5. One byte equals.....?

(A) 4 bits

(B) 8 bits

(C) 12 bits

(D) 16 bits

6. Molarity of 4% solution of sodium hydroxide solution is :

(A) 0.1 M

(B) 0.5 M

(C) 0.01 M

(D) 1.0 M

7. The difference between dipole-dipole forces and hydrogen bonds are that :

(A) Dipole-dipole forces only exist between non-polar molecules

(B) Dipole-dipole forces occur between polar molecules

(C) Dipole-dipole forces are caused by the interaction of partial charges on both molecules

(D) None of the above are able to distinguish between dipole-dipole forces and hydrogen bonds

8. Which of the following bonds would show the strongest absorption in the Infra Red ?

(A) Carbon-hydrogen

(B) Oxygen-hydrogen

(C) Nitrogen-hydrogen

(D) Sulfur-hydrogen

9. Which of the following compounds is the strongest Brönsted base ?

(A) H_2PO^{4-}

(B) HSO^{4-}

(C) NO^{3-}

(D) CH_3COO^-

10. A homozygous, Rh-positive man (RR) marries an Rh-negative (rr) woman. Their first child is normal, but their second child has hemolytic disease (Rh disease). The first child did not have hemolytic disease because :

(A) The child was heterozygous (Rr)

(B) The child lacked Rh antigens

(C) Anti-Rh antibodies were induced only after the birth of the first child

(D) Anti-Rh antibodies present in the mother were destroyed by the immune system of the first child

11. Mendel's law of segregation, as applied to the behavior of chromosomes in meiosis, means that :

(A) Pairing of homologs will convert one allele into the other, leading to separation of the types

(B) Alleles of a gene separate from each other when homologs separate in meiosis I, or in meiosis II if there is a single crossover between the gene and the centromere

(C) Genes on the same chromosome will show 50% recombination

(D) Alleles of a gene will be linked and passed on together through meiosis

12. With respect to human height, the production of short individuals by two average-sized parents is best explained by :

(A) Mutation

(B) Sex linkage

(C) Polygenic inheritance

(D) Discontinuous variation

13. A balanced polymorphism may be maintained by all the following, *except* :

(A) Natural selection

(B) Directional selection

(C) Heterozygote advantage

(D) Frequency dependent selection

14. Members of which of the following groups *cannot* generate their own ATP ?

(A) Lichens

(B) Bacteria

(C) Viruses

(D) Protozoa

15. In vascular plants DNA is contained in which of the following ?

I. Nucleus

II. Chloroplast

III. Mitochondrion

(A) I only

(B) I and II only

(C) I and III only

(D) I, II and III

16. A retroviral genome possesses complete information for the synthesis of the following components, *except* :

(A) Viral matrix

(B) Viral capsid

(C) Viral envelope

(D) Receptor binding machinery

17. How do virus-infected cells help other cells resist viruses ?

(A) By producing antimicrobial proteins called complement

(B) By producing proteins called interferon

(C) By producing proteins called viricide

(D) By producing histamine

18. Antibiotic penicillin acts by :

(A) Acting on plasma membrane of prokaryotic cell

(B) Inhibiting the synthesis of NAM and NAG units

(C) Inhibiting the cross linking of peptidoglycan strands

(D) All of the above

19. A water-soluble globular protein is most likely to have the highest proportion of which of the following amino acid residues buried in its core ?

(A) Serine

(B) Glycine

(C) Glutamate

(D) Isoleucine

20. Which of the following would yield more energy when catabolized to pyruvate ?

(A) Glucose

(B) Glucose 1-phosphate

(C) Fructose

(D) Phospho-enol pyruvate

21. Which of the following *does not* contribute to tertiary structure ?

(A) The 'hydrophobic effect', driving non-polar residues to the interior

(B) The ability of water to solubilize uncharged, polar side groups

(C) The ability of water to solubilize charged side groups

(D) The presence at the extreme ends of the protein chain of an ionizable carboxylic acid (C-terminus) and an ionizable amino group (N-terminus)

22. Which of the following types of information *cannot* be determined from the traditional northern blotting technique ?

(A) The size of an *m*-RNA species

(B) Relative abundance of the *m*-RNA species

(C) The half life of an *m*-RNA species

(D) None of the above

23. A protein in an SDS PAGE gel moves slower than the expected molecular weight. If the protein is not post-translationally modified then the behaviour is most likely due to :

(A) Denaturation

(B) Excessive charge

(C) Fatty acylation

(D) Multimerization

24. Beta Adrenergic receptors are located in :

(A) Heart muscle

(B) Parasympathetic nervous system

(C) Postganglionic neurones of the autonomic nervous system

(D) Autonomic ganglia

25. Approximately, how much blood flows directly through the atria into the venticles even before the atria contract ?

(A) 40%—50%

(B) 20%—30%

(C) 70%—80%

(D) The atria must contract for blood to flow

26. The exchange of gases between the lungs and lung capillaries is called :

(A) Internal respiration

(B) External respiration

(C) Ventilation

(D) Breathing

27. When the osmolality of the blood increases :

(A) ADH secretion is decreased in response

(B) Blood volume tends to increase in response

(C) Both occur

(D) Neither occur

28. The nucleotide sequence at the 3' end of a *t*-RNA molecule specific to codon GAG would be :

(A) CUC

(B) CTC

(C) GAG

(D) ACC

29. Which of the following is *not* a post-translational modification ?

(A) Adenylation

(B) Glycosylation

(C) Phosphorylation

(D) Palmitoylation

30. Which of the following is *not* a cis element ?

(A) Promoter

(B) Operator

(C) Repressor

(D) Enhancer

31. What product of the immune system attaches to bacteria, making them easier to be eaten by white blood cells ?

(A) Hemoglobin

(B) Antibody

(C) Antigen

(D) None of the above

32. Plasmid vectors for cloning :

(A) can generally accommodate larger inserts than phage vectors can

(B) grow within bacteria and are present in bacterial colonies on an agar plate

(C) include centromeres to allow propagation in yeast

(D) burst bacteria and form plaques on a 'lawn' of bacteria

33. Which of the following is required for the cell cycle progression ?

(A) Cdk and cyclin

(B) Cdk alone

(C) Cyclin alone

(D) None of the above

34. If the first number of an enzyme in classification is 4, then it belongs to the :

(A) Ligases

(B) Oxidoreductases

(C) *Lyases*

(D) Transferases

35. On a Line-Weaver Burk plot which of the following shows increase in slope with increased inhibitor concentration ?

(A) Competitive inhibition

(B) Uncompetitive inhibition

(C) Non-competitive inhibition

(D) Both (A) and (C)

36. α-ketoglutarate + enzyme-NH_2 $\leftrightarrow$ Enzyme + glutamate is an example of :

(A) Transamination reaction

(B) Oxidative deamination reaction

(C) Both (A) and (B)

(D) None of the above

37. Rho factor is required for :

(A) Transcription initiation

(B) Replication initiation

(C) Transcription termination

(D) Replication termination

38. DNA solutions "A" absorbs 40% higher at all wave lengths than solution "B", it indicates :

(A) DNA in solution A is stable

(B) DNA in solution B is denatured

(C) DNA in solution A is denatured

(D) DNA in both solutions are denatured

39. One explanation for the partial suppression of glucose-dependent insulin release seen in type II diabetes mellitus is that :

(A) Pancreatic cells lose their muscarinic receptors

(B) Insulin is not processed normally, remaining in the proinsulin form

(C) Type II diabetes is characterized by peripheral tissue resistance to insulin only with pancreatic insulin release being normal

(D) The GLUT-2 glucose transporter may be under expressed in pancreatic beta cells.

40. Which of the following is *not* a feature of cancerous cell ?

(A) Aneuploidy

(B) Change in cytoskeleton

(C) Decrease in motility

(D) None of the above

41. Which of the following statements is *true* about nucleic acids ?

(A) DNA and RNA are isomers because they have the same elemental composition

(B) Uracil and thymine are pyrimidines with each containing two hexagonal rings

(C) The sugar phosphate backbone is held together with hydrogen bonds

(D) None of the above

42. Which of the following is *not* true about SRP (signal recognition particle) ?

(A) It contains 7s RNA

(B) It determines the destination of proteins

(C) It causes a temporary halt on translation

(D) None of the above

43. Electrons entering the mitochondria via the glycerol phosphate shuttle enter the electron transport chain at the level of :

(A) Coenzyme Q

(B) NADH dehydrogenase at the beginning of Complex I

(C) Cytochrome *b* at the beginning of Complex III

(D) Cytochrome *c*

44. Recoverin acts to 'reset' the visual cycle after a light burst by :

(A) Promoting conversion of GTP into cGMP via guanylyl cyclase

(B) Closing a calcium channel in the cell membrane

(C) Converting all-trans retinal to 11-cis retinal

(D) Phosphorylating metarhodopsin

45. Which of the following statements about the plasmalemma (cell surface membrane) is *true* ?

(A) It allows free and unlimited movement of essential molecules into and out of the cytoplasm

(B) Glycolipids and glycoproteins are biological markers which act as antibodies to destory foreign antigens

(C) It sometimes contains cholesterol which is thought to affect the fluidity of membrane

(D) All of the above

46. Which of the following statements about photosynthesis is *correct* ?

(A) The first stable product of the light-independent reaction is glycerate 3-phosphate

(B) Photolysis take place in the light-dependent stage

(C) Water supplies electrons for non-cyclic photophosphorylation

(D) All of the above

47. Which enzyme is responsible for the production of uric acid ?

(A) Xanthine oxidase

(B) Nucleoside triphosphate pyrophosphohydrolase

(C) Hypoxanthine-guanine phosphoribosyltransferase

(D) PRPP synthetase

48. Which of the following is *not* a cardiac marker ?

(A) CPK

(B) LDH

(C) Troponin T

(D) None of the above

49. The following are all associated with the transport of cabron dioxide by blood, *except* :

(A) Carbaminohaemoglobin

(B) Carboxyhaemoglobin

(C) Carbonic anhydrase

(D) Chloride shift

50. Injury in response to an intramuscular injection can lead to the elevation of which of the following in the blood ?

(A) Phosphocreatine kinase

(B) Myosin light chain kinase

(C) Alkaline phosphatase

(D) None of the above

51. Which of the following statements is *true* about BMR (Basal Metabolic Rate) ?

(A) Male and female have equal BMR

(B) Children have higher BMR

(C) BMR is higher in malnutrition

(D) All of the above

52. The intake of which foodstuff results in greatest SDA (Specific Dynamic Action) ?

(A) Carbohydrates

(B) Fats

(C) Proteins

(D) Vitamins

53. Smooth endoplasmic reticulum is *not* involved in :

(A) Sequestering of Ca^{2+}

(B) Detoxification of various organic compounds

(C) Release of glucose from glucose-6-phosphate in liver

(D) None of the above

54. Shine Delgarno sequence is :

(A) Present on *r*-RNA and rich in purine nucleotides

(B) Present on *m*-RNA and rich in pyrimidine nucleotides

(C) Present on *t*-RNA and rich in purine nucleotides

(D) Present on *m*-RNA and rich in purine nucleotides

55. Which of the following is an autoimmune disorder ?

(A) Rheumatoid arthritis

(B) Gout

(C) Jaundice

(D) All of the above

56. Curve plotted between formation of double-stranded DNA against time of incubation and DNA denaturation is called :

(A) Tm curve

(B) Cot curve

(C) Hyperchromic curve

(D) None of the above

57. Which of the following is *not* a genetic disorder ?

(A) Gaucher disease

(B) Nieman-Pick disease

(C) Burkit lymphoma

(D) Goiter

58. Homoserine despite being an amino acid is *not* preferred substrate for protein formation because :

(A) It would form serine-homoserine adducts

(B) It would lead to cleavage of a peptide bond

(C) It is highly hydrophobic

(D) It is highly susceptible to proteolytic cleavage

59. Reaction between carbohydrates and phenyl hydrazine leads to the formation of osazone, this is a :

(A) Nucleophilic addition

(B) Nucleophilic substitution

(C) Electrophilic addition

(D) None of the above

60. A compound containing ceramide and phosphocholine attached to terminal CH_2OH is called :

(A) Cerebroside

(B) Ganglioside

(C) Cholesterol

(D) Sphingomyelin