises up vertically. What happens to its potential energy?
    a. It initially increases, then decreases
    b. It initially decreases, then increases
    c. It increases till it becomes maximum
    d. It increases

54. One kilowatt is approximately equal to:
    a. 1.34 hp
    b. 1.56 hp
    c. 1.83 hp
    d. 2.50 hp

55. The speed of sound can be found by relation:
    a. $v = ma$
    b. $v = 1/\lambda$
    c. $v = \lambda/v$
    d. $v = v\lambda$

56. Which of the following pairs of gases contains the same number of molecules?
   a. 8 g of O_2 and 22 g of CO_2
   b. 16 g of O_2 and 14 g of N_2
   c. 32 g of O_2 and 32 g of N_2
   d. 28 g of N_2 and 22 g of CO_2

57. The change in energy between a chemical reaction and the surroundings at constant temperature is called:
   a. Enthalpy change
   b. Enthalpy
   c. Enthalpy profile
   d. Dynamic enthalpy

58. The equilibrium constant of a reaction is 300. If the volume of reaction flask is tripled the equilibrium constant is:
   a. 300
   b. 600
   c. 900
   d. 100

59. An α-particle is:
   a. A hydrogen molecule
   b. a helium nucleus
   c. An electron
   d. A proton

60. Which of the following configurations is wrong?
   a. Li(3) = 2,1
   b. O(8) = 2,6
   c. S(16) = 2,6,8
   d. Cl(17) = 2,8,7

61. The median of the data arranged in ascending order 8, 9, 12, 18, (x+2), (x+4), 30, 31, 34, 39 is 24. The value of x is:
   a. 20
   b. 11
   c. 22
   d. 24

62. In a frequency distribution, the mid-value of class is 17.5 and the width of class is 3. The lower limit of the class is:

    a. 16

    b. 14.5

    c. 19

    d. 20.5

63. If the mean of five observations x, x+4, x+8, x+12 and x+16 is 15, then the value of x is:

    a. 5

    b. 6

    c. 7

    d. 8

64. In a survey of 364 children aged 19-36 months, it was found that 91 liked to eat potato chips. If a child is selected at random, the probability that he/she does not like to eat potato chips is:

    a. 0.25

    b. 0.50

    c. 0.75

    d. 0.80

65. The correlation coefficient computed for two parameters measured in 200 patients is r = 0.429. This means that:

    a. The two parameters are directly correlated, and the link is weak

    b. The two parameters are inversely correlated, and the link is strong

    c. The two parameters are directly correlated, and the link is strong

    d. We do not trust this coefficient's value

66. If $x = 2 + \sqrt{3}$, then $x^2 + \frac{1}{x^2}$ equals:

    a. 14

    b. 4

    c. $\left(2 + \sqrt{3}\right)^2$

    d. None of these

67. The perpendicular distance of the point M (3, 10) from y-axis is:

    a. 3

    b. 10

    c. 7

    d. 13

68. The radius of a wire is decreased to one-third. If the volume remain same, the length of wire becomes:
    a. 2 times
    b. 3 times
    c. 6 times
    d. 9 times

69. The graph of the equation x = y:
    a. Is parallel to x-axis
    b. Is parallel to y-axis
    c. Passes through the origin
    d. Coincides with y-axis

70. The edge of a cube is 20 cm. Number of small cubes of 5 cm edge that can be formed from this cube are:
    a. 100
    b. 64
    c. 32
    d. 4