PH March Exam (4) 72

Ph.D. Science.
Molecular Biology.

Con. 3193-12.

KK-4157

(3 Hours)

[Total Marks : 100

28/04/2012.

N.B. (1) **Section I** consists of **40** multiple choice objective type questions **(all** are **compulsory)**
(2) Attempt any **three** from **Section II.**
(3) Attempt any **two** from **Section III.**

Section I (40 marks)

1. Which cytoskeletal fibres are most likely the nuclear lamins :–
   (a) microtubules
   (b) microfilament
   (c) intermediate filament
   (d) actomyosin.

2. In mammalian cells, centromere DNA is characteristic of–
   (a) facultative heterochromatin
   (b) constitutive heterochromatin
   (c) euchromatin
   (d) depressed chromatin.

3. Which of the following statement about histones is false–
   (a) histones are very similar between species
   (b) histones have many basic amino acids
   (c) histones are rich in arginine and lysine
   (d) each histone has one single gene that codes for it.

4. If 30% nucleotide bases in human DNA is adenine then what is the percentage of guanine bases in human DNA ?
   (a) 20% (b) 30% (c) 40% (d) 70%.

5. Ribosomes are made up of how many subunits ?
   (a) 0 (they are whole) (b) 2 (c) 3 (d) 4.

6. Ribosomes are found–
   (a) only in nucleus
   (b) in the cytoplasm
   (c) attached to smooth ER
   (d) only in eukaryotic cells.

7. Terminal chiasmata are characteristics of–
   (a) anaphase I (b) prophase I
   (c) prophase II (d) metaphase I.

8. Unlike gamets body cells are called as–
   (a) somatic cells (b) semantic cells
   (c) sematic cells (d) synergitic cells.

9. A monosaccharide without D and L isomer is—
   (a) Ribose (b) Deoxyribose
   (c) Erythrose (d) Dihydroxyacetone.

10. The lipid content of chylomicron is–
    (a) 45% (b) 75% (c) 90% (d) 99%.

11. Which of the following is not a basic amino acid–
    (a) Lysine (b) Leucine
    (c) Arginine (d) Histidine.

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12. Different forms of isoenzyme of an enzyme have the same –
    (a) amino acid sequence (b) michaelis constant
    (c) catalytic activity (d) all of the above.

13. Which of the following is not an aromatic amino acid–
    (a) Tyrosine (b) Tryptophan
    (c) Phenylalanine (d) Isoleucine.

14. The metal ion present in carboxypeptidase is–
    (a) Iron (b) Magnesium
    (c) Zinc (d) Copper.

15. The antibodies of the Ig G class are–
    (a) glycoproteins (b) lipoproteins
    (c) glycolipids (d) None of the above.

16. The role of kidney in excretory system of mammals is –
    (a) To remove salt from the body and to keep water in the body
    (b) To remove water from the body and to keep salt in the body
    (c) To remove nitrogenous waste from the body and to maintain water level in the body
    (d) To remove water from the body and to maintain levels of nitrogenous substances in the body.

17. Compare to the charge and mass of a proton, an electron has –
    (a) Same charge and a smaller mass
    (b) Same charge and same mass
    (c) Spposite charge and a smaller mass
    (d) Opposite charge and same mass.

18. A battery consist of which type of cells ?
    (a) electrolytic (b) electrochemical
    (c) electroplating (d) electromagnetic.

19. Upon losing a proton, a Bronsted acid becomes –
    (a) highly reactive (b) its conjugate acid
    (c) its conjugate base (d) a hydronium ion.

20. The Gibb's free energy, ΔG is negative for –
    (a) The exergonic process (b) endergonic process
    (c) temperature dependant process (d) None of the above.

21. The unit of current is–
    (a) Ohm (b) Watt
    (c) Ampere (d) None of the above.

22. Light travels at the fastest speed in–
    (a) glass (b) water
    (c) hydrogen (d) vacuum.

23. Paper chromatography is an example of–
    (a) adsorption chromatography
    (b) partition chromatography
    (c) ion exchange chromatography
    (d) affinity chromatography.

24. One use of regression line is to determine–
    (a) if any X-values are outliers
    (b) if change in X causes a change in Y
    (c) if any Y-values are outliers
    (d) to estimate the change in Y for a one unit change in X.

25. Name one technique for describing groups on a quantitative variables–
    (a) Chi-square (b) percentage
    (c) t-test for proportions (d) frequency polygon.

26. The male hormone testosterone is produced by–
    (a) Leydig cells (b) Epididymis
    (c) Seminiferous tubules (d) Vas deferens.

27. The pollen transferred to the stigma of the same flower called as–
    (a) allogamy (b) autogamy
    (c) cross pollination (d) double fertilization.

28. In Mendel's F 2 generation, one out of four plants had white flowers because–
    (a) the trait is sex linked
    (b) both parents were heterozygous purple
    (c) one parent was homozygous recessive
    (d) both parents were heterozygous white.

29. On which of the following chromosomes are sex linked traits carried ?
    (a) 13 (b) 18 (c) Y (d) X

30. Which of the following represents a dihybrid ?
    (a) WW Ss (b) Ww SS (c) Ww Ss (d) WW SS.

31. 60 s ribosomal subunit contains all the following except–
    (a) 5 S rRNA (b) 5·8 S rRNA (c) 18 S rRNA (d) 28 S rRNA.

32. Codons are present in–
    (a) Template strand of DNA (b) mRNA
    (c) tRNA (d) rRNA.

33. Ten base pairs are present in one turn of the helix in–
    (a) A–DNA (b) B–DNA
    (c) C–DNA (d) Z–DNA.

34. Polymerase Chain Reaction technique is based on–
    (a) DNA translation (b) DNA transcription
    (c) DNA replication (d) DNA repair.

35. The class of restriction enzyme used in cloning technique is–
    (a) Type I (b) Type II
    (c) Type III (d) All of the above.

36. Transcription of Eukaryotic DNA is carried out in presence of–
    (a) Sigma factor (b) Transcription factor
    (c) RNA polymerase (d) Transcription factors and RNA polymerase.

37. Bar body is a–
    (a) Euchromatin (b) Heterochromatin
    (c) Facultative heterochromatin (d) None of the above.

38. The number of nucleotides in a tRNA is–
    (a) 25 (b) 50 (c) 75 (d) 200.

39. Down's syndrome is caused due to–
    (a) Single point mutation (b) Non disjunction
    (c) Deletion (d) Inversion.

40. Tryptophan operon has a special regulatory region called as–
    (a) Operator (b) Attuator
    (c) Promoter (d) Leader.

Section II

2. Write briefly on any **three** :– 30
    (a) Thermodynamics Laws and its biological importance
    (b) Structure and functions of chloroplast
    (c) Photoelectric effect
    (d) Regulation of body fluids
    (e) Electrophoresis.

Section III

3. Write an essay on the Molecular Biology of development and differentiation. 15

4. Describe molecular and cellular basis of immunity. 15

5. The mechanism of enzyme catalysis with suitable examples. 15

6. Explain in detail recombinant DNA technology and its importance to the society. 15
