Sr. No. 401

ENTRANCE TEST-2024

SCHOOL OF BIOLOGICAL SCIENCES

CLINICAL BIOCHEMISTRY

Question Booklet Series **A**

Total Questions : **60**
Time Allowed : **70 Minutes**

Roll No. : | | | | | | |

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SEAL

1. Which of the following is not a mucopolysaccharide ?
   (A) Heparin
   (B) Chondrotin sulphate
   (C) Hyaluronic acid
   (D) Inulin

2. The total DNA comprises of what amount of cytoplasmic DNA in cells ?
   (A) 95-99%
   (B) 65-75%
   (C) 45-50%
   (D) 1-5%

3. Cobalt containing vitamin is :
   (A) Vitamin B_2
   (B) Vitamin B_6
   (C) Vitamin B_{12}
   (D) Vitamin B_6

4. Which of the following is not a factor responsible for denaturation of Proteins ?
   (A) pH change
   (B) Organic solvents
   (C) Heat
   (D) Charge

5. The coenzyme is :
   (A) Often a metal
   (B) Always a protein
   (C) Often a vitamin
   (D) Always an organic compound

6. Blocking of enzyme action by blocking its active sites is :
   (A) Allosteric Inhibition
   (B) Feedback Inhibition
   (C) Competitive Inhibition
   (D) Non-competitive Inhibition

7. Specificity of protein in enzyme action depends upon :
   (A) Active sites
   (B) Km constant
   (C) Linear sequence of amino acids
   (D) Turn over number

8. Enzymes exist in the cells as :
   (A) Solution
   (B) Crystals
   (C) Solids
   (D) Colloids

9. Which of the following will yield glucose on hydrolysis ?
   (A) Sucrose
   (B) Lactose
   (C) Maltose
   (D) Raffinose

10. All the following are true about Phenylketonuria except :
   (A) Deficiency of phenylalanine hyrdroxylase
   (B) Mental retardation
   (C) Increased urinary excretion of P-hydroxy-phenyl pyruvic acid
   (D) Decreased serotonin formation

11. Protein anabolism is stimulated by :
   (A) ACTH
   (B) Testosterone
   (C) Glycogen
   (D) Epinephrine

12. Lipids play a crucial role in the formation of myelin, which is essential for :
   (A) Muscle contraction
   (B) Nerve impulse transmission
   (C) Blood clotting
   (D) Bone growth

13. Which of the phase of mitosis is longest ?
    (A) Telophase
    (B) Anaphase
    (C) Metaphase
    (D) Prophase
14. What is true about peroxisomes ?
    (A) Double membranous
    (B) Oxidase synthesizes H_2O_2
    (C) Catalase breakdown H_2O_2
    (D) Both (B) and (C)
15. All the following substances pass through cell membrane except :
    (A) O_2
    (B) H_2O
    (C) CO_2
    (D) H^+
16. Which cell organelle is present in both prokaryotic and eukaryotic cell ?
    (A) Endoplasmic reticulum
    (B) Mitochondria
    (C) Ribosomes
    (D) All of the above
17. Photochemical reaction occurs in :
    (A) The plasma membrane of green plants
    (B) The membrane of lysosomes
    (C) The outer membrane of mitochondria
    (D) The thylakoid membrane
18. How many ATP molecules are required for the conversion of one N2 to $2NH4^+$ during biological oxidation N_2 fixation ?
    (A) 8 ATP
    (B) 12 ATP
    (C) 10 ATP
    (D) 16 ATP
19. Triple response radical swelling, inhibition of elongation of epicotyl, horizontal growth of epicotyl is shown by dark grown pea seedlings in presence of which plant hormone ?
    (A) Ethylene
    (B) Auxin
    (C) Cytokinin
    (D) Insulin
20. The movement of water and minerals through xylem is explained by the :
    (A) Pressure flow theory
    (B) Translocation theory
    (C) Bulk flow theory
    (D) Cohesion tension theory
21. Independent assortment of genes occurs due to the orientation of chromosome at :
    (A) metaphase of mitosis
    (B) metaphase I of meiosis
    (C) metaphase II of meiosis
    (D) any phase of cell division
22. A normal couple has seven children (2 daughters & 5 sons). Three of the sons suffer from a hereditary disorder but none of the daughters is affected. Which is the inheritance type ?
    (A) Sex limited recessive
    (B) Autosomal dominant
    (C) Sex linked dominant
    (D) Sex linked recessive

23. Match the correct :

P.	Sex linked	1. Baldness
Q.	Sex influenced	2. Acquired immune deficiency syndrome
R.	Sex limited	3. Klinefelter's syndrome
		4. Haemophilia
		5. Tuft of hairs (hypertrichosis on pinna)

(A) P-4, Q- 1, R-5

(B) P-5, Q-3, R-2

(C) P-5, Q-1, R-3

(D) P-4, Q-3, R-2

24. What would be the best term to describe effect of one gene on another in a way that one would hide the effect of another on a phenotype ?

(A) Pleiotropy

(B) Homeostasis

(C) Epistasis

(D) Hyperstasis

25. DNA helicases in E. Coli :

(A) moves in the direction opposite of replication fork

(B) binds with template of the leading strand

(C) is a hexameric protein with ATPase activity

(D) catalyzes formation of primer

26. The Shine-Dalgarno sequence is responsible for :

(A) binding of RNA Polymerase to gene during transcription

(B) binding DNA Polymerase to origin of replication during DNA replication

(C) binding of ribosome to mRNA during intiation of translation

(D) binding of Snurps during splicing

27. Degeneracy of genetic code implies that :

(A) the codons degenerate after the synthesis of polypeptide chain

(B) more than one codon can code for one amino acid

(C) some codons degenerate as they are not involved in coding for any amino acid

(D) one codon can code for more than one amino acid

28. In E. coli which of the following codons are recognized by the release factor RF1 ?

(A) UAG and UGA

(B) UAA and UGG

(C) UAG and UAA

(D) UAG and UUA

29. Which of the following is viral disease ?

(A) Hepatitis

(B) Influenza

(C) Measles

(D) All of the above

30. The Causative agent of Cholera is :

(A) Vibrio cholera

(B) Salmonella Typhi

(C) Bacillus Anthracis

(D) None of the above

31. Viruses which cause lysis of bacteria are known as :

(A) lysogenic

(B) lytic

(C) lipolytic

(D) lysozymes

32. HIV is :
(A) Retrovirus
(B) Single stranded RNA genome
(C) Both (A) and (B)
(D) None of the above

33. Inflammation are characterized by :
(A) Pain
(B) Redness
(C) Swelling
(D) All of the above

34. The antibody present on the surface of mature B-Cell :
(A) IgM
(B) IgG
(C) IgA
(D) None of the above

35. Which immunoglobin is involved in hypersensitivity reactions ?
(A) IgE
(B) IgD
(C) IgA
(D) IgG

36. Thrombosis :
(A) is the flow of blood in arteries or veins is impeded
(B) it cause blockage in the artery and vein
(C) both (A) and (B)
(D) none of the above

37. What is the purpose of using a selectable marker in recombinant DNA technology ?
(A) To mark the location of a specific gene
(B) To facilitate the cloning process
(C) To distinguish recombinant from non-recombinant cells
(D) To induce mutations in the target gene

38. What is the role of a host organism in gene cloning ?
(A) To produce the gene of interest
(B) To provide a suitable environment for gene expression
(C) To act as a template for DNA synthesis
(D) To transport recombinant DNA into other organisms

39. Which of the following statements regarding Ti plasmids is true ?
(A) Ti plasmids are found naturally in plant cells
(B) Ti plasmids primarily induce the formation of leaves in infected plants
(C) Ti plasmids transfer genes responsible for opine synthesis into plant cells
(D) Ti plasmids primarily infect animal cells instead of plant cells

40. Golden Rice is genetically engineered to produce higher levels of which essential nutrient ?
(A) Vitamin C
(B) Iron
(C) Vitamin E
(D) Beta-carotene (provitamin A)

41. In thyroid function tests, what does an elevated level of free thyroxine (FT4) indicate ?
(A) Hyperthyroidism
(B) Hypothyroidism
(C) Euthyroidism
(D) Thyroid cancer

42. What is the significance of an elevated level of serum alkaline phosphatase (ALP) in liver function tests ?
(A) Hepatocellular damage
(B) Cholestasis or obstruction of bile flow
(C) Impaired protein synthesis
(D) Liver cirrhosis

43. Which lipid abnormality is associated with an increased risk of developing atherosclerosis and cardiovascular disease ?

(A) High levels of HDL cholesterol

(B) Low levels of LDL cholesterol

(C) High levels of triglycerides

(D) Normal levels of total cholesterol

44. What is the primary purpose of a glucose tolerance test (GTT) ?

(A) To diagnose diabetes mellitus

(B) To assess pancreatic function

(C) To evaluate kidney function

(D) To monitor glycogen storage disorders

45. What is the function of the mucociliary escalator in the respiratory system ?

(A) Regulation of airflow into the lungs

(B) Exchange of oxygen and carbon dioxide in the alveoli

(C) Removal of foreign particles and pathogens from the airways

(D) Control of respiratory rate and depth

46. What is the primary function of the gall bladder in the digestive system ?

(A) Production of digestive enzymes

(B) Storage and concentration of bile

(C) Absorption of nutrients

(D) Regulation of gastric acid secretion

47. Which of the following hormones stimulates the release of bile from the gall bladder and pancreatic enzymes from the pancreas ?

(A) Gastrin

(B) Secretin

(C) Ghrelin

(D) Insulin

48. Which hormone is produced by the adrenal medulla and is involved in the body's response to stress, regulating heart rate and blood pressure ?

(A) Cortisol

(B) Epinephrine

(C) Aldosterone

(D) Thyroxine

49. The term antibodies was discovered by :

(A) Ehrlich and Metchnikoff

(B) Karl Landsteiner

(C) Emil Von Behring

(D) Louis Pasteur

50. Exogenous antigens bind to which class of MHC molecules ?

(A) MHC-1

(B) MHC-II

(C) MHC-I

(D) All of the above

51. Which of the following represent the antigen presenting cells ?

(A) T cells, Null cells, Macrophages

(B) B cells, Macrophages, Dendritic cells

(C) Natural killer cells, Kuffer cells, Macrophages

(D) B cells, T cells, Natural killer cells

52. β-2 microglobulin is found on which MHC molecule ?

(A) MHC class I

(B) MHC class II

(C) MHC class III

(D) All of the above

53. Which of the following is soluble in water ?

(A) CS_2

(B) C_2H_5OH

(C) CCl_4

(D) $CHCl_3$

54. Hydrogen bonding is maximum in :

(A) ethanol

(B) diethyl ether

(C) ethyl chloride

(D) triethyl amine

55. The molecule which does not exhibit dipole moment is :

(A) NH_3

(B) $CHCl_3$

(C) H_2O

(D) CCl_4

56. Which one of the following is the strongest acid ?

(A) $ClO_3(OH)$

(B) $ClO_2(OH)$

(C) $SO(OH)_2$

(D) $SO_2(OH)_2$

57. Sodium dodecyl sulphate is used to separate proteins by PAGE because :

(A) It increases the solubility of proteins

(B) It gives the uniform negative charge to the proteins

(C) Increases stability of proteins

(D) It decreases the surface tension of the buffer used in electrophoresis

58. The three-dimensional images of the surface of the cells and tissue can be visualized by :

(A) Scanning electron microscope

(B) Fluorescence microscope

(C) Compound microscope

(D) Transmission electron microscope

59. The molecular mass of the smallest molecules unable to penetrate the pores of a gell is called :

(A) Void volume

(B) Exclusion limit

(C) Bed volume

(D) Internal volume

60. The forces that effect the biomolecules to sediment at the bottom of the tube is :

(A) Force of buoyancy

(B) Force of friction

(C) Centrifugal force

(D) All of the above

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1. The SF_4 molecule has which type of geometry ?
   (A) Tetrahedral
   (B) Bent
   (C) See Saw
   (D) T-Shaped
2. The Bond Order of N_2 is
   (A) 2
   (B) 1
   (C) 3
   (D) 2.5
3. What is the pH of a 1.0×10^{-8}M Solution of HCL?
   (A) 5.98
   (B) 6.98
   (C) 6.40
   (D) 5.50
4. For a spontaneous change, total entropy is
   (A) Negative
   (B) Positive
   (C) Zero
   (D) Either positive or negative
5. Which among the following is an example of transport Protein?
   (A) Myosin
   (B) Hemoglobin
   (C) Collagen
   (D) None of these
6. Which among the following shows inversion of configuration when subjected to hydrolysis?
   (A) Glucose
   (B) Galactose
   (C) Sucrose
   (D) Maltose
7. Which one of the following fatty acids is synthesized by the cells in the body from Linoleic acid ?
   (A) Linolenic acid
   (B) Lysgeric acid
   (C) Arachidonic acid
   (D) None of the above
8. Which amino acid is the precursor of Creatinine, heme, bile acids in the body ?
   (A) Tryptophan
   (B) Glycine
   (C) Cysteine
   (D) Alanine
9. Which of the following enzyme classes catalyses the linking of two compounds?
   (A) Transferases
   (B) Hydrolases
   (C) Ligases
   (D) Lyases
10. Which of the following has no effect on simple enzyme activity?
   (A) Substrate concentration
   (B) pH
   (C) Temperature
   (D) Presence of Co-enzymes
11. Which of the following statements is true for enzymatically catalysed reaction?
   (A) Additional substrate molecules are energized to overcome the activation energy of the reaction
   (B) The activation energy of the reaction is lowered so that a larger proportion of the substrate qualifies to overcome it
   (C) The activation energy of the reaction is increased, thus decreasing the likelihood that any substrate molecules will overcome it
   (D) The activation energy of the reaction is lowered so that fewer substrate molecules can overcome it

12. Non-competitive inhibitor of an enzyme catalysed reaction

(A) Decreases Vmax

(B) Binds to Michaelis complex (ES)

(C) Both (A) and (B)

(D) Can actually increase reaction velocity in rare cases

13. Von Geirke's disease occurs due to deficiency of which enzyme ?

(A) Glucose -6-phosphatase

(B) Phosphofructokinase

(C) Phosphorylase

(D) Phosphoglucomutase

14. Transamination of aspartate forms

(A) Pyruvate

(B) Oxaloacetate

(C) Acetyl CoA

(D) Alanine

15. Which organ of the body is mainly affected in Phenylketonuria?

(A) Liver

(B) Kidney

(C) Brain

(D) Heart

16. The BMR of an average man is around:

(A) 5900 KJ

(B) 7100 KJ

(C) 6100 KJ

(D) 5500 KJ

17. Which ribosome is present in the Prokaryotic cell?

(A) 80S

(B) 70S

(C) 50S and 40S

(D) 60S and 30S

18. Peroxisome has a prominent role in the metabolism of

(A) Citric acid cycle

(B) C_3 Pathway

(C) Glyoxylate pathway

(D) Glycolysis

19. Mitochondrial DNA is different from nuclear DNA because of

(A) Being linear

(B) Having A=T and C-G

(C) Lacking histone bodies

(D) None of these

20. In cell membrane, carbohydrates in glycoproteins or glycolipids are oriented:

(A) Towards outside

(B) Towards inside

(C) Towards outside and inside

(D) Randomly distributed

21. What is the basis for the difference in how the leading and lagging strands of DNA molecules are synthesized?

(A) The origins of replication occur only at the 5'end.

(B) Helicases and single-strand binding proteins work at the 5' end.

(C) DNA polymerase can join new nucleotides only to the 3' end of a growing strand.

(D) DNA ligase works only in the 3' S 5' direction.

22. *E. coli* cells grown on ^{15}N medium are transferred to ^{14}N medium and allowed to grow for two more generations (two rounds of DNA replication). DNA extracted from these cells is centrifuged. What density distribution of DNA would you expect in this experiment?

(A) one high-density and one low-density band

(B) one intermediate-density band

(C) one high-density and one intermediate-density band

(D) one low-density and one intermediate-density band

23. The functioning of enhancers is an example of

(A) transcriptional control of gene expression.

(B) a post-transcriptional mechanism to regulate mRNA.

(C) the stimulation of translation by initiation factors.

(D) post-translational control that activates certain proteins.

24. In eukaryotic cells, transcription cannot begin until

(A) the two DNA strands have completely separated and exposed the promoter.

(B) several transcription factors have bound to the promoter.

(C) the 5_ caps are removed from the mRNA.

(D) the DNA introns are removed from the template.

25. Photoautotrophs use

(A) light as an energy source and CO_2 as a carbon source.

(B) light as an energy source and methane as a carbon source.

(C) N_2 as an energy source and CO_2 as a carbon source.

(D) CO_2 as both an energy source and a carbon source.

26. Which of the following statements is *not* true?

(A) Archaea and bacteria have different membrane lipids.

(B) Both archaea and bacteria generally lack membrane enclosed organelles.

(C) The cell walls of archaea lack peptidoglycan.

(D) Only bacteria have histones associated with DNA.

27. Biologists suspect that endosymbiosis gave rise to mitochondria before plastids partly because

(A) The products of photosynthesis could not be metabolized without mitochondrial enzymes.

(B) All eukaryotes have mitochondria (or their remnants), whereas many eukaryotes do not have plastids.

(C) Mitochondrial DNA is less similar to prokaryotic DNA than is plastid DNA.

(D) Without mitochondrial CO_2 production, photosynthesis could not occur.

28. Which of the following involves metabolic cooperation among prokaryotic cells?

(A) Binary fission

(B) Endospore formation

(C) Endotoxin release

(D) Biofilms

29. Fowl cholera in chickens is caused by

(A) Bacillus anthrax

(B) Clostridium tetani

(C) E-coli

(D) Pasteurella multocida

30. The most important attractant released by the invading bacteria and not produced by mammalian cells is

(A) Interleukin-8

(B) Formylated methionine

(C) C5a

(D) All of the above

31. The amino acid which is responsible for producing more flexibility at the hinge region of an antibody is

(A) Glycine

(B) Tyrosine

(C) Tryptophan

(D) Proline

32. The proteins that participate in formation of alternative pathway of complementary system are

(A) C1, C4, C2, C3

(B) C2, C5, C7, C3

(C) C3, factor B, factor D, Properdin

(D) None of the above

33. Independent assortment occurs when homologous chromosomes are

(A) Uniformly segregated into different gametes

(B) Randomly segregated into different gametes

(C) Uniformly segregated into same gametes

(D) Randomly segregated into same gametes

34. Which one is not an example of Mendelian trait/ disorder in humans?

(A) Phenylketonuria

(B) Thalassemia

(C) Cystic fibrosis

(D) Turner's syndrome

35. Segregation occurs when the homologous chromosomes separate during

(A) Meiotic prophase-I

(B) Meiotic metaphase-I

(C) Meiotic anaphase-I

(D) Meiotic telophase-I

36. Which statement is not true for crossing over ?

(A) It increases variability by forming new gene combinations

(B) It involves non-sister chromatids of homologous chromosomes

(C) It reduces variability by forming new gene combinations

(D) It leads to separation of linked genes

37. Which of the following gene is not essential for creating golden rice ?

(A) Phytoene synthase

(B) Zeta carotene desaturase

(C) Lycopene-beta-cyclase

(D) Phytoene desaturase

38. The non-autonomous controlling element reported in maize by Barbara Mc Clintock was

(A) Ac element

(B) Ds element

(C) L1 element

(D) All of the above

39. Which of the following Vir genes form a transfer apparatus for T-DNA export from bacteria into the plant cell ?

(A) Vir B complex and Vir D4

(B) Vir G and Vir A

(C) Vir D4 and Vir D2

(D) Vir C1 and Vir A

40. RNase H
    (A) Cleaves and digests RNA
    (B) Cleaves and digests the RNA-DNA heteroduplex
    (C) Cleaves single stranded DNA and RNA
    (D) Removes nucleotides from 5 end of DNA and RNA

41. Caraway method is used for the estimation of
    (A) Blood Urea
    (B) Serum Creatinine
    (C) Serum Urea
    (D) Serum Uric acid

42. Deficiency of enzyme glucose-6-phosphate dehydrogenase results in
    (A) Thalasemia
    (B) Sickle cell anemia
    (C) Hemolytic anemia
    (D) Megaloblastic anemia

43. The over production of Bilirubin beyond the ability of liver to conjugate is known as
    (A) Hepatic Jaundice
    (B) Post Hepatic Jaundice
    (C) Hemolytic Jaundice
    (D) All of the above

44. Bence Jonas protein are found in 40% cases of
    (A) Arthritis
    (B) Gout
    (C) Multiple myeloma
    (D) Injury

45. Which of the following compounds are produced by Normal endothelium that inhibits platelet aggregation ?
    (A) Prostacyclin and nitric-oxide
    (B) Collagen and thromboxane
    (C) Thromboxane and ADP
    (D) Platelet phospholipid

46. Blood is
    (A) Ectodermal in origin
    (B) Mesodermal in origin
    (C) Endodermal in origin
    (D) None of the above

47. Pernicious anaemia develops because of
    (A) Folic acid deficiency
    (B) Iron deficiency
    (C) Inability to absorb vitamin B12
    (D) All of the above

48. Which of the following are features of chronic inflammation ?
    1. Occurs for few months to several years
    2. Instant response
    3. Involves mast cells, macrophages and other granulocytes
    4. Release of chemical compounds like histamine, prostaglandins, leukotrienes
    5. Involves cytokines and antibodies
    6. T and B cells are involved
    (A) 1, 3, 6
    (B) 2, 3, 4, 6
    (C) 1, 3, 4, 5
    (D) 1, 5, 6

49. Which of the following respiratory systems does not have a close relationship with a blood supply?
    (A) The tracheal system of an insect
    (B) The lungs of a vertebrate
    (C) The gills of a fish
    (D) The skin of an earthworm

50. Growth factors are local regulators that
    (A) Are produced by the anterior pituitary.
    (B) Bind to cell-surface receptors and stimulate growth and development of target cells.
    (C) Are modified fatty acids that stimulate bone and cartilage growth.
    (D) Are found on the surface of cancer cells and stimulate abnormal cell division.

51. Steroid and peptide hormones typically have in common

(A) Their requirement for travel through the bloodstream.

(B) The building blocks from which they are synthesized.

(C) Their solubility in cell membranes.

(D) The location of their receptors.

52. The trachea and oesophagus of mammals are both connected to the

(A) Large intestine.

(B) Pharynx.

(C) Stomach.

(D) Rectum.

53. To facilitate chromatographic separation, the composition of mobile phase may be gradually changed with respect to

(A) pH

(B) Salt concentration

(C) Polarity

(D) All of the above

54. In absorption chromatography, adsorption equilibrium is between

(A) Stationary solid ion exchanger and mobile liquid electrolyte phase

(B) Stationary liquid phase and a mobile liquid or gas phase

(C) Stationary solid phase and a mobile liquid phase

(D) Stationary immobilized ligand and a mobile liquid phase

55. A 7.5% polyacrylamide gel is used to separate proteins ranging between

(A) 60-20kd

(B) 30-120kd

(C) 15-45kd

(D) 12-30kd

56. In centrifugation, angular velocity(◗) is calculated by the equation

A. $\omega = \frac{4\pi^2 (\text{rev.min}^{-1})^2 \text{ r}}{3600 \times 981}$

B. $\omega = \frac{2\pi \text{ rev.min}^{-1}}{60}$

C. $\omega = \frac{4\pi^2 (\text{rev.min}^{-1})^2 \text{ r}}{60 \times 981}$

D. $\omega = \frac{2\pi \text{ rev.min}^{-1}}{3600}$

57. Alpha-linolenic acid is the precursor of the plant hormone

(A) Cytokinin

(B) Jasmonic acid

(C) Strigolactones

(D) Ethylene option

58. The prosthetic group/groups present in subunits of enzyme nitrate reductase

(A) NAD, FAD, Ca

(B) FAD, Mn, Mo

(C) FAD, heme, pterin

(D) cyt-b557, NAD, FAD

59. High carbon dioxide compensation point is found in

(A) C4 plants

(B) C3 plants

(C) CAM plants

(D) None of the above

60. Which one of the following plant hormones use two component histidine kinase receptor system for signal transduction ?

(A) Auxin

(B) Cytokinin

(C) Gibberellin

(D) Abscisic acid

ROUGH WORK

Sr. No. 049

ENTRANCE TEST-2022

SCHOOL OF BIOLOGICAL SCIENCES

CLINICAL BIOCHEMISTRY

Question Booklet Series A

Total Questions : 60
Time Allowed : 70 Minutes

Roll No. : | | | | | | |

Instructions for Candidates :

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
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5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.
6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.
7. There will be **'Negative Marking'** for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.
8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.
9. Do not make any stray mark on the OMR sheet.
10. Calculators and mobiles shall not be permitted inside the examination hall.
11. Rough work, if any, should be done on the blank sheets provided with the question booklet.
12. OMR Answer Sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.
13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/ herself.
14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

SEAL

1. Which of the following compound contains both ionic and covalent bonds ?
   (A) Methane
   (B) Hydrogen
   (C) Potassium cyanide
   (D) Potassium chloride

2. The substance that can act as both oxidizing as well as reducing agent is :
   (A) $NaNO_3$
   (B) $NaNO_2$
   (C) $Na_2S_2O_3$
   (D) Na_2O_2

3. Which one of the following interactions is the weak and non-specific attractive force ?
   (A) Ionic interactions
   (B) Hydrophobic interactions
   (C) Covalent interactions
   (D) van der Waals interactions

4. The amino acid that has the largest number of rotatable bonds in side chain is :
   (A) Tyrosine
   (B) Proline
   (C) Histidine
   (D) Lysine

5. Which of the following are called non-sugars ?
   (A) Polysaccharides
   (B) Disaccharides
   (C) Monosaccharides
   (D) Oligosaccharides

6. The carboxyl group of each fatty acid is joined to glycerol through a :
   (A) Hydrogen bond
   (B) Covalent bond
   (C) Ionic bond
   (D) van der Waals interactions

7. The deficiency of vitamins that are responsible for causing scurvy and pellagra are :
   (A) Ascorbic acid and Riboflavin
   (B) Ascorbic acid and Thiamine
   (C) Ascorbic acid and Niacin
   (D) Pantothenic acid and Niacin

8. The complete biologically active conjugated enzyme is called :
   (A) Holoenzyme
   (B) Coenzyme
   (C) Simple enzyme
   (D) Apoenzyme

9. Enzymes are sensitive to pH. This pH dependence is due to :
   (A) The structure of the active site
   (B) The structure of the enzyme
   (C) Presence of the charged amino acids at the active site
   (D) Shape and size of the enzyme

10. The inhibitor that binds only to the enzyme substrate complex is called :
   (A) Competitive inhibitor
   (B) Non-Competitive inhibitor
   (C) Un-Competitive inhibitor
   (D) None of the above

11. Number of CO_2 and NADH molecules released during the Krebs cycle is :
   (A) 3 CO_2 and 2 NADH
   (B) 2 CO_2 and 3 NADH
   (C) 1 CO_2 and 2 NADH
   (D) 1 CO_2 and 3 NADH

12. Hemolytic anemia is caused by the deficiency of which of the following enzymes ?
    (A) Glucose-6-phosphate dehydrogenase
    (B) 6-phosphogluconate dehydrogenase
    (C) α-ketoglutarate dehydrogenase
    (D) Succinate dehydrogenase

13. β-oxidation of palmitic acid (16 carbons) is
    Palmitoyl COA + 7COA + 7FAD + 7NAD + $7H_2O \rightarrow$
    For the oxidation of this 16-carbon atom fatty acid, the complete reaction is :
    (A) 6 acetyl COA + $7FADH_2$ + 7NADH + $7H_2O$
    (B) 8 acetyl COA + $7FADH_2$ + 8NADH + $8H_2O$
    (C) 8 acetyl COA + $7FADH_2$ + 7NADH
    (D) 8 acetyl COA + $7FADH_2$ + 7NADH + $6H_2O$

14. The enzyme that is deficient in children having Lesch-Nyhan Syndrome is :
    (A) Hypoxanthine-guanine phosphoribosyl-transferase
    (B) Adenine phosphoribosyl transferase
    (C) Purine nucleoside phosphorylase
    (D) Ribonucleotide reductase

15. The modern cell theory includes :
    (A) That the cell is the structural and functional unit of life
    (B) That all cells arise from the pre-existing cells
    (C) Energy flow occurs within cells and all the known living things are made up of one or more cells
    (D) All of the above

16. Which one of the following glucose transporters is present on the erythrocyte membrane ?
    (A) GLUT-1
    (B) GLUT-2
    (C) GLUT-3
    (D) GLUT-5

17. The signal sequence of the protein is cleaved by a signal peptidase in which of the following cell organelles ?
    (A) Golgi apparatus
    (B) Cytosol
    (C) Endoplasm Reticulum lumen
    (D) Mitochondria

18. The stage at which the kinetochore spindle fibers pull the two kinetochores towards the opposite poles is
    (A) Metaphase
    (B) Prophase
    (C) Telophase
    (D) Anaphase

19. The major features of B-form of DNA are :
    (A) The two long polynucleotide stands are coiled around a central axis
    (B) Both the strands are wrapped in a right handed helix
    (C) The strands are antiparallel
    (D) None of the above

20. The enzyme that is primarily utilized for DNA repairing and filling of gaps during replication and repair process is :
    (A) DNA polymerase I
    (B) DNA polymerase II
    (C) DNA polymerase III
    (D) All of the above

21. In bacterial promoter, the -10 and -35 regions has a consensus sequence of :
(A) TTTAC, TTGATA
(B) TTCCAA, TTCGAA
(C) TATAAT, TTGACA
(D) TTGGCA, CCGGCG

22. The Shine Dalgarno sequence is complementary to a region at the 3′ end of :
(A) 28SrRNA
(B) 16SrRNA
(C) 23SrRNA
(D) 5SrRNA

23. The characteristic features of prokaryotic organisms are :
(A) The true membrane bound nucleus is absent
(B) DNA complexed with histones is absent
(C) Mitosis and meiosis absent
(D) All of the above

24. Peptidoglycan is a polymer containing two sugar derivates N-acetylglucosamine and N-acetylmuramic acid that are joined through :
(A) α-1,4 glycosidic bond
(B) β-1,4 glycosidic bond
(C) β-1,6 glycosidic bond
(D) α-1,6 glycosidic bond

25. The nature of nucleic acid in coronavirus is :
(A) dsDNA
(B) dsRNA
(C) ssRNA
(D) ssDNA

26. Puromycin an antibiotic inhibits protein synthesis by binding to :
(A) A site of ribosome
(B) P site of ribosome
(C) E site of ribosome
(D) None of the above

27. The term antibodies was given by
(A) Ehrlich and Metchnikoff
(B) Karl Landsteiner
(C) Emil Von Behring
(D) Louis Pasteur

28. Choose the correct match of the following antibodies :

a.	IgA	1.	Basophils
b.	IgE	2.	Heavy chain
c.	IgG	3.	Secretory component
d.	IgM	4.	Pentamer
		5.	Crosses placenta

(A) a-5, b-4, c-3, d-1
(B) a-3, b-1, c-5, d-4
(C) a-2, b-3, c-5, d-1
(D) a-5, b-4, c-1, d-2

29. Exogenous antigens bind to which class of MHC molecules :
(A) MHC-1
(B) MHC-II
(C) MHC-I
(D) All of the above

30. A patient with a disease produces autoantibodies against the acetylcholine receptors present on the motor end plates of muscles is having :
(A) Graves' Disease
(B) Systemic Lupus Erythematosus
(C) Multiple Sclerosis
(D) Myasthenia Gravis

31. Mendal chose the garden pea for his experiments because :

(A) Garden pea is easy to cultivate and short life cycle

(B) Bisexual flowers and discreated characters

(C) Self-fertilization and easy hybridization

(D) All of the above

32. Independent assortment of genes occurs due to the orientation of chromosomes at :

(A) Metaphase of mitosis

(B) Metaphase I of meiosis

(C) Metaphase II of meiosis

(D) All the phases of the cell division

33. Crossing over takes place in which phase of the prophase I stage of meiosis ?

(A) Leptotene

(B) Zygotene

(C) Pachytene

(D) Diplotene

34. The nucleotide sequence in the telomeres of vertebrates is :

(A) CCCTAA

(B) TTTGTT

(C) CCCAGG

(D) TTAGGG

35. The endonuclease which digests ssRNA at the 3′ end of the pyrimidine residues is

(A) RNase A

(B) RNase H

(C) Mung bean nuclease

(D) Si nuclease

36. Choose the correct match of some pharmaceutical recombinant human proteins expressed in transgenic plants :

P. Tobacco and sunflower plant	1. Serum Albumin
Q. Tobacco and potato plant	2. Growth hormone
R. Rice plant	3. Epidermal growth factor
S. Tobacco plant	4. Alpha-interferon

(A) P-4, Q-3, R-2, S-1

(B) P-2, Q-1, R-4, S-3

(C) P-1, Q- 2, R-3, S-4

(D) P-3, Q-2, R-4, S-1

37. Potrykus and Beyer developed genetically engineered rice known as golden rice rich in :

(A) Vitamin D

(B) Vitamin E

(C) Vitamin C

(D) Vitamin A

38. Which of the following techniques are used to transfer DNA into the host cell ?

1. Electroporation
2. Transformation
3. Sonication
4. Transfection

(A) 1, 2, 3 and 4 only

(B) 2, 3 and 4 only

(C) 1 and 2 only

(D) 1, 3 and 4 only

39. The end product of the thylakoid reactions are the high energy compounds in the form of :
(A) ADP and $NADP^+$
(B) ATP and NADPH
(C) ADP and NADPH
(D) ATP and $NADP^+$

40. Photorespiration takes place in which of the three organelles of the plant cell ?
(A) Cytosol, chloroplast, mitochondria
(B) Golgi apparatus, chloroplast, mitochondria
(C) Chloroplast, peroxisomes, mitochondria
(D) None of the above

41. The correct sequence for the linear electron flow in plants is :
(A) PSII, cytochrome b6f complex and PSI
(B) PSI, PSII and cytochrome b6f complex
(C) PSI, cytochrome b6f complex and PSII
(D) Cytochrome b6f complex, PSII and PSI

42. The amino acid methionine is the precursor of which of the following plant hormones ?
(A) Gibberellins
(B) Abscisic acid
(C) Cytokines
(D) Ethylene

43. Sodium dodecyl sulphate is used to separate proteins by PAGE because :
(A) It increases the solubility of proteins
(B) It gives the uniform negative charge to the proteins
(C) Increases stability of proteins
(D) It decreases the surface tension of the buffer used in electrophoresis

44. The three-dimensional images of the surface of the cells and tissue can be visualized by :
(A) Scanning electron microscope
(B) Fluorescence microscope
(C) Compound microscope
(D) Transmission electron microscope

45. The molecular mass of the smallest molecules unable to penetrate the pores of a cell is called :
(A) Void volume
(B) Exclusion limit
(C) Bed volume
(D) Internal volume

46. The forces that effect the biomolecules to sediment at the bottom of the tube is :
(A) Force of buoyancy
(B) Force of friction
(C) Centrifugal force
(D) All of the above

47. Which nephron process is the least selective ?
(A) Reabsorption
(B) Active transport
(C) Salt pumping by the loop of Henle
(D) Filtration

48. Which of the following is not an accurate statement ?
(A) Hormones are chemical messengers that travel to target cells through the circulatory system
(B) Hormones are secreted by specialized cells usually located in endocrine glands
(C) Hormones of the same chemical class usually have the same function
(D) Hormones often regulate homeostasis through antagonistic functions

49. The primary chemical stimulus for breathing is the concentration of :
(A) Carbon monoxide in the blood
(B) Carbon dioxide in the blood
(C) Oxygen in the blood
(D) Carbonic acid in the blood

50. Which of the following is not a primary activity of the stomach ?
(A) Mechanical digestion
(B) Nutrient absorption
(C) Enzyme secretion
(D) Mucus secretion

51. Thyroid hormone's metabolic role includes :
(A) Decreased oxygen consumption
(B) Increased lipogenesis
(C) Increased Lipolysis
(D) Protein Anabolism

52. Which of the following does not describe a thyroid hormone's metabolic function ?
(A) Glycogenolysis
(B) Gluconeogenesis
(C) Glucose oxidation
(D) Glycogenesis

53. The black colour of urine is caused by the presence of :
(A) Inflammation
(B) Creatinine
(C) Alkaptonuria
(D) Pus cells

54. OGTT test is more sensitive than fasting blood sugar and :
(A) Random blood sugar
(B) Serum protein
(C) Hba1c
(D) Serum protein

55. Which of the following statements is not true?
(A) An antigen can have different epitopes
(B) An antibody has more than one antigen-binding site
(C) A pathogen makes more than one antigen
(D) A lymphocyte has receptors for multiple different antigens

56. Following emigration from blood vessels, leucocyte migration to the site of infection or injury is mediated by :
(A) Prostaglandins
(B) Histamine
(C) Bradykinin
(D) Chemokines

57. Regarding Chronic inflammation, which is correct ?
(A) It is characterised by hyperaemia, oedema, and leukocyte infiltration
(B) Monocytes use the same chemotactic pathways as neutrophils
(C) It is always preceded by acute inflammation
(D) Most frequently results in resolution

58. Which of the following is a sign of inflammation ?
(A) Calor
(B) Dolor
(C) Rubor
(D) All of the above

59. V_{max} decreases and K_m remains constant is an example of :
(A) Competitive inhibition
(B) Uncompetitive inhibition
(C) Non-competitive inhibition
(D) None of the above

60. The molecule which does not exhibit dipole moment is :
(A) NH_3
(B) $CHCl_3$
(C) H_2O
(D) CCl_4

Sr. No. 365

ENTRANCE TEST-2020

SCHOOL OF BIOLOGICAL SCIENCES

CLINICAL BIOCHEMISTRY

Total Questions : 60
Time Allowed : 70 Minutes

Question Booklet Series A

Roll No. : | | | | | | |

Instructions for Candidates :

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
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1. What is the fundamental difference between matter and energy ?

(A) Matter is cycled through ecosystems; energy is not

(B) Energy is cycled through ecosystems; matter is not

(C) Energy can be converted into matter; matter can't be converted into energy

(D) Matter can be converted into energy; energy can not be converted into matter

2. Concentrated aqueous sulphuric acid is 98% H_2SO_4 by mass and has a density of 1.80 $g.mL^{-1}$. Volume of acid required to make 1 litre of 0.1 M H_2SO_4 solution is :

(A) 5.55 mL

(B) 11.10 mL

(C) 16.65 mL

(D) 22.20 mL

3. Where is the RAM located ?

(A) Expansion Board

(B) External Drive

(C) Mother Board

(D) All of the above

4. The de-Broglie wavelength 'λ' of a particle :

(A) is proportional to mass

(B) is proportional to impulse

(C) is inversely proportional to impulse

(D) does not depend on impulse

5. Probability sampling is otherwise called :

(A) Multiple choice

(B) Uni-variate Analysis

(C) Random Sampling

(D) Bi-variate Analysis

6. The correlation coefficient computed for two parameters measured in 429 patients is r = 0.829. This means that :

(A) The two parameters are directly correlated, and the link is weak -r is positive and close to 0

(B) The two parameters are inversely correlated, and the link is strong -r is negative and close to 1

(C) The two parameters are directly correlated, and the link is strong -r is positive and close to 1

(D) There are too few cases (< 30) and we do not trust this coefficient's value

7. The distribution of test statistic used in median test is :

(A) Binomial

(B) Normal

(C) t-Test

(D) Chi-Square

SEAL

8. If the linear trend is present in the population then which of the following methods is the most efficient sampling technique ?

(A) Cluster sampling

(B) Systematic sampling

(C) Stratified sampling

(D) Simple random sampling

9. During exercise stimulation of TCA cycle results principally from which of the following ?

(A) Allosteric activation of isocitrate dehydrogenase by increased NADH

(B) A rapid decrease in concentration of four carbon intermediates

(C) Product inhibition of citrate synthase

(D) Stimulation of flux through a number of enzymes by decreased NADH/NAD+ ratio

10. The ability of hemoglobin to serve as an effective transporter of oxygen and carbon dioxide between lungs and tissues is explained by which of the following properties ?

(A) The isolated heme group with ferrous iron binds oxygen much more avidly than carbon dioxide

(B) The α- and β-globin chains of hemoglobin have very different primary structures than myoglobin

(C) Hemoglobin utilizes oxidized ferric iron to bind oxygen, in contrast to the ferrous ion of myoglobin

(D) In contrast to myoglobin, hemoglobin exhibits greater changes in secondary and tertiary structure after oxygen binding

11. A term infant is born at home and does well with breast-feeding. Two days later, the mother calls frantically because the baby is bleeding from the umbilical cord and nostrils. The most likely cause is :

(A) Deficiency of vitamin C due to a citrus-poor diet during pregnancy

(B) Hypervitaminosis A due to ingestion of beef liver during pregnancy

(C) Deficiency of vitamin K because infant intestines are sterile

(D) Deficiency of vitamin E due to maternal malabsorption during pregnancy

12. The vitreous humor of eye is composed of :

(A) Heparin

(B) Hyaluronic acid

(C) Keratan sulfate

(D) Dermatan sulfate

13. In competitive inhibition :

(A) K_m is decreased and V_{max} is increased

(B) K_m is increased and V_{max} is increased

(C) K_m is decreased and V_{max} is normal

(D) K_m is increased and V_{max} is normal

14. The enzyme :

(A) Decreases the energy of activation

(B) Increases the equilibrium constant

(C) Increases total energy of activation

(D) Increases total energy of the product

15. Allosteric enzymes show all the following characteristics, except :

(A) Substrate binding site and regulatory site are different

(B) Sigmoid kinetics

(C) Binding between substrate and regulatory sites

(D) Cooperative binding of the substrate

16. What is an Isozyme ?

(A) Same structure, different function

(B) Different structure, the same function

(C) Same structure, the same function

(D) Different structure, different function

17. A segment of B-DNA encodes an enzyme of molecular mass 50kDa. The estimated length of this segment in μm would be :

(A) 0.1547

(B) 0.1547×10^{-3}

(C) 0.4641

(D) 0.4641×10^{-3}

18. Prokaryotic cells have a specialized material with them called as :

(A) Peptidoglycan/murein

(B) Pectin

(C) Peptidoglucose

(D) Peptidoaminose

19. Nuclear DNA replicates in the :

(A) G2 phase

(B) M phase

(C) S phase

(D) None of the above

20. 'Micrographia' is the most famous work on discovery of the cell which was given by :

(A) Robert Hook

(B) Lorenz Oaken

(C) Theodor Schwann

(D) F. Miescher

21. A child with tall stature, loose joints, and detached retinas is found to have a mutation in type II collagen. Recall that collagen consists of a repeating tripeptide motif where the first amino acid of each tripeptide is the same. Which of the following amino acids is the recurring amino acid most likely to be altered in mutations that distort collagen molecules ?

(A) Glycine

(B) Hydroxyproline

(C) Hydroxylysine

(D) Tyrosine

22. A woman was told by her physician to go down on a low fat diet. She decided to continue to consume the same number of calories by increasing her carbohydrate intake while decreasing her fat intake. Which of the following blood lipoprotein levels would be decreased as a consequence of her diet ?

(A) IDL

(B) VLDL

(C) HDL

(D) Chylomicrons

SEAL

23. A 42-year-old male patient undergoing radiation therapy for prostate cancer develops severe pain in the metatarsal phalangeal joint of his right big toe. Monosodiumurate crystals are detected by polarized light microscopy in fluid obtained from this joint by arthrocentesis. Uric acid crystals are present in his urine. This patient's pain is directly caused by the overproduction of the end product of which of the following metabolic pathways ?

(A) De novo pyrimidine biosynthesis

(B) De novo purine biosynthesis

(C) Purine salvage

(D) Purine degradation

24. What is the outcome of the accumulation of acetyl-CoA in the mitochondria of the liver ?

(A) It is used as an energy source

(B) It has broken down into free fatty acids

(C) It gets converted to oxaloacetate

(D) If forms ketone bodies

25. A solution contains DNA polymerase I and the Mg^{2+} salts of dATP, dGTP, dCTP, and TTP. The following DNA molecules are added to aliquots of this solution. Which of them would lead to DNA synthesis ?

(A) A single-stranded closed circle containing 1000 nucleotide units

(B) A double-stranded closed circle containing 1000 nucleotide pairs

(C) A single-stranded closed circle of 1000 nucleotides base-paired to a linear strand of 500 nucleotides with a free 3 -OH terminus

(D) A double-stranded linear molecule of 1000 nucleotide pairs with a free 3 -OH group at each end

26. During each cycle of chain elongation in translation, how many conformational changes does ribosome undergo that are coupled to GTP hydrolysis ?

(A) Zero

(B) One

(C) Two

(D) Three

27. Telomerase, an RNA-protein complex which completes the replication of telomeres during DNA synthesis, is a specialized :

(A) RNA dependent DNA polymerase

(B) DNA dependent DNA polymerase

(C) DNA dependent RNA polymerase

(D) RNA dependent RNA polymerase

28. The genome of a typical bacterium contains about 5×10^6 base pairs and can be replicated in about 41 minutes. The human geonome is 600x larger (3×10^9 base pairs) and at the rate of a bacterium would require 300 hours to be replicated; yet the entire human genome can be replicated within several hours. How is this possible ?

(A) Eukaryotic DNA is simpler to replicate than prokaryotic DNA

(B) Human DNA polymerase work much faster than those of prokaryotes

(C) The nucleosomes of eukaryotic DNA allow for faster DNA replication

(D) Human DNA contains more origins of replication than prokaryotic DNA

29. *Listeria monocytogenes* is frequently a food borne pathogen because :

(A) It can survive at 4 degree C

(B) It survives under conditions of low pH

(C) It survives in the presence of high salt concentration

(D) All of the above are correct

30. Most bacteria require vitamins as :

(A) Growth Factors

(B) Sources of energy

(C) Sources of carbon

(D) Sources of electron donors

31. Which of the following statements is correct ?

(A) Lipopolysaccharide is part of the cell wall of *Escherichia coli*

(B) Cholera toxin is attached to the flagella of *Vibrio cholerae*

(C) The lecithinase of clostridium perfringens causes diarrhea

(D) Toxic shock syndrome toxin-1 is produced by hemolytic strains of *Staphylococcus epidermidis*

32. Which one of the following microorganisms can be part of the normal vaginal flora and cause meningitis in newborns ?

(A) *Candida albicans*

(B) *Corynebacterium species*

(C) Group B *streptococci*

(D) *Staphylococcus epidermidis*

33. A plasma cell secretes :

(A) Antibody of a single specificity related to that on the surface of the parent B-cell

(B) Antibody of two antigen specificities

(C) The antigen it recognizes

(D) Many different types of antibody

34. Which of the following tests could be positive in 'window period' of HIV infection ?

(A) HIV ELISA

(B) Western Blot Assay

(C) HIV protein p24 Assay

(D) None of the above

35. A human volunteer agrees to be passively sensitized with IgE specific for a ragweed antigen (allergen). When challenged with the allergen intradermally, he displayed a typical skin reaction due to an immediate hypersensitivity reaction. If the injection with sensitizing IgE was preceded by an injection (at the same site) of Fc fragments of human IgE and then followed by intradermal injection with allergen, which of the following outcomes would you predict ?

(A) No reaction would occur because the Fc fragments would interact with the allergen and prevent it from gaining access to the sensitized mast cells

(B) No reaction would occur because the Fc fragments would interact with the IgE antibodies making their antigen-binding sites unavailable for binding to antigen

(C) No reaction would occur because the Fc fragments would interact with Fc receptors on mast cells

(D) The reaction would be exacerbated due to the increased local concentration of IgE Fc fragments

36. Which of the following is a non-organ-specific (systemic) autoimmune disease ?

(A) Myasthenia gravis

(B) Systemic Lupus erythematosus (SLE)

(C) Hashimoto's thyroiditis

(D) Insulin-dependent diabetes mellitus

37. In drosophila (fruit flies), eye color is sex-linked and red eye color is dominant to white eye color. Which of the following are not possible in a cross between a red-eyed male and a heterozygous female ?

(A) Red-eyed male

(B) White-eyed male

(C) Carrier female

(D) Homozygous white-eyed female

38. Which of the following factors could lead to variations in the offspring of asexually reproducing organisms ?

(A) Crossing over

(B) Fertilization

(C) Mutation

(D) Independent assortment

39. Long radishes crossed with round radishes result in all oval radishes. This type of inheritance is :

(A) Multiple alleles

(B) Complete dominance

(C) Co-dominance

(D) Incomplete dominance

40. With respect to the 'tails' of histone molecule which of the following is not true ?

(A) N-Terminal extension

(B) Lacks defined structure

(C) Required for the association of nucleosome

(D) Sites for extensive modification

41. A beta globin cDNA can be used for cloning of *E.coli*, whereas the chromosomal gene for beta-globin can not be. Why ?

(A) Bacterial RNA polymerase can not transcribe introns

(B) Bacteria do not have machinery for splicing of mRNA

(C) The hairpin loops block the ribosomes during translation

(D) Bacteria can not process proteins to their proper size

42. A pharmaceutical firm is interested in the bacterial production of thymidylate synthase in large quantities for drug-targeting studies. An important step in the overall cloning strategy involves ligation of synthase cDNA into a plasmid vector containing a replication origin, an antibiotic resistance gene, and a promoter sequence. Which additional nucleotide sequence should be included in this vector to ensure optimal production of the thymidylate synthase ?

(A) Operator sequence

(B) Poly Asequence

(C) Shine-Dalgarno sequence

(D) Attenuator sequence

43. Pure plasmid DNA was isolated from a bacterium. Restriction enzyme digestion of this plasmid with either BamH 1 or EcoR 1 resulted in two DNA fragments. A double digestion of the same plasmid with both these enzymes resulted in three DNA fragments. From this we can conclude that the isolated plasmid DNA is :

(A) Double stranded and linear

(B) Double stranded and circular

(C) Single stranded and linear

(D) Single stranded and circular

44. Choose the correct statement with respect to the self priming method of cDNA synthesis :

(A) It is less preferred than RNaseH method

(B) A hairpin structure is formed with guarantee

(C) The sequence corresponding to the 5' end is lost

(D) Reverse transcriptase is not used

45. Cytatin C is a marker for :

(A) Glomerular filteration

(B) Proximal tubular function

(C) Distal tubular function

(D) Renin-Angiotensin system

46. Nitric oxide acts through activating :

(A) Membrane bound guanylate cyclase

(B) Soluble guanylate cyclase

(C) Adenylatecyclase

(D) Calcium channels

47. Which of the following is most suitable for monitoring patients on exogenous thyroxine ?

(A) Total T_3 and T_4

(B) Thyrotropin

(C) Free T_4

(D) Thyroid binding globulin

48. The best liver function test is :

(A) Serum AST/ALT

(B) Serum Alkaline Phosphatase

(C) Serum Bilirubin

(D) INR

49. Approximately 30-60 minutes after being bitten by a "bug", a 28-year-old man noticed a localized swelling and erythema in the affected area. The edema is most likely the result of :

(A) Altered plasma oncotic pressure

(B) Increased arterial hydrostatic pressure

(C) Increased vascular permeability

(D) Lymphatic obstruction

50. Which of the following is the hallmark of acute inflammation ?

(A) Neutrophils

(B) Connective tissue

(C) Macrophages

(D) Granulation tissue

51. Which of the following is TRUE regarding Folic acid deficiency anemia ?

(A) Folate is synthesized in human body

(B) Ingestion of alcohol interferes with absorption of folate

(C) Like vitamin B12 deficiency anemia, folic acid deficiency anemia results in neurological manifestation

(D) Supplementation with one microgram daily will replenish folate stores

52. Localized areas of ischemic necrosis are associated with :

(A) Ascites

(B) Hematoma

(C) Infarction

(D) Emboli formation

53. Ketone bodies increase in the urine in :

(A) Acromegaly

(B) Diabetes mellitus

(C) Diabetes insipidus

(D) Cushing's disease

54. A major function of lymphatic system is :

(A) To return of tissue fluid to cardiovascular system

(B) Gas distribution

(C) Circulation of blood

(D) Distribution of nutrients

55. The endocrine gland which corresponds to setting up of body's biological clock is :

(A) Pituitary gland

(B) Thymus gland

(C) Pineal gland

(D) Thyroid gland

56. Excess tissue fluid in the brain drains into :

(A) Ventricles

(B) Blood

(C) CSF

(D) Lymphatics

57. Which of the following instruments is used to measure the energy of monochromatic radiation most accurately ?

(A) Thermopile

(B) The Chemical Actinometer

(C) Photoelectric cell

(D) The potential detector

58. The isomers that can be converted into another form by rotation of the molecules around a single bond are :

(A) Geometrical isomers

(B) Conformers

(C) Enantiomers

(D) Diastereomers

59. Aqueous solution of which of the following compounds is the best conductor of electric current ?

(A) Acetic acid

(B) Hydrochloric acid

(C) Ammonia

(D) Fructose

60. Mixture of ice and water form a :

(A) Closed system

(B) Open system

(C) Thermodynamic system

(D) Heterogeneous system

1. Which of the following is not an electromagnetic wave ?
   (A) X-rays
   (B) Cosmic rays
   (C) Infra red rays
   (D) None of these

2. Which element is the most abundant element in the universe ?
   (A) Oxygen
   (B) Phosphorus
   (C) Hydrogen
   (D) Helium

3. Which of the following statements best describes the Second Law of Thermodynamics ?
   (A) Energy can be neither created nor destroyed
   (B) The internal energy of the system is constant
   (C) When an isolated system undergoes a spontaneous change, the entropy of the system will increase
   (D) Neither matter nor heat can pass into or out of the system

4. In the binary language each letter of the alphabet, each number and each special character is made up of a unique combination of :
   (A) Eight bytes
   (B) Eight kilobytes
   (C) Eight characters
   (D) Eight bits

5. Which of these measures can be used to present an average for data ?
   (A) Mean, median and mode
   (B) Standard deviation, range and mean
   (C) Mean, beta and normal distribution
   (D) Median, mean and normal distribution

6. The totality of all objects under a study is called _____.
   (A) Sample
   (B) Group
   (C) Population
   (D) Specimen

7. The standard deviation is the _____ of the variance.
   (A) square
   (B) square root
   (C) cube
   (D) cube root

8. For the chi-square test to be effective, the expected value for each cell in the contingency table has to be at least :
   (A) 2
   (B) 3
   (C) 5
   (D) 10

9. Glycogen is a branched polymer of glucose and has :
   (A) One reducing end and several non reducing ends
   (B) No reducing ends
   (C) No non reducing ends
   (D) One non reducing end and several reducing ends

10. The number of double bonds present in Arachidonic acid are :
   (A) 2
   (B) 1
   (C) 6
   (D) 4

11. Deficiency of Niacin causes :
   (A) Beri-Beri
   (B) Scurvy
   (C) Pellagra
   (D) Pernicious anemia

12. In which of the following respect A-form of DNA differs from B-form of DNA ?
   (A) Helix handedness
   (B) Base pair per helical turn
   (C) Helical diameter
   (D) Repeating unit

13. The first ribozyme was discovered by :
    (A) David Chilton Philips
    (B) Francis Crick
    (C) Carl Woese
    (D) Thomas Cech and Sidney Altman
14. Histidine is often found at the active site of enzymes because :
    (A) It has a cyclic group
    (B) It has a pk_a of 6.8
    (C) It is an imino acid
    (D) It can form hydrogen bonds
15. V_{max} decreases and K_m remains constant is an example of :
    (A) Competitive inhibition
    (B) Un competitive inhibition
    (C) Non-competitive inhibition
    (D) None of the above
16. Enzymes that transfer the phosphate from ATP to a substrate are called as :
    (A) Kinases
    (B) Transaminases
    (C) Phosphorylases
    (D) Isomerases
17. In cell membrane, the lipid bilayer is majorly held together by :
    (A) Surface tension
    (B) Van der Walls forces and surface tension only
    (C) Hydrophobic forces and hydrogen bonds
    (D) None of the above
18. Golgi apparatus is involved in :
    (A) Transport proteins released from cell
    (B) Packaging proteins into vesicles
    (C) Altering or modifying proteins
    (D) All of the above
19. What is a nucleosome ?
    (A) A region in the cell's nucleus that contains euchromatin
    (B) A region of DNA wound around histone proteins
    (C) A region of a chromosome made up of multiple loops of chromatin
    (D) A 30-nm fiber found in chromatin
20. Chiasmata formation and crossing over occurs during :
    (A) Prophase-I of meiosis
    (B) Prophase-II of meiosis
    (C) Both Prophase-I and Prophase-II of meiosis
    (D) None of the above
21. Which of the following statement is true for glucokinase ?
    (A) It catalyzes the phosphorylation of fructose
    (B) It has a higher K_m for glucose as compared to hexokinase
    (C) It is found in muscle
    (D) It is inhibited by glucose-6-phosphate
22. Beta oxidation pathway of one molecule of palmitic acid yields
    (A) 8 molecules of acetyl COA
    (B) 9 molecules of acetyl COA
    (C) 16 molecules of acetyl COA
    (D) Only CO_2 and H_2O
23. Lesch-Nyhan syndrome is caused by a deficiency of :
    (A) Xanthine oxidase
    (B) Pyrimidine phosphoribosyl transferase
    (C) Adenine phosphoribosyl transferase
    (D) Hypoxanthine-guanine phosphoribosyl transferase

24. Perilipins are :
(A) Phosphorylated receptors for Hormone sensitive lipase
(B) A family of proteins coating the lipid droplets preventing untimely lipid mobilization
(C) Free fatty acids bound to serum albumin
(D) Fatty acid transporter in adipocytes

25. Which of the following statements about the eukaryotic type II topoisomerases is UNTRUE ?
(A) Cannot underwind DNA i.e., introduce negative supercoils
(B) Can relax both positive and negative supercoils
(C) Breaks both DNA strands and changes linking number in increments of 2 (two)
(D) None of the above

26. Which of the following amino acids is involved for the initiation of polypeptide chain synthesis ?
(A) Methionine
(B) Lysine
(C) Serine
(D) Tryptophan

27. Cot analysis provides an estimate of :
(A) G+C content of DNA
(B) Tm of DNA
(C) Complexity of the genome
(D) Hyperchromic shift of the genome

28. The ribosome is involved in all of the following, except :
(A) Peptide bond formation
(B) Aminoacylation of proteins
(C) Binding of protein factors during elongation
(D) Binding of aminoacyl tRNA to mRNA

29. Rod shaped bacteria are called :
(A) Bacilli
(B) Streptococci
(C) Cocci
(D) Spirilla

30. Nature of genome in bacteria is :
(A) dsDNA
(B) dsRNA
(C) ssDNA
(D) ssRNA

31. Virulent phage is the one that :
(A) Replicates through lytic cycle only
(B) Replicates through both lysogenic and lytic cycles
(C) Integrates into host genome without lysis of host cell
(D) None of the above

32. Which of the following viruses is a retrovirus ?
(A) Bacteriophage
(B) Human Immunodeficiency virus
(C) Influenza viruses
(D) Picornavirus

33. Macrophages have the ability to :
(A) Produce antibodies
(B) Express IgM molecules on their cell surface
(C) Process and present antigen to the T-cell
(D) Differentiate into dendritic cells when necessary

34. Which of the following are found in eye tears ?
(A) Cytokines, lactoferrin, IgM
(B) Lactoferrin, albumin, IgG
(C) Cytokines, lysozyme, IgE
(D) Lysozyme, lactoferrin, IgA

35. Which of the following represent the antigen presenting cells ?
(A) T cells, Null cells, Macrophages
(B) B cells, macrophages, dendritic cells
(C) Natural killer cells, kupffer cells, macrophages
(D) B cells, T cells, Natural killer cells

36. β-2 microglobulin is found on which MHC molecule ?
(A) MHC class I
(B) MHC class II
(C) MHC class III
(D) All of the above

37. The genotypic ratio of the cross between Rr and rr is :
(A) 1:2:1
(B) 3:1
(C) 1:1
(D) 1:1:1

38. Cross between AaBB and aaBB will form :
(A) lAaBB:laaBB
(B) all AaBB
(C) 3AaBB:laaBB
(D) lAaBB:3aaBB

39. The number of linkage groups in *Pisum sativum* is :
(A) 4
(B) 5
(C) 7
(D) 10

40. Gametes of AaBb individual can be :
(A) Aa, Bb
(B) AB, ab
(C) Ab, ab, Ab
(D) AB, Ab, aB, ab

41. S1 nuclease is an endonuclease enzyme purified from :
(A) Thermus Aquaticus
(B) Aspergillus oryzae
(C) Escherichia coli
(D) Proteus vulgaris

42. Which of the following can be used for transferring DNA into host cells ?
(A) Electroporation
(B) Lipofection
(C) Transfection
(D) All of the above

43. The chemical compound that is used for the cell membranes to fuse together is :
(A) Chloramphenicol
(B) Ethidium bromide
(C) Polyethylene glycol
(D) Cesium chloride

44. Berberine is a plant secondary metabolite produced through tissue culture obtained from :
(A) *Azadirachta indica*
(B) *Digitalis lanata*
(C) *Taxus buccata*
(D) *Coptis japonica*

45. A predominantly direct hyperbilirubinemia is present in all of the following causes of jaundice, except :
(A) Hemolysis
(B) Bile duct obstruction
(C) Drug-induced liver injury
(D) Primary biliary cirrhosis

46. In a patient with diabetic nephropathy and proteinuria, which of the following is not associated with the rate of decline in GFR ?
(A) Glycated haemoglobin (HbA1c) concentration
(B) Mean arterial pressure
(C) Serum bicarbonate
(D) Serum total CO_2

47. A person is said to have impaired glucose tolerance when :
(A) The fasting plasma glucose is less than 126 mg/dl and the two hour glucose level is between 140 and 199 mg/dl
(B) The two hour glucose level is less than 140 mg/dl, and all values between 0 and 2 hours are less than 200 mg/dl.
(C) Either the two hour levels is greater than 200 mg/dl or the fasting glucose is noted as greater than 126 mg/dl
(D) None of the above

48. The normal serum creatinine range is :
(A) 0.5-1.1 mg/L in women and 0.6-1.2 mg/L in men
(B) 0.5-1.1 mg/dL in women and 0.6-1.2 mg/dL in men
(C) 0.5-1.1 g/dL in women and 0.6-1.2 g/dL in men
(D) 0.5-1.1 mg/mL in women and 0.6-1.2 mg/mL in men

49. The hallmark of acute inflammation is :
(A) Macrophages
(B) Granuloma formation
(C) Neutrophils
(D) Fibroblast growth

50. Most common condition responsible for myocardial infarction is :
(A) Aneurysm
(B) Heart failure
(C) Coronary artery thrombosis
(D) Renal failure

51. Anaphylactic shock is caused :
(A) By a severe allergic reaction to an allergen
(B) By vasodilatation in severe infection
(C) When the heart fails to pump effectively
(D) When there is an obstruction to the flow of blood

52. Which of the following is/are cardinal sign/s of acute inflammation ?
(A) Heat
(B) Erythema
(C) Pain
(D) All of the above

53. Most of the CO_2 transported in the blood is in the form of :
(A) HCO_3^-
(B) Dissolved in plasma
(C) Carbamino compounds formed from hemoglobin
(D) None of the above

54. Which hormone, besides thyroxine and triiodothyronine, is produced by the thyroid gland ?
(A) Calcitonin
(B) Cortisol
(C) Thyroid stimulating hormone
(D) None of the above

55. Which of the following hormones are glycoproteins ?
(A) Oxytocin, growth hormone, prolactin
(B) Parathyroid hormone, insulin, glucagon
(C) Follicle stimulating hormone, luteinizing hormone, thyroid stimulating hormone
(D) All of the above

56. All preganglionic autonomic neurons secrete :
(A) Epinephrine
(B) Acetylcholine
(C) Nicotine
(D) Dopamine

57. Which of the following is soluble in water ?
(A) CS_2
(B) C_2H_5OH
(C) CCl_4
(D) $CHCl_3$

58. The molecule which does not exhibit dipole moment is :
(A) NH_3
(B) $CHCl_3$
(C) H_2O
(D) CCl_4

59. Which of these does not influence the rate of reaction ?
(A) Nature of the reactants
(B) Concentration of the reactants
(C) Molecularity of the reaction
(D) Temperature of the reaction

60. What are the appropriate reasons for the deviation from the Beer's law among the following ?
i. Monochromaticity of light
ii. Very high concentration of analyte
iii. Association of analyte
iv. Dissociation of analyte
(A) i, ii and iv
(B) ii, iii and iv
(C) i, iii and iv
(D) i, ii and iii

1. One Atomic Mass Unit (AMU) equals to :
   (A) 1.6605×10^{-27} kg
   (B) 6.0225×10^{23} kg
   (C) 0.082057 L atm $mol^{-1} K^{-1}$
   (D) 3.66×10^{-27} kg
2. If the temperature of a patient is 40°C, his temperature on the Fahrenheit scale will be :
   (A) 70 °F
   (B) 102 °F
   (C) 104 °F
   (D) 100 °F
3. Hydrogen bonding is a form of :
   (A) Ionic interaction
   (B) Dipole-dipole interaction
   (C) Covalent interaction
   (D) All the above
4. Inventor of World Wide Web (WWW) is :
   (A) Steve Jobs
   (B) Tim Berners-Lee
   (C) Vinton Cerf
   (D) Robert Kahn
5. The positive square root of the variance of a set of values is called :
   (A) Median value
   (B) Mean value
   (C) Standard deviation
   (D) Variance
6. Which of the following is NOT a true statement about the coefficient of variation ?
   (A) The coefficient of variation is expressed as a percent of the mean and is unitless
   (B) The coefficient of variation is commonly used in POLs as a measure of precision
   (C) The larger the coefficient of variation, the greater the precision
   (D) The coefficient of variation is used to compare the precision of two different laboratories
7. In a normal curve, the highest point on the curve occurs at the mean, μ, which is also the :
   (A) Median and mode
   (B) Geometric mean and harmonic mean
   (C) Lower and upper quartiles
   (D) Variance and standard deviation
8. How many variables do you need to run an one-sample chi-square analysis ?
   (A) At least three
   (B) Only one
   (C) At least two
   (D) There are no restrictions
9. Which amino acid is *INCORRECTLY* matched to its side-chain ?
   (A) Lysine : ε- amino–aliphatic hydrocarbon chain
   (B) Glutamic acid : β–carboxylate–aliphatic hydrocarbon chain
   (C) Tyrosine : aromatic imidazole
   (D) Methionine : γ–methylmercapto–aliphatic hydrocarbon chain
10. Which phospholipid is lacking in the plasma membrane of a eukaryotic cell ?
    (A) Lecithin
    (B) Cardiolipin
    (C) Cephalin
    (D) None of the above
11. Nonionizing radiation, such as UV light, causes covalent bonds to form between adjacent pyrimidine bases. This would most likely form a dimer of :
    (A) Thymine and thymine
    (B) Cystosine and cytosine
    (C) Cytosine and thymine
    (D) Uracil and cytosine
12. Imerslund-Gräsbeck syndrome is an inherited disorder related to malabsorption of :
    (A) Vitamin B_1
    (B) Vitamin B_3
    (C) Vitamin B_6
    (D) Vitamin B_{12}

13. Enzymes that catalyze the addition of groups to double bonds, or formation of double bonds by removal of groups are called :
(A) Transferases
(B) Lyases
(C) Ligases
(D) None of the above

14. A protein having both structural and enzymatic traits is :
(A) Collagen
(B) Trypsin
(C) Actin
(D) Myosin

15. Which graphical method is used to determine the degree of cooperativity in an enzyme ?
(A) Hill plot
(B) Koshland curve
(C) Michaelis-Menten hyperbola
(D) Cannot be determined

16. In methanol poisoning the damaging effect of formaldehyde is prevented by administration of ethanol at a slow controlled rate. Ethanol acts like a/an _____ inhibitor of the enzyme _____.
(A) Uncompetitive, alcohol dehydrogenase
(B) Competitive, alcohol dehydrogenase
(C) Competitive, pyruvate carboxylase
(D) Irreversible, alcohol dehydrogenase

17. The model organism that provided the first compelling experimental evidence for the role of nucleus in controlling the growth of a cell was :
(A) Acetabularia
(B) Neurospora
(C) Starfish
(D) Escherichia

18. Clathrin coated pits are associated with :
(A) Pinocytosis
(B) Exocytosis
(C) Receptor mediated endocytosis
(D) Phagocytosis

19. The Mitochondria-Associated Membranes (MAM) are structures formed by linkage between :
(A) Mitochondria and endoplasmic reticulum
(B) Mitochondria and golgi bodies
(C) Mitochondria and lysosomes
(D) None of the above

20. Mammalian cells use several CDKs and cyclins to regulate passage through the cell cycle. In the $G_1 \rightarrow S$ transition, the activity of which of the following increases in cells ?
(A) Cyclin D-CDK4/6
(B) Cyclin E-CDK2
(C) Cyclin A-CDK2
(D) Cyclin A/B-CDK1

21. Which of the following enzymes is inhibited in Arsenic poisoning ?
(A) Hexokinase
(B) Pyruvate kinase
(C) Alpha keto glutarate dehydrogenase
(D) Succinate dehydrogenase

22. A deficiency of Cystathionine-β-synthase has been diagnosed in a new born baby with refusal to feed and irritability. Which of the following compounds is expected to be elevated in blood ?
(A) Serine
(B) Glutamate
(C) Cysteine
(D) Homocysteine

23. Which key substrate of fatty acid synthesis also controls the inhibition of β-oxidation and thereby prevents a futile cycle ?
(A) Acetyl CoA
(B) Malonyl CoA
(C) Pyruvate
(D) Propionyl CoA

24. Which of the following is a correct statement to justify the cause of fatty liver in Kwashiorkor ?
(A) Increased mobilization of lipids from adipose tissue
(B) Increased synthesis of lipids in liver
(C) Deficiency of ApoB100 protein
(D) All of the above

25. In the genetic disease, Xeroderma pigmentosum, the cells fail to repair damaged DNA, due to a defect in:
(A) Direct repair
(B) Mismatch repair
(C) Nucleotide excision repair
(D) Double strand break repair

26. Viral encoded Ras oncogene transforms normal mammalian cells into cancer cells. Viral Ras protein differs from its normal counterpart in having :
(A) Diminished GTPase activity
(B) Increased GTPase activity
(C) Diminished ATPase activity
(D) Increased ATPase activity

27. Which statement is *INCORRECT* about the typical purine-rich, AGGAGG consensus sequence in bacterial and archaeal mRNA ?
(A) It is approximately 8-10 nucleotides upstream from the initiator AUG codon
(B) It is usually capped with m^7GpppG
(C) It binds near the 3′ terminus of 16S ribosomal RNA
(D) It is called the Shine-Dalgarno sequence

28. A sample of DNA from a patient's amniotic fluid cells is prepared for DNA fingerprinting by treatment with an enzyme that hydrolyzes specific phosphodiester bonds of both strands within the sequence, 5′–GAATTC–. Which enzyme is used ?
(A) Topoisomerase
(B) Ligase
(C) Exonuclease
(D) Restriction endonuclease

29. Gram-positive cocci include which of the following ?
(A) *Streptococcus* species
(B) *Meningococcus* species
(C) *Haemophilus* species
(D) All of the above

30. Antibiotic group that acts through inhibition of DNA synthesis includes :
(A) Penicillins
(B) Fluroquinolones
(C) Cephalosporins
(D) Tetracyclines

31. In case of Staphylococcal infections which microbial product/s (virulence factors) is/are involved in bacterial pathogen dissemination through a mammalian host ?
(A) Hemolysins
(B) Protein A
(C) Staphylokinase
(D) All of the above

32. Choose the correct relationship between the virus and its host cell surface protein that serves as virus receptor :

I. Measles virus	a. Acetylcholine receptor on neurons
II. Hepatitis A virus	b. Intercellular adhesion molecules (ICAMs) on the surface of respiratory epithelial cells
III. Influenza A virus	c. CD46 complement regulator protein
IV. Rabies virus	d. Sialic acid–containing glycoprotein
V. Rhinovirus	e. Alpha 2-macroglobulin

(A) I–e; II–a; III–b; IV–c; V-d
(B) I–c; II–e; III–d; IV–a; V-b
(C) I–b; II–c; III–d; IV–e; V-a
(D) I–d; II–c; III–e; IV–a; V-b

33. The idiotype of an antibody molecule is determined by the amino acid sequence of the :
(A) Variable region of the light chain
(B) Constant region of the light chain
(C) Constant regions of the heavy and light chains
(D) Variable regions of the heavy and light chains

34. Choose the *INCORRECT* statement about the Fc regions of immunoglobulins :
(A) They can be cleaved from the Fab regions by papain
(B) They are responsible for antigen binding
(C) They are involved in mast cell binding
(D) They are involved in the activation of the complement cascade

35. Which component of HIV envelop is responsible for binding to T cells ?
(A) CD4
(B) CD8
(C) gp120
(D) p24

36. Autoantibodies produced against DNA, histones and RBCs is characteristic of :
(A) Systemic lupus erythematosis
(B) Multiple sclerosis
(C) Grave's disease
(D) Myasthenia Gravis

37. In which of the following phases of meiosis does the chiasmata form, marking the attachment between homologous chromosomes where genetic information can be exchanged (crossing-over) ?
(A) Prophase I
(B) Metaphase I
(C) Anaphase I
(D) Telophase I

38. Which of the following generates genetic diversity ?
(A) Mitosis
(B) Meiosis equational division
(C) Meiosis reduction division
(D) None of the above

39. Assume that a cross is made between AaBb and aabb plants and all of the offspring are either AaBb or aabb. These results are consistent with the following circumstance :
(A) Complete linkage
(B) Alternation of generations
(C) Codominance
(D) Incomplete dominance

40. The fruit fly, or drosophila, is suitable for studying genetics because it presents :
(A) Many distinct traits but has only two chromosomes with one sex chromosome and one autosome
(B) Many distinct traits but has only four chromosomes with one sex chromosome and three autosomes
(C) Many distinct traits but has only four chromosomes with no sex chromosome
(D) Many distinct traits and has forty-six chromosomes with two sex chromosomes and forty-four autosomes

41. Which of the following, all created by recombinant DNA techniques, was the first successful alternative to previous, possibly infectious, solutions ?
(A) Hepatitis B vaccine
(B) Human insulin
(C) Tissue plasminogen activator
(D) beta-interferon

42. Paul Berg's gene splicing experiment created the first rDNA molecule which was :
(A) A T4 phage fragment incorporated into SV40 vector
(B) A lambda phage fragment incorporated in SV40 vector
(C) A T4 phage fragment incorporated into pSC101 vector
(D) A lambda phage fragment incorporated pSC101 vector

43. Nick translation is carried out by :
(A) DNA Polymerase I
(B) DNA Polymerase II
(C) DNA Ligase
(D) None of the above

44. Transfer DNA (T-DNA) is :
(A) DNA of plasmid origin which is transferred to the *Agrobacterium* chromosome
(B) DNA from the chromosome of *Agrobacterium* species which is transferred to the plant genome
(C) DNA of plasmid origin of bacteria like *Agrobacterium* which is transferred to the plant genome
(D) Telomeric DNA of linear chromosome

45. In a patient with chronic liver disease, all of the following can suggest the presence of chronic liver insufficiency, *EXCEPT* :
(A) Low albumin
(B) Prolonged prothrombin time
(C) Elevated bilirubin
(D) Elevated aminotransferases

46. Which of the following is *not true* for Hashimoto thyroiditis ?
(A) It is an autoimmune disease caused by CD4 cells with specificity to thyroid antigens
(B) Commonly presents as hypothyroidism
(C) Hashimoto thyroiditis can progress to lymphoma of thyroid
(D) None of the above

47. Inulin, a substance used to measure glomerular filtrate, has all the following qualities *EXCEPT* :
(A) Is a small polysaccharide of low molecular weight made up of mannose
(B) Is poorly digested in the body
(C) Is completely filtered at the glomerulus
(D) Is neither secreted nor reabsorbed at the tubules

48. In Oral Glucose Tolerance Test, the Lag curve for oxyhyperglycemia can be indicative of :
(A) Hyperthyroidism
(B) Gastrectomy
(C) Early diabetes
(D) All the above

49. Identify the main cause of thrombosis among the following :
(A) Edema
(B) Hypoxia
(C) Hypercoagulability
(D) Low blood pressure

50. Histamine is involved in acute inflammatory responses and is released from mast cells. Which of the following statements about it is *INCORRECT* ?
(A) It is found in blood basophils, platelets and mast cells
(B) It causes increased permeability of arterioles
(C) It may be released by physical trauma
(D) It acts on the microcirculation via H1 receptors

51. Troponins appear in plasma in _____ after Myocardial Infarction (MI) and remain for _____.
(A) 3–10 h.... 1.5-3 days
(B) 4-6 h.... 2-3 days
(C) 5-12 h.... 2-5 days
(D) 3-4 h.... up to 10 days

52. Which of the following is the CENTRAL pathophysiological feature of shock ?
(A) Cellular hypoxia at a tissue level
(B) Hypotension
(C) Cardiac failure
(D) Decreased blood volume

53. The hemoglobin-oxygen dissociation curve shifts to the right in all cases *EXCEPT* :
(A) Hypothermia
(B) Increase in 2, 3 bis-phosphoglycerate (2, 3 BPG)
(C) Increase in hydrogen ion concentration
(D) Increase in pCO_2

54. Which of the following hormones does not counteract the hypoglycemic effect of insulin ?
(A) Growth hormone
(B) Thyroxine
(C) Cortisol
(D) Adrenaline

55. Which of the following hormones/autocoids have an effect of increasing the Glomerular Filtration rate ?
(A) Epinehrine
(B) Nor epinephrine
(C) Prostaglandins
(D) Endothelin

56. What condition is indicated by the following blood gas results : Bicarbonate = 32 mmol/L (Normal = 22–26 mmol/L); pCO_2 = 65 mm Hg (Normal = 3545 mmHg); pH = 7.28 (Normal = 7.35 – 7.45) ?
(A) Healthy condition
(B) Uncompensated metabolic acidosis
(C) Compensated metabolic acidosis
(D) Uncompensated respiratory acidosis

57. The pH of pure water :
(A) Increases with an increase in temperature and water becomes alkaline
(B) Decreases with an increase in temperature but water is still neutral
(C) Decreases with an increase in temperature and water becomes acidic
(D) Does not depend on temperature

58. The correct order of nucleophilicity is :
(A) $R\text{-}NH_2 > R\text{-}OH > R\text{-}F$
(B) $R\text{-}F > R\text{-}OH > R\text{-}NH_2$
(C) $R\text{-}OH > R\text{-}NH_2 > R\text{-}F$
(D) All have the same nucleophilicity

59. $t_{1/2}$ for a second order reaction is :
(A) Directly proportional to the initial concentration of the reactant
(B) Directly proportional to the square root of the initial concentration of the reactant
(C) Inversely proportional to the initial concentration of the reactant
(D) Does not depend on the initial concentration of the reactant

60. Which of the following statements is *TRUE* for an exothermic reaction ?
(A) The heat content of the products is less than that of the reactants and ΔH has, by convention, a negative value
(B) The heat content of the products is more than that of the reactants and ΔH has, by convention, a positive value
(C) The heat content of the products and the reactants is same and value of ΔH is, by convention, zero
(D) The heat content of the products is more than that of the reactants and the value of ΔH is, by convention zero

Sr. No. 412

ENTRANCE TEST-2017

SCHOOL OF BIOLOGICAL SCIENCES

CLINICAL BIOCHEMISTRY

Total Questions : 60 **Question Booklet Series** **B**

Time Allowed : 70 Minutes **Roll No. :** | | | | | | |

Instructions for Candidates :

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SEAL

1. A promoter of a typical eukaryotic gene is composed of
   (A) A binding site for sigma factor
   (B) A binding site for TATA binding protein
   (C) A binding site for transcription factor II D
   (D) A binding site for transcription factor II B

2. Which is *not* the constituent of lipopolysaccharides in Gram negative cell walls?
   (A) Lipid A
   (B) Core polysaccharide
   (C) Phospholipids
   (D) O-side chain

3. A large percentage of antibiotics and semi synthetic drugs are produced by members of the genus
   (A) *Cephalosporium*
   (B) *Penicillium*
   (C) *Mycobacterium*
   (D) *Streptomyces*

4. The genome of cauliflower mosaic virus is
   (A) Positive stranded RNA
   (B) Single stranded DNA
   (C) Double stranded DNA
   (D) Double stranded RNA

5. The major virulence factor of *Haemophilus influenzae* type b is
   (A) Its surface pili
   (B) Its surface polysaccharides
   (C) Its cell wall
   (D) Its cell membrane

6. Which of the following statement is *true* regarding IgM?
   (A) IgM is a pentamer
   (B) IgM exists as monomer on B-cell surface
   (C) IgM is involved in early immune response
   (D) All of these

7. Which of the following is *not* associated with lymphatic system?
   (A) Tonsils
   (B) Spleen
   (C) Peyers patch
   (D) None of the above

8. T-helper cell is
   (A) $CD4^+$
   (B) $CD5^+$
   (C) $CD6^+$
   (D) $CD7^+$

9. Clonal selection occurs when antigen is encountered by
   (A) Mast cells
   (B) T cells
   (C) Neutrophills
   (D) Basophills

10. A plant of genotype AB/ab is test crossed to ab/ab, if the two loci are 10 map units apart, what proportion of progeny will be AB/ab?
   (A) 5%
   (B) 45%
   (C) 10%
   (D) 20%

11. Balbiani rings in polytene chromosomes are rich in
   (A) DNA
   (B) DNA and RNA
   (C) DNA, RNA and proteins
   (D) RNA and proteins

12. If a man of blood group AB marries a woman of blood group A whose father was of blood group O, to what different blood groups can this man and woman expect their children to belong?
   (A) A, AB, B
   (B) A, AB
   (C) AB, O
   (D) A, O, B

13. Which of the following chromosomal change is usually most damaging when in the homozygous condition?
   (A) Deletion
   (B) Duplication
   (C) Translocation
   (D) Inversion

SEAL

14. Problems in obtaining large amounts of proteins encoded by recombinant genes can often be overcome by using:
(A) BACS
(B) Expression vectors
(C) YACS
(D) All of these

15. DNA of a bacterium is not cleaved by its own restriction enzymes because the recognition DNA sequences are
(A) Deleted
(B) Methylated
(C) Bound by inhibitory proteins
(D) Not accessible to restriction enzymes

16. Which technique is used to introduce genes into dicots?
(A) Electroporation
(B) Particle acceleration
(C) Microinjection
(D) Ti plasmid infection

17. Which of the following is *not* done by glial cells?
(A) Receiving and conducing electrochemical signals
(B) Giving metabolic support to neurons
(C) Producing insulating sheaths around axons
(D) Removing debris after the death of a neuron

18. The most abundant protein in human blood is
(A) Transferrin
(B) Albumin
(C) Gamma globulin
(D) Hemoglobin

19. An increased secretion of renin would be expected to have what effect on sodium and potassium excretion in urine?
(A) Increase in sodium excretion and decrease in potassium excretion
(B) Increase in sodium excretion and decrease in potassium excretion
(C) Decrease in sodium excretion and increase in potassium excretion
(D) Decrease in sodium excretion and decrease in potassium excretion

20. Which of the following hormones does not act through second messenger system?
(A) Glucagon
(B) Epinephrine
(C) Testosterone
(D) Follicle stimulating hormone

21. Which of the following enzymes is increased in obstructive jaundice?
(A) Acid phosphatase
(B) Alkaline phosphatase
(C) Amylase phosphatase
(D) Carbonic anhydrase

22. Creatinine clearance is decreased in
(A) Liver disease
(B) Renal disease
(C) Hepatoma
(D) Myocardial infarction

23. Which is *not* the characteristics of type I diabetes ?
(A) Obesity
(B) Increased thirst
(C) Increased appetite
(D) Increased urination

24. In a state of shock there is
(A) A decreased hydrostatic pressure and increased osmotic pressure
(B) Cardiovascular collapse
(C) Active process leading to increased volume of blood
(D) Decreased pulse rate

25. Cyanide causes cell injury by
(A) Binding to sulfhydryl groups of proteins
(B) Poisoning mitochondrial cytochrome oxidase
(C) Causing lipid peroxidation
(D) Catalyzing oxidation to toxic metabolite

26. Which of the following is the hall mark of acute inflammation ?
(A) Neutrophils
(B) Macrophages
(C) Connective tissue
(D) Granulation tissue

27. Force of attraction which is stronger than dipole-dipole forces is
(A) London dispersion forces
(B) Hydrogen bonding
(C) Vander Waal's forces
(D) Intermolecular forces

28. The temperature at which a system undergoes a reversible isothermal process without transfer of heat is called as
(A) Kelvin temperature
(B) Critical temperature
(C) Absolute zero temperature
(D) Reversible temperature

29. In a zero order reaction, for every 10° rise of temperature the rate is doubled. If the temperature is increased from 10°C to 100°C, the rate of the reaction will become
(A) 64 times
(B) 128 times
(C) 256 times
(D) 512 times

30. pH scale has a range of
(A) 1 to 7
(B) 0 to 10
(C) 1 to 14
(D) 0 to 14

31. Light year is related to
(A) Energy
(B) Speed
(C) Distance
(D) Intensity

32. The weight of an object in a satellite orbiting around the earth is
(A) Actual weight
(B) Less than actual weight
(C) Greater than actual weight
(D) Zero

33. The most electronegative element among the following is
(A) Sodium
(B) Bromine
(C) Fluorine
(D) Oxygen

34. Which of the following is an input device?
(A) Scanner
(B) Speaker
(C) Monitor
(D) Projector

35. Who is regarded as the father of biostatistics?
(A) Fischer
(B) Karl Pearson
(C) Francis Galton
(D) Francis Bacon

36. State whether the variable is discrete or continuous : The age of the oldest student in a statistics class
(A) Discrete
(B) Continuous
(C) None
(D) Both

37. Correlation coefficient is a number between
(A) +1 and +2
(B) 0 and +1
(C) –1 and 0
(D) –1 and +1

38. Chi square test
(A) Measures the degree of variation of the experimental result from the expected result
(B) Tests the closeness of observed and expected frequency
(C) Tests the population variance and sample variance
(D) All of these

SEAL

39. How many stereoisomers are possible for an aldohexose?

(A) 8

(B) 16

(C) 32

(D) 64

40. A polysaccharide formed by β l-4 Glycosidic linkages between glucose residue is

(A) Inulin

(B) Amylose

(C) Agar

(D) Cellulose

41. Amino acid residues commonly found in the middle of β turn are

(A) Hydrophobic

(B) Pro and Gly

(C) Those with ionized R-groups

(D) Two Cys

42. An example of a trimeric protein is

(A) Lysozyme

(B) Hemoglobin

(C) Keratin

(D) Collagen

43. A sphingomyelin includes all of the following components *except*

(A) Amino alcohol

(B) Phosphate group

(C) Glycerol

(D) Sphingosine

44. Which pyrimidine base contains an amino group at carbon 4 ?

(A) Cytosine

(B) Thymine

(C) Uracil

(D) Adenine

45. The members of the oxidoreductase class of enzymes are most likely to use which of the following coenzymes?

(A) NADH

(B) Vitamin C

(C) Folic acid

(D) FADH2

46. Enzyme kinetics is based on

(A) Law of equilibrium

(B) Gibbs free energy

(C) Law of mass action

(D) Order of reaction

47. Succinate is the substrate for succinate dehydrogenase that converts succinate to fumarate. In the presence of reversible competitive inhibitor like malonate in place of succinate, the enzyme's

(A) K_m increases and V_{max} remains same

(B) Both K_m and V_{max} increases

(C) Both K_m and V_{max} decreases

(D) K_m decreases and V_{max} remains the same

48. A sigmoidal plot of substrate concentration ([S]) verses reaction velocity (V) may indicate

(A) Michaelis-Menten kinetics

(B) Co-operative binding

(C) Competitive inhibition

(D) Non-competitive inhibition

49. Which one of the following supports glycogen synthesis?

(A) High cyclic adenosine monophosphate (cAMP) levels

(B) Inactive adenylate cyclase

(C) Active phosphorylase

(D) Epinephrine

50. Which of the following is *not true* about beta oxidation of fatty acid containing even number of carbons?

(A) End product-Acetyl COA

(B) Cofactor required NAD^+ and FAD^+

(C) Decreases during starvation

(D) Site - mitochondria

51. A deficiency of Cystathionine-β-synthase has been diagnosed in a new born baby with refusal to feed and irritability. Which of the following compounds is expected to be elevated in blood?

(A) Serine

(B) Glutamate

(C) Homocysteine

(D) Valine

52. Which of the following is a *correct* statement to justify the cause of fatty liver in Kwashiokor?

(A) There is more mobilization of lipids from adipose mass

(B) There is more synthesis of lipids in the liver

(C) There is deficiency of apo B100 protein

(D) All of the above

53. In diabetes mellitus there is reduced oxidation of carbohydrates, what will be the effect of insulin administration on respiratory quotient (RQ)?

(A) It will increase

(B) It will decrease

(C) No effect

(D) Initial rise and then fall

54. Fluidity of membranes is increased by

(A) Phospholipids

(B) Cholesterol

(C) Saturated fatty acids

(D) Polyunsaturated fatty acids

55. Very small molecules enter the cell by

(A) Exocytosis

(B) Active transport

(C) Phagocytosis

(D) Diffusion

56. Passage through pores in the nuclear envelope is restricted primarily to

(A) Proteins, RNA, and protein-RNA complexes

(B) Lipids and glycolipids

(C) DNA and RNA

(D) RNA and protein-carbohydrate complexes

57. In the cell cycle, mitosis occurs between

(A) S and G1 phase

(B) S and G2 phase

(C) G1 and G2 phase

(D) All of the above

58. Which is the correct order, from smallest to largest number of base pairs?

(A) Plasmid, transposon, chromosomal DNA

(B) Chromosomal DNA, transposon, plasmid

(C) Transposon, plasmid, chromosomal DNA

(D) Plasmid, chromosomal DNA, transposon

59. Okazaki fragments

(A) Require only DNA polymerase for synthesis

(B) Require only RNA polymerase for synthesis

(C) Are made when DNA is exposed to UV radiations

(D) Are composed of both DNA and RNA

60. Most abundant type of RNA in the cell is

(A) rRNA

(B) mRNA

(C) tRNA

(D) hnRNA

Sr. No. 207

ENTRANCE TEST-2016

FACULTY OF BIOLOGICAL SCIENCES

M.Sc. CLINICAL BIO-CHEMISTRY

Question Booklet Series **A**

Total Questions : 60
Time Allowed : 70 Minutes

Roll No. : | | | | | | |

Instructions for Candidates :

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SEAL

1. Which Instrument is used to measure Pressure ?

   (A) Saccharimeter (B) Ammeter

   (C) Manometer (D) Lactometer

2. What does Angstrom measure ?

   (A) Quantity of liquid (B) Length of light waves

   (C) Length of cables (D) Speed of Ships

3. Light year is related to :

   (A) Energy (B) Speed

   (C) Distance (D) Intensity

4. The brain of any computer system is :

   (A) ALU (B) Memory

   (C) CPU (D) Control Unit

5. In designing an experiment, blocking is used :

   (A) To reduce bias (B) To reduce variation

   (C) As a substitute for a control group (D) As a first step in randomization

6. A coin is tossed. Find the probability that the result is heads :

   (A) 1 (B) 0.5

   (C) 0.1 (D) 0.9

7. The events A and B are mutually exclusive. If P(A) = 0.7 and P(B) = 0.2, what is P(A or B) ?

   (A) 0.5 (B) 0.9

   (C) 0.14 (D) 0

8. State whether the variable is discrete or continuous : —The age of the oldest student in a statistics class :

   (A) Discrete (B) Continuous

   (C) None (D) Both

9. Which of the following is false ?

(A) Enzymes are always made of amino acids

(B) Enzymes lower the activation energy of reactions

(C) Enzymes are affected by temperature

(D) Enzymes can be denatured

10. Which of the following is true for all nucleotides ?

(A) They contain ribose, a phosphate and a nitrogenous base

(B) They are double-stranded and anti-parallel

(C) They contain a pentose, a phosphate and a nitrogenous base

(D) They contain deoxyribose, a phosphate and a nitrogenous base

11. Which of the following is not passive ?

(A) Facilitated diffusion

(B) Na+–K+ Pump

(C) Osmosis

(D) Diffusion

12. Very small molecules enter the cell by :

(A) Exocytosis

(B) Active transport

(C) Phagocytosis

(D) Diffusion

13. A noncompetitive inhibitor of an enzyme-catalyzed reaction :

(A) Increases K_m and increases V_{max}

(B) Increases K_m and reduces V_{max}

(C) Reduces K_m and increases V_{max}

(D) Reduces K_m and reduces V_{max}

14. Feedback mechanisms regulate the rate of enzyme activity, effectively "turning off" an enzyme in a reversible way until more products is needed. Which of the following would be most effective as a feedback mechanism ?

(A) Reduced concentration of product

(B) Increased concentration of substrate

(C) A change in pH

(D) Temporary binding of a non-substrate molecule in the active site

15. The conversion of ATP to cAMP is catalyzed by :

(A) ATP synthase
(B) Carbonic anhydrase
(C) Phosphatase
(D) Adenylate cyclase

16. Abzymes are :

(A) Immunoglobulins
(B) Isozymes
(C) Allosteric enzymes
(D) Catalytic antibodies

17. A disease caused by viroids is :

(A) Potato spindle tuber
(B) Cauliflower mosaic
(C) Tobacco mosaic
(D) Turnip yellow mosaic

18. The first cloned mammal is :

(A) Bonnie
(B) Dolly
(C) Molly
(D) Polly

19. The chromosome having centromere at the tip are called as :

(A) Acrocentric
(B) Meta centric
(C) Sub meta-centric
(D) Telocentric

20. Passage through pores in the nuclear envelope is restricted primarily to :

(A) Proteins, RNA, and protein-RNA complexes
(B) Lipids and glycolipids
(C) DNA and RNA
(D) RNA and protein-carbohydrate complexes

21. At the end of glycolysis, each molecule of glucose has yielded 2 molecules of _____, 2 molecules of _____, and a net of 2 molecules of _____.

(A) FAD; NAD+; ADP
(B) CO_2; NAD+; ADP
(C) Lactic acid; Ethanol; CO_2
(D) Pyruvate; NADH; ATP

22. As a result of glycolysis, pyruvate oxidation and the citric acid cycle, only a small portion of the energy of glucose has been converted to ATP. At this point, the majority of the usable energy is contained in :

(A) Oxidized electron carriers NAD+ and FAD

(B) Pyruvate

(C) Acetyl coenzyme A

(D) Reduced electron carriers NADH and FADH2

23. During a heart attack, blood flowing to the heart muscle is interrupted by blockage of a coronary artery. How would you expect the metabolism in the heart to change ?

(A) Oxidative phosphorylation would slow down in the mitochondria

(B) The rate of production of lactic acid would be stimulated

(C) The use of glucose by the muscle tissue would increase

(D) All are expected metabolic changes

24. Emulsifying agent produced by the liver and stored in the gall bladder aids fat digestion and absorption :

(A) Amino Acid (B) Cholesterol

(C) Mucus (D) Bile

25. The proof reading of newly synthesized DNA, to excise incorrect nucleotides which have been inserted, is done by :

(A) A restriction endonucleases (B) DNA gyrase

(C) DNA ligase (D) DNA polymerase III

26. In which medium would the level of an enzyme of arginine biosynthesis be the lowest ?

(A) Glucose+salts (B) Lactose +salts

(C) Glucose +salts +tryptophan (D) Arginine+salts

27. Which is the correct order, from smallest to largest number of base pairs ?

(A) Plasmid, transposon, chromosomal DNA

(B) Chromosomal DNA, transposon, plasmid

(C) Transposon, plasmid, chromosomal DNA

(D) Plasmid, chromosomal DNA transposon

28. An enzyme that recognizes a specific (palindromic) sequence and cuts within a DNA molecule is called as :

(A) Exonuclease
(B) Methylase
(C) Modification enzyme
(D) Restriction endonuclease

29. Which of the following bacteria lack a cell wall and are therefore resistant to penicillin ?

(A) Cyanobacteria
(B) Mycoplasmas
(C) Bdellovibrios
(D) Spirochetes

30. Flagella move the cell by :

(A) Many flagella beating in a synchronous, whip-like motion
(B) An individual flagellum beating in a whip-like motion
(C) Spinning like a propeller
(D) Attaching to nearby particles and contracting

31. Cytoplasmic inclusions include :

(A) Ribosomes
(B) Mesosomes
(C) Fat Globules
(D) All of the above

32. The cell walls of Gram positive bacteria contain two modified sugar, viz. N- acetylgucosamine (NAG) and N- acetylmuramic acid (NAM). They are covalently linked by :

(A) α-1,4-glycosidic bond
(B) β-1,6-glycosidic bond
(C) α-1,6-glycosidic bond
(D) β- 1,4-glycosidic bond

33. Several of the complement components are :

(A) Glycolipids
(B) Cytokines
(C) Enzymes
(D) Hormones

34. Clonal selection occurs when antigen is encountered by :

(A) Mast cells
(B) T cells
(C) Neutrophills
(D) Basophills

35. Plasma cells :

(A) Are derived from T-cells

(B) Develop into B-cells

(C) Secrete large amounts of gamma interferon

(D) Have a highly developed rough endoplasmic reticulum

36. Specific antibodies are readily detectable in serum following primary contact with antigen after :

(A) 1 h

(B) 5-7 days

(C) 3-5 weeks

(D) Only following a second contact with antigen

37. Linked genes :

(A) Assort randomly (B) Can crossover and recombine

(C) Are allelic (D) Co-segregate

38. Syntenic genes are :

(A) Allelic (B) Dominant

(C) On different chromosomes (D) On the same chromosome

39. FISH stands for :

(A) Fluorescent in situ hybridization (B) First induced strand hybrid

(C) F1 insertion segment homolog (D) Flanking insertion sequence hybrid

40. Crossing over occurs during :

(A) Interphase (B) Prophase

(C) Metaphase (D) Anaphase

41. Problems in obtaining large amounts of proteins encoded by recombinant genes can often be overcome by using :

(A) BACS (B) Expression vectors

(C) YACS (D) All of these

42. Which of the following is obtained using processed mRNA molecules as a template ?

(A) rDNA (B) mDNA

(C) cDNA (D) tDNA

43. Virulence trait of Agrobacterium tumefaciens is borne on :

(A) Chromosomal DNA

(B) Tumour inducing plasmid DNA

(C) Both chromosomal and plasmid DNA

(D) Cryptic plasmid DNA

44. Which technique is used to introduce genes into dicots ?

(A) Electroporation (B) Particle acceleration

(C) Microinjection (D) Ti plasmid infection

45. The hormone Progesterone causes what to occur in women ?

(A) Follicle Development

(B) Development of the Uterine Lining

(C) Spermatogenesis

(D) Female Secondary Sex Characteristics

46. The target of the hormone Erythropoietin is :

(A) White Blood Cells (B) The Kidneys

(C) Bone Marrow (D) Right Atrium of the heart

47. Prostaglandins are synthesized from :

(A) Carbohydrates (B) Fats

(C) Amino acids (D) Cholesterol

48. A pheromone is :

(A) An endorphin released within the anterior pituitary

(B) A growth factor related to the production of tumors

(C) A product of a neurosecretory cell that acts on neighboring cells

(D) A chemical released by one animal to affect the behavior of another animal

49. Which statement about hormone types is correct ?

(A) Non-steroid hormones activate an enzyme cascade

(B) Steroid hormones regulate the production of a particular protein

(C) Steroid hormones all have four carbon rings with different side chains

(D) All of the choices are correct

50. Which is an example of negative feedback ?

(A) Nursing action stimulates the hypothalamus to release oxytocin that triggers mammary gland milk production

(B) When the blood becomes dilute, ADH is no longer released from the hypothalamus

(C) Uterine stretching sends nerve impulses to the hypothalamus that releases oxytocin that triggers uterine contraction

(D) FSH and LH stimulate the gonads to produce sperm or eggs

51. Cyclic AMP functions as _____ for _____ hormones.

(A) Binding site; nonsteroid

(B) Membrane receptor; steroid

(C) Activity site; G protein

(D) Second messenger; nonsteroid

52. What seems to be the cause of juvenile onset or insulin dependent diabetes mellitus (IDDM) ?

(A) The receptors on the target cells become no longer responsive to insulin

(B) Immune cells attack the pancreas that can then no longer produce insulin

(C) The individual consumes too much sugar which causes an overload in the bloodstream

(D) Obesity seems to be the most common cause of IDDM

53. Progress of shock include :

(A) Blood flow to heart decreases

(B) Blood goes to brain and other vital organs

(C) Body cells begin to die because of oxygen deprivation

(D) All of the above

54. The main causes of thrombus formation are :

(A) Hypercoagulability
(B) Endothelial cell injury
(C) Disturbed blood flow
(D) All of the above

55. Edema is :

(A) Abnormal accumulation of fluid in the interstitium
(B) Accumulation of fluid in vessels
(C) Both (A) and (B)
(D) None of the above

56. Inflammation process involves :

(A) Local vascular system
(B) Immune system
(C) Both (A) and (B)
(D) None of the above

57. The most electronegative element among the following is :

(A) Sodium
(B) Bromine
(C) Flourine
(D) Oxygen

58. The molecules of which gas have highest speed?

(A) H_2 at –73°C
(B) CH_4 at 300 K
(C) N_2 at 1,027°C
(D) O_2 at 0°C

59. The law which states that the amount of gas dissolved in a liquid is proportional to its partial pressure is :

(A) Dalton's law
(B) Gay Lussac's law
(C) Henry's law
(D) Raoult's law

60. The main buffer system of the human blood is :

(A) $H_2CO_3 - HCO_3$
(B) $H_2CO_3 - CO_3^{2-}$
(C) $CH_3COOH - CH_3COO^-$
(D) $NH_2CONH_2 - NH_2CONH^+$

M.Sc. Clinical Biochemistry/B

1. CD_4^+ T Cells are also referred to as :
   (A) Cytotoxic Cells (B) Null Cells
   (C) Killer Cells (D) Helper Cells

2. Crossing over occurs during :
   (A) interphase (B) prophase
   (C) metaphase (D) anaphase

3. The traits Mendel studied in garden peas showed :
   (A) Complete dominance (B) Incomplete dominance
   (C) Epistasis (D) Polygenic inheritance

4. What do telomeres do ?
   (A) They protect the chromosomes from degradation by nucleases
   (B) They prevent the ends of chromosome from fusing with one another
   (C) They are required for complete chromosomal replication
   (D) All the above statements are correct

5. Linked genes :
   (A) assort randomly (B) can crossover and recombine
   (C) are allelic (D) co-segregate

6. A plasmid cloning vector PBR 322 contains all of the following sequences except :
   (A) Origin of replication (B) Ampicillin resistance gene
   (C) Multiple cloning site (D) Tetracycline resistance gene

7. Restriction endonucleases are :
   (A) Used in genetic engineering for uniting two DNA molecules
   (B) Used for in vitro DNA synthesis
   (C) Present in mammalian cells for degeneration of DNA of dead cells
   (D) Synthesised by bacteria for their defence

8. Which of the following food crop has recently been genetically engineered to obtain edible vaccine to develop immunity against hepatitis B ?
   (A) Potato (B) Banana
   (C) Maize (D) Tomato

9. The term magic bullet is often associated with :

(A) Interleukin 2
(B) Cytotoxic T Cell
(C) Monoclonal Antibody
(D) Complement system

10. The most common sample specimen in clinical chemistry is :

(A) plasma
(B) whole blood
(C) serum
(D) buffy coat

11. In enzyme analysis, the following should be monitored closely, EXCEPT :

(A) Temperature
(B) Concentration of substrate
(C) pH
(D) Non-competitive inhibitor

12. Electrolytes are called amphoteric substances because :

(A) They can either be negatively or positively charged
(B) They can be water or non-water soluble
(C) They can transform from one energy form to another
(D) They are directly transported in the blood stream.

13. The hormone Progesterone causes what to occur in women ?

(A) Follicle Development
(B) Development of the Uterine Lining
(C) Anovulation
(D) Female Secondary Sex Characteristics

14. In the maintenance of normal blood pH, these two organs are involved :

(A) Lungs and heart
(B) Lungs and kidneys
(C) Kidneys and heart
(D) Kidneys and liver

15. The target of the hormone Erythropoietin is :

(A) White Blood Cells
(B) Liver
(C) Bone Marrow
(D) The Kidneys

16. Blood urea decreases in all of the following conditions, except :

(A) Liver cirrhosis
(B) Pregnancy
(C) Renal failure
(D) Urea cycle disorders

17. What seems to be the cause of juvenile onset or insulin dependent diabetes mellitus (IDDM) ?

(A) The receptors on the target cells become no longer responsive to insulin.

(B) Immune cells attack the pancreas that can then no longer produce insulin.

(C) The individual consumes too much sugar which causes an overload in the bloodstream

(D) Obesity seems to be the most common cause of IDDM.

18. In C4 plants, CO2 is fixed twice respectively in :

(A) Mesophyll and bundle sheath (B) Bundle sheath and mesophyll

(C) Epidermis and mesophyll (D) Mesophyll and epidermis

19. Enzyme required in early CO2 fixation in C4 cycle is :

(A) RuBP carboxylase (B) RuBP oxygenase

(C) PGA dehydrogenase (D) PEP carboxylase

20. Main function of the hormone cytokinin is :

(A) Induction of cell division and delay in senescence

(B) To cause dormancy

(C) To break dormancy

(D) To take part in cell division

21. A sudden change from anaerobic and aerobic process produces :

(A) Chargaff's effect (B) Pasteur effect

(C) Blackmann's low effect (D) Emerson effect

22. The most electronegative element among the following is :

(A) Sodium (B) Bromine

(C) Fluorine (D) Oxygen

23. The unit of rate constant of zero order reaction is :

(A) $Lmol^{-1}min^{-1}$ (B) $mol\ L^{-1}\ min^{-1}$

(C) min^{-1} (D) dimensionless

24. The difference between ΔH and ΔE at constant volume is equal to :

(A) pV (B) $p\Delta V$

(C) $-V\Delta p$ (D) $V\Delta p$

25. For acetic acid the pKa = 4.47. The pH of a solution containing CH_3COOH and CH_3COONa in equilibrium ratio is :

(A) 0.047 (B) 2.37

(C) 0.447 (D) 4.47

26. Acidity of normal rain water is due to :

(A) NO (B) NO_2

(C) CO_2 (D) SO_2

27. Light year is related to :

(A) Energy (B) Speed

(C) Distance (D) Intensity

28. Which programming language is also called as formula translation ?

(A) PASCAL (B) JAVA

(C) COBOL (D) FORTRAN

29. Computer language used on internet is :

(A) C++ (B) C

(C) PASCAL (D) JAVA

30. A coin is tossed. Find the probability that the result is heads.

(A) 1 (B) 0.5

(C) 0.1 (D) 0.9

31. The events A and B are mutually exclusive. If P(A) = 0.7 and P(B) = 0.2, what is P (A or B) ?

(A) 0.5 (B) 0.9

(C) 0.14 (D) 0

32. ANOVA was introduced by :

(A) Helmert
(B) Pearson
(C) R.A. Fisher
(D) Francis

33. For testing of hypothesis about population proportion, we use :

(A) Z-test
(B) t-Test
(C) Both Z and t-test
(D) F test

34. Which amino acid residue is most likely to be found in the interior of a water soluble globular protein ?

(A) Aspartic acid
(B) Valine
(C) Lysine
(D) Serine

35. O-glycosidic bond in a polysaccharide forms between :

(A) Anomeric hydrogen and alkoxy carbon
(B) Anomeric oxygen and alkoxy carbon
(C) Anomeric carbon and Alkoxy oxygen
(D) All of the above

36. The prostaglandins are synthesised from :

(A) Linolenic acid
(B) Oleic acid
(C) Arachidonic acid
(D) Linoleic acid

37. In a DNA, percentage of thymine is 20%, what will be the percentage of guanine ?

(A) 30%
(B) 20%
(C) 40%
(D) 60%

38. A non-competitive inhibitor of an enzyme-catalyzed reaction :

(A) increases K_m and increases V_{max}
(B) increases K_m and reduces V_{max}
(C) reduces K_m and increases V_{max}
(D) reduces K_m and reduces V_{max}

39. At what [S], the velocity (v_0) of an enzyme catalysed reaction is 25% of the V_{max} ?

(A) 1/3 K_m
(B) 4 K_m
(C) 1/2 K_m
(D) 1/4 K_m

40. An allosteric modulator influences enzyme activity by :
    (A) Binding to a site on the enzyme molecule distinct from catalytic site
    (B) Competing for catalytic with the substrate
    (C) Changing the specificity of an enzyme for its substrate
    (D) None of these

41. Which of the following is false ?
    (A) Enzymes are always made of amino acids
    (B) Enzymes lower the activation energy of reactions
    (C) Enzymes are affected by temperature
    (D) Enzymes can be denatured

42. Which of the following is not passive ?
    (A) facilitated diffusion
    (B) Na^+ - K^+ Pump
    (C) osmosis
    (D) diffusion

43. Passage through pores in the nuclear envelope is restricted primarily to :
    (A) proteins, RNA, and protein-RNA complexes
    (B) lipids and glycolipids
    (C) DNA and RNA
    (D) RNA and protein-carbohydrate complexes

44. Larger thylakoids in choloroplast are called as :
    (A) Grana
    (B) Grana lamellae
    (C) Loculus
    (D) Stroma lamellae

45. Mitochondria can be distinguished from similar looking particles in living cells by virtue of their affinity for a dye known as :
    (A) Safranin
    (B) Janus green
    (C) Cotton blue
    (D) Acetocarmine

46. At the end of glycolysis, each molecule of glucose has yielded 2 molecules of _____, 2 molecules of _____, and a net of 2 molecules of _____.
    (A) FAD; NAD+; ADP
    (B) CO2; NAD+; ADP
    (C) Lactic acid; ethanol; CO2
    (D) Pyruvate; NADH; ATP

47. The synthesis of all of the following compounds except one is deficient in a patient suffering from Phenylketonuria.

(A) Melanin
(B) Melatonin
(C) Catecholamines
(D) Thyroid hormone

48. A critical enzyme used directly in the synthesis of dTMP (thymidine) is :

(A) Carbamoyl phosphate
(B) Aspartate Transcarbamoylase
(C) Dihydrooratase
(D) Thymidylate synthase

49. A patient diagnosed with Homocystinuria should be supplemented with all of the following vitamins except :

(A) Vitamin C
(B) Folic acid
(C) Vitamin B_{12}
(D) Pyridoxal-Phosphate

50. Which of the following is obtained using processed mRNA molecules as a template ?

(A) rDNA
(B) mDNA
(C) cDNA
(D) tDNA

51. The proof reading of newly synthesized DNA, to excise incorrect nucleotides which have been inserted, is done by :

(A) a restriction endonucleases
(B) DNA gyrase
(C) DNA ligase
(D) DNA polymerase III

52. Most abundant RNA in the cell is :

(A) tRNA
(B) rRNA
(C) mRNA
(D) cRNA

53. Which is usually the correct order, from smallest to largest number of base pairs ?

(A) plasmid, transposon, chromosomal DNA
(B) chromosomal DNA, transposon, plasmid
(C) transposon, plasmid, chromosomal DNA
(D) plasmid, chromosomal DNA transposon

54. Flagella move the cell by :

(A) many flagella beating in a synchronous, whip-like motion

(B) an individual flagellum beating in a whip-like motion

(C) spinning like a propeller

(D) attaching to nearby particles and contracting

55. Mycobacterium cell walls are characterized by :

(A) Phospholipid (B) Ketodeoxyoctonate

(C) Glycolipid (D) Ribitoltecihoic acid

56. When a virus enters a cell but does not replicate immediately, the situation is called as :

(A) Lysogeny (B) Fermentation

(C) Lytic (D) Synergism

57. Peptidoglycan is also known as :

(A) N Acetyl muramic acid (B) Murein mucopeptide

(C) N Acetyl glucosamine (D) Mesodiaminopimetic acid

58. Agretope is the region of antigen that interacts with :

(A) T-cell receptor (B) MHC

(C) Antibody (D) MHC and T-cell receptor

59. Which one of the following statements best describe properties of interleukin-1 ?

(A) It does not activate B-cells

(B) It is a macrophage derived product

(C) It may stimulate cytotoxic B-cells

(D) This is a single biologically active form

60. Macrophages are derived from :

(A) Macrophages themselves (B) Monocytes

(C) Both (D) None

SEAL

M.Sc. Clinical Biochemistry/B

1. Each human haploid genome contains about :

   (A) 3×10^6 base pairs (B) 3×10^9 base pairs

   (C) 3×10^{11} base pairs (D) 3×10^{13} base pairs

2. *HindIII* is a restriction enzyme isolated from :

   (A) *Haemophilus influenzae* (B) *Haemophilus haemolyticus*

   (C) *Haemophilus parainfluenzae* (D) *Thermus aquaticus*

3. Which of the following is **not** an enzyme used in recombinant DNA research ?

   (A) Polynucleotide kinase

   (B) Reverse transcriptase

   (C) Alkaline phosphatase

   (D) All the above enzymes are used in recombinant DNA research

4. Who among the following won the Nobel Prize for demonstrating that X-rays cause mutation ?

   (A) Phillip Leder (B) Severo Ochoa

   (C) Hermann J. Muller (D) Marshall W. Nirenberg

5. Indole-3-acetic acid is a/an :

   (A) Abscisic acid (B) Auxin

   (C) Gibberellin (D) Cytokinin

6. Which of the following is a polysaccharide composed of β-D-glucopyranose residues linked together by β 1-3 glycosidic linkage ?

   (A) Cellulose (B) Callose

   (C) Verbascose (D) No such polysaccharide exists

7. Pheophytin is :

(A) A primary electron acceptor present in PSI

(B) Yet another name for a quinone historically called Q

(C) A manganese protein, probably involved in the first step of water oxidation in photosynthesis

(D) A colorless chlorophyll *a*, which lacks Mg^{2+}

8. Which of the following correlates with the Bohr Effect ?

(A) Increase in the concentration of CO_2 and H^+ ion increases the dissociation of oxygen from hemoglobin

(B) Decrease in the concentration of CO_2 and H^+ ion increases the dissociation of oxygen from hemoglobin

(C) Increase in the concentration of CO_2, but not H^+ ion increases the dissociation of oxygen from hemoglobin

(D) Neither the concentration of CO_2 nor H^+ ion affects the dissociation of oxygen from hemoglobin

9. What would be the effect of increase in blood pH (alkalosis) on the delivery of oxygen to the tissue ?

(A) Less oxygen would be delivered

(B) More oxygen would be delivered

(C) Alkalosis would not affect the delivery of oxygen to the tissue

(D) Such a condition (alkalosis) does not arise in the living tissue due to the buffering system

10. Sickle cell hemoglobin differs from the normal hemoglobin by a single amino acid. In the β-chain of sickle cell hemoglobin :

(A) A glutamic acid has replaced a valine

(B) A valine has replaced a glutamic acid

(C) A glutamine has replaced a valine

(D) A valine has replaced a glutamine

11. A symmetrical molecule with no unbalanced electrical charge is called a :

(A) Polar molecule (B) Nonpolar molecule

(C) Molecular dipole (D) Chiral

12. The sensitivity of the best balances is only about :

(A) 1×10^{-4} g (B) 1×10^{-6} g

(C) 1×10^{-8} g (D) 1×10^{-12} g

13. Which of the following ions is the strongest base ?

(A) Acetate ion (B) Chloride ion

(C) Bicarbonate ion (D) Hydroxide ion

14. Why does HI (Hydrogen Iodide) have a boiling point higher than that of HCl ?

(A) The molecular weight of HI is greater than that of HCl

(B) The molecular weight of HI is lesser than that of HCl

(C) Molecular weight has nothing to do with the boiling point

(D) HI does not exist

15. Which of the following processes increase the entropy of particles ?

(A) Freezing

(B) Melting and vaporization

(C) Dissolution, melting and vaporization

(D) Dissolution, but not melting and vaporization

16. The specific gravity of a 200 ml sample of urine having a mass of 210 g will be :

(A) 0.95

(B) 1.05

(C) 4.20

(D) Specific gravity cannot be calculated using the above information

17. Find the Celsius temperature corresponding to 180°F :

(A) 324°C (B) 356°C

(C) 82.2°C (D) 117.7°C

18. Which of the following can combine with four hydrogen atoms ?

(A) Sodium (B) Magnesium

(C) Aluminium (D) Silicon

19. All the calculations, comparisons and arithmetic operations in a computer are performed in :

(A) CU (B) ALU

(C) ROM (D) RAM

20. The biostatistics is aimed at :

(A) To organize and represent data in suitable tables, diagrams or graphs

(B) To design experimental investigation and sample surveys for generating data, and draw valid inference from the data

(C) Option 'A' is correct, but option 'B' is not correct

(D) Both option 'A' and 'B' are correct

21. Continuous variables are represented by :

(A) Bar diagram (B) Line diagram

(C) Histogram (D) Pie chart

22. Mode can be located graphically with the help of :

(A) Line diagram (B) Bar diagram

(C) Pie diagram (D) Histogram

23. Coefficient of variability is helpful in understanding the :

(A) Mean deviation (B) Relative variation

(C) Median and mode (D) Most frequent occurrence

24. Which of the following is called table sugar, cane sugar, or beet sugar ?

(A) Sucrose (B) Fructose

(C) Maltose (D) D-Glucose

25. Which of the following terms is used as a generic descriptor for the cobalamins ?

(A) Vitamin B_1 (B) Vitamin B_2

(C) Vitamin B_6 (D) Vitamin B_{12}

26. Which of the following amino acids does **not** have a net positive charge at pH 7 ?

(A) Lysine (B) Arginine

(C) Histidine (D) Glutamine

27. Lactate dehydrogenase is a/an :

(A) Hydrolase
(B) Oxidoreductase
(C) Transferase
(D) None of the above

28. Which of the following is correct about the enzymes ?

(A) Enzymes are always proteins
(B) Enzymes speed up the reaction by increasing the activation energy of the reaction
(C) Enzymes speed up the reaction by lowering the activation energy of the reaction
(D) Option (A) and (B) are correct

29. Which of the following class of enzyme inhibitors is often referred to as the structural analogs ?

(A) Irreversible inhibitors
(B) Reversible, competitive inhibitors
(C) Both the above options are correct
(D) None of the above is correct

30. Which of the following factors affect the rate of a reaction ?

(A) The structure of the reacting species
(B) The physical state of the reactants
(C) The concentration of the reactant
(D) All of the above

31. Which of the following is the most correct option about the PCNA ?

(A) It is a cofactor of DNA polymerase delta δ
(B) It is a cofactor of DNA polymerase delta δ in eukaryotic cell
(C) It is a cofactor of DNA polymerase delta δ in eukaryotic cell, involved in the synthesis of DNA
(D) It is a cofactor of DNA polymerase delta δ in eukaryotic cell, involved in the synthesis and repair of DNA

32. The type of mitosis where the nuclear envelope remains intact is called :

(A) The open mitosis
(B) The closed mitosis
(C) The intact nucleus mitosis
(D) Nuclear envelope cannot remain intact during mitosis

33. In which of the following stages of prophase-1, homologous chromosomes align side-by-side in such a way that the allelic genes are situated adjacent to one another ?

(A) Leptotene (B) Zygotene
(C) Pachytene (D) Diplotene

34. Which among the following structures is a reservoir of Ca^{2+} in the cell ?

(A) Lysosome (B) Microbody
(C) Golgi body (D) Endoplasmic reticulum

35. Which of the following minerals does **not** function as prosthetic group in enzymes ?

(A) Iron (B) Copper
(C) Molybdenum (D) Iodine

36. Which of the following is a major lipid soluble antioxidant in cell membranes and plasma lipoproteins ?

(A) Vitamin A (B) Vitamin D
(C) Vitamin E (D) Vitamin K

37. Formation of uric acid from purine nucleosides by way of the purine bases hypoxanthine, xanthine, and guanine does **not** involve :

(A) Orotic acid (B) Adenosine
(C) Guanosine (D) Inosine

38. The order of enzymes involved in the biosynthesis of mevalonate is as follows :

(A) HMG-CoA synthase, HMG-CoA reductase, Thiolase
(B) HMG-CoA reductase, HMG-CoA synthase, Thiolase
(C) Thiolase, HMG-CoA reductase, HMG-CoA reductase
(D) Thiolase, HMG-CoA synthase, HMG-CoA reductase

39. 5.8S RNA is a type of :

(A) snRNA (B) miRNA
(C) rRNA (D) tRNA

40. The mammalian nuclear DNA-dependent RNA polymerase II is involved in the synthesis of :

(A) snRNA (B) snRNA and miRNA
(C) mRNA and snRNA (D) mRNA and miRNA

41. The binding of aminoacyl-tRNA to the A site occurs in which of the following phases of translation ?
    (A) Initiation phase
    (B) Elongation phase
    (C) Termination phase
    (D) It occurs prior to the initiation phase

42. The operon model was proposed by :
    (A) Jacob and Monod
    (B) Avery, MacLeod, and McCarty
    (C) Watson and Crick
    (D) None of the above

43. Which of the following is not prescribed for the treatment caused by bacteria ?
    (A) Penicillin
    (B) Tetracyclin
    (C) Griseofulvin
    (D) Chloramphenicol

44. The primary stain used in Ziehl-Neelsen method to differentiate bacteria into acid fast and non-acid fast groups is :
    (A) Safranin
    (B) Methylene blue
    (C) Carbol fuchsin
    (D) Crystal violet

45. *E.coli* is a :
    (A) Gram positive rod shaped bacteria
    (B) Gram negative facultative anaerobe
    (C) Gram positive anaerobic bacteria
    (D) Gram negative obligatory anaerobic, rod shaped bacteria

46. Which of the following is a division of bacteria that constitutes the bacteria without the cell wall ?
    (A) Gracilicute
    (B) Firmicute
    (C) Tenericute
    (D) Mendosicute

47. Which of the following is/are a systemic autoimmune disease/s ?
    (A) Systemic lupus erythematosus
    (B) Multiple sclerosis and scleroderma
    (C) Rheumatoid arthritis
    (D) All the above options are correct

48. The HIV infection is termed as AIDS when the T_H cell count falls below :

(A) 10 cells/mm^3 (B) 50 cells/mm^3

(C) 100 cells/mm^3 (D) 200 cells/mm^3

49. Which of the following is an **incorrect** statement about DNA vaccine ?

(A) DNA vaccine is easy to manufacture in large quantity

(B) DNA vaccine ensures that there is no strong immune response against vaccine

(C) DNA vaccine can be formed against a polysaccharide antigen

(D) A mixture of plasmids can be used to form broad-spectrum vaccine

50. Which of the following is a/are major type/s of the antigenic determinant or epitope on immunoglobulin ?

(A) Isotype (B) Allotype

(C) Idiotype (D) All of the above

51. The usual centrifugal force and time of centrifugation used in automated centrifugation units for blood specimen is :

(A) 1,000 × *g* for 8-12 minutes (B) 3,000 × *g* for 8-12 minutes

(C) 1,000 × *g* for 20-30 minutes (D) 3,000 × *g* for 20-30 minutes

52. Anuria is a condition when the urine output is less than :

(A) 10 ml/24 h

(B) 50 ml/24 h

(C) 100 ml/24 h

(D) The urine output is totally blocked in anuria

53. Gout is an inherited disorder of :

(A) Pyrimidine metabolism (B) Purine metabolism

(C) Thyroid (D) Pituitary

54. Non-protein nitrogenous compounds are excreted by the body through the :

(A) Liver (B) Kidney

(C) Intestine (D) Lung

55. The cations sodium and potassium in the plasma are counterbalanced by a number of anions, most notably the :

(A) Phosphate (B) Bicarbonate
(C) Chloride (D) Protein

56. Which of the following condition/s increase the lungs ability to eliminate CO_2, resulting in hypocapnia ?

(A) Chronic obstructive airways disease
(B) Pulmonary fibrosis
(C) Emphysema
(D) None of the above

57. Wilson's disease is a :

(A) Disorder of copper metabolism (B) Vascular disease of the liver
(C) Portal vein thrombosis (D) Congenital hepatic fibrosis

58. A person with sex chromosome, XXY would have :

(A) 1 Barr body (B) 2 Barr bodies
(C) 3 Barr bodies (D) No Barr body

59. Trisomy 21 is :

(A) Patau syndrome (B) Edward syndrome
(C) Down syndrome (D) Turner syndrome

60. Which of the following technique can be performed on RNA ?

(A) Northern blotting (B) Southern blotting
(C) Western blotting (D) None of the above

M.Sc. Clinical Biochemistry/A

1. Which one of the following is not a major internet protocol ?
   (A) e mail (B) HTTP
   (C) FTP (D) MS

2. Which one of the following statements about bioinformatics is not true ?
   (A) Bioinformatics is the study of the structure of biological systems
   (B) Bioinformatics is a postal correspondence course in biology
   (C) Bioinformatics derives knowledge from computer analysis of biological data
   (D) Bioinformatics is storage, manipulation and analysis of biological information via computer science

3. Two water droplets merge with each other to form a larger droplet. In this process :
   (A) Energy is liberated
   (B) Energy is absorbed
   (C) Energy is neither liberated nor absorbed
   (D) Some mass is converted into energy

4. Fast neutrons can easily be stopped by :
   (A) Use of lead shield (B) Passing them through water
   (C) Elastic collision with heavy nuclei (D) Applying a strong electrical field

5. Which one of the following is a method of ascertaining whether two variables are correlated or not ?
   (A) t-Test (B) Scatter Diagram method
   (C) Chi Square test (D) None of the above

6. Which one of the following statements regarding Kurtosis is not true ?
   (A) It is used for description and comparison of frequency distribution
   (B) It is peakedness of the distribution
   (C) Kurtosis means 'Bulginess'
   (D) Kurtosis for a distribution is positive when mean and median for a distribution are different

7. Which one of the following is not a 'restricted random sampling' method ?

(A) Stratified sampling (B) Systematic sampling

(C) Lottery method (D) Cluster sampling

8. Which one of the following can be used to test whether there is a significant difference between observed frequency distribution and theoretical probability distribution ?

(A) Unpaired t-Test (B) Chi Square Test

(C) Paired t-test (D) None of the above

9. Which one of the following statements is false ?

(A) Collagen is a protein in which the polypeptides are mainly in the α-helix conformation

(B) Disulfide linkages are important for keratin structure

(C) Gly residues are particularly abundant in collagen

(D) α-keratin is a protein in which the polypeptides are mainly in the α-helix conformation

10. Which one of the following is not a nucleic acid ?

(A) mRNA (B) Plasmids

(C) Prions (D) Virions

11. A-form of DNA has all the following features, except :

(A) Right handed helix

(B) Major groove is narrow and deep

(C) Most prevalent form within the cell

(D) Strands are held together by hydrogen bonds

12. Which one of the following statements is not correct :

(A) Glycosaminoglycans are hetero polysaccharides made of repeat disaccharide units

(B) Glycosaminoglycans are extensively branched

(C) Majority of Glycosaminoglycans are linked to core proteins to form proteoglycans

(D) Glycosaminoglycans are excellent lubricators and shock absorbers

13. Which one of the following statements regarding transition-state analogue is correct :

(A) resembles the transition-state structure of the normal enzyme-substrate complex

(B) typically reacts more rapidly with an enzyme than the normal substrate

(C) is less stable when binding to an enzyme than the normal substrate

(D) stabilizes the transition state for the normal enzyme-substrate complex

14. All the following are examples of enzyme induction except :

(A) Beta galactosidase by lactose

(B) Tryptophan pyrrolase by glucocorticoids

(C) Transaminases by insulin

(D) ALA synthase by barbiturates

15. The active site of glycolytic enzyme hexokinase has a histidine residue and this enzyme is active when this histidine is not ionized. If hydrogen ions are added to this enzyme solution, what type of inhibition results ?

(A) Competitive inhibition

(B) Non-competitive inhibition

(C) Allosteric inhibition

(D) Covalent inhibitory modification

16. When substrate concentration is equal to Km value :

(A) Half of the enzyme molecules are bound to the substrate molecules and other half are free

(B) Maximum velocity is achieved

(C) Maximum enzyme molecules are taking part in the reaction

(D) The reaction is now at equilibrium

17. During meiosis which one of the following processes occurs ?

(A) Genomic imprinting

(B) Gene amplification

(C) Gene Recombination

(D) Gene switching

18. Which of the following is found in both prokaryotic and eukaryotic cells ?

(A) Centriole

(B) Lysosome

(C) Nucleolus

(D) Ribosome

19. Which of the following contains a microtubular structure similar in form to a basal body ?

(A) Centriole
(B) Lysosome
(C) Nucleolus
(D) Peroxisome

20. Which among the following contains hydrolytic enzymes associated with the intracellular digestion of macromolecules ?

(A) Centriole
(B) Lysosomes
(C) Nucleolus
(D) Peroxisome

21. Ketone bodies are produced mainly in :

(A) Brain
(B) Liver
(C) Erythrocytes
(D) Skeletal Muscle

22. Sources of NADPH for fatty acid biosynthesis include the following, except :

(A) Glucose-6-phosphate dehydrogenase
(B) 6-phosphgluconate dehydrogenase
(C) Cytoplasmic malate dehydrogenase
(D) Cytoplasmic isocitrate dehydrogenase

23. Fats and proteins can be used as fuel in the cell because they :

(A) can be converted to glucose by enzymes
(B) can be converted to intermediates of glycolysis or the citric acid cycle
(C) can pass through the mitochondrial membrane to enter the citric acid cycle
(D) contain more energy than glucose

24. Basal metabolic rate is increased by all the following, except :

(A) Fever
(B) Thyroxine
(C) Starvation
(D) Cold climate

25. RNAs, such as self-splicing introns, that can catalyze biological reactions are known as:

(A) enzymes
(B) spliceosomes
(C) ribozymes
(D) mature RNAs

26. Which one of the following statements is true for Human DNA ?

(A) 50% of human DNA contains genes and the rest are silent areas

(B) About 1% of human DNA is present inside mitochondria

(C) 10% of human DNA is unique or non repetitive

(D) There are around a thousand coding regions in human DNA

27. Which one of the following statements is true for transcription ?

(A) The TATA box or pribnow box is not on template strand, but on the coding strand

(B) Promoters are specific areas on the mRNA

(C) Termination of transcription can never be rho independent

(D) In bacterial primary transcript introns are cleaved and exons are spliced to form mature mRNA molecules

28. Which one of the following statements is true for translation ?

(A) Translation is a nuclear process of the cell

(B) Puromycin inhibits translation in bacteria but not in mammals

(C) 'P' or peptidyl site of ribosomal assembly carrics peptidyl tRNA

(D) Aminoacyl tRNA synthase is not very specific for the tRNA and amino acid

29. Bacterial Spores :

(A) Are resistant to antibodies

(B) Allow the bacteria to multiply in adverse conditions

(C) are usually formed by gram negative bacteria

(D) can be identified with gram stain

30. Which of the following statements regarding Human Immunodeficiency Virus on entering host cell is true :

(A) The RNA strand serves as the mRNA strand for protein synthesis

(B) Viral RNA is acted upon by the reverse transcriptase and a complementary DNA strand is produced

(C) RNA-DNA hybrid is acts on the genetic material

(D) Virus is not integrated into the host cell

31. The following are true about hepatitis B :
    (A) it is a RNA virus
    (B) immunity can be acquired by vaccination with a live attenuated virus
    (C) persistent presence of HBsAg increases the risk of chronic liver disease
    (D) the average incubation period is 30 days

32. The mechanism of action of tetracycline is that it :
    (A) Inhibits tRNA binding to ribosome
    (B) Decreases binding of ribosome to mRNA
    (C) Causes misreading of codes
    (D) Inhibits translocation

33. Which one of the following statements is true ?
    (A) In peripheral blood 15% of lymphocytes are T cells and 80% of lymphocytes are B cells
    (B) The B cells lead to humoral immunity and cell mediated immunity
    (C) T helper cells carry CD8 determinants on the cell surface
    (D) T suppressor cells down regulate the activities of both T and B cells

34. Which one of the following statements is true ?
    (A) IgM is the major circulating antibody amounting to ~80% of total immunoglobulins
    (B) IgG, IgD and IgE can cross the placental barrier and protect a newborn from infection
    (C) IgM is the predominant class of antibody in the primary response
    (D) IgA has five subunits and a characteristic J chain

35. Which one of the following statements is true ?
    (A) Area of immunoglobulin capable of binding complement lies in Fab Fragment
    (B) Pepsin a proteolytic enzyme cleaves Immunoglobulin so that two Fab portions combined together are released
    (C) Both heavy and light chains of immunoglobulin contain variable and constant regions
    (D) Depending on type of heavy chain the Immunoglobulins are differentiated into seven classes

36. Which one of the following statements is true ?

(A) Allograft is rejected mainly by T cell mediated mechanisms

(B) B cells when stimulated by antigens secrete soluble substances called cytokines

(C) T cells are involved in phagocytosis

(D) The complement system is comprised of carbohydrates present in T cells

37. In X linked recessive inheritance, when the father is a patient and mother normal :

(A) All daughters will be carriers

(B) Amongst sons half will be normal

(C) 25 % of female offsprings will be sufferers

(D) 25 % of female offsprings will be genetically normal

38. Which one of the following is an example of traditional inheritance ?

(A) Uniparental disomy (B) Cytoplasmic inheritance

(C) Genomic imprinting (D) Chromosomal crossing over

39. If the allele for green pod color (G) is dominant over the allele for yellow pod color (g), which of the following genotypes would a plant with yellow pods have ?

(A) GG (B) gg

(C) Gg (D) gG

40. Which of the following statements is correct ?

(A) Syntheny : presence of genes on the same chromosome

(B) Isochromosome : chromosomes which are identical to each other

(C) Genoscopy : similar genotypes that manifest as different phenotypes

(D) Autosome : 23 pairs in normal human beings

41. "Gene library" is a term used to describe :

(A) a computerized listing of known DNA sequences

(B) bacteria with plasmids containing DNA fragments representing the majority of the genetic information from a plant or animal

(C) a collection of books about recombinant DNA technology

(D) a compilation of the amino acid sequences of protein coding genes

42. Application of recombinant DNA technology include all the following, except :
    (A) Detection of oncogenes
    (B) Detection of mutations
    (C) Inhibition of replication
    (D) Gene therapy

43. Application of Polymerase Chain reaction include all the following, except :
    (A) To identify bacterial strains
    (B) Amplification of genes to detect mutations
    (C) To detect drug resistance of bacteria
    (D) To multiply DNA available for finger printing

44. Restriction fragment Length Polymorphism is used to :
    (A) Identify a specific gene in bacteria
    (B) Locate mutations in DNA
    (C) Study the rate of Transcription
    (D) To amplify genes

45. HDL cholesterol is said to be good cholesterol, because :
    (A) HDL contains enzymes to break down cholesterol
    (B) HDL carries cholesterol from liver to tissues where it is broken down
    (C) HDL carries cholesterol from tissues to liver wherefrom it is excreted
    (D) HDL inhibits cholesterol synthesis

46. All enzymes are elevated in obstructive liver desease, except :
    (A) Gamma glutamyl transferase
    (B) 5' Nucleotidase
    (C) Alkaline phosphatase
    (D) Lactate dehydrogenase

47. Insulin increases activity of all the following enzymes, except :
    (A) Acetyl CoA carboxylase
    (B) Hormone sensitive lipase
    (C) Glycogen synthase
    (D) Glucose-6-phosphate dehydrogenase

48. Acute pancreatitis can be diagnosed by estimation the blood concentration of one of the following enzymes :
    (A) Alkaline phosphatase
    (B) Acid phosphatase
    (C) Alanine transaminase
    (D) Amylase

49. Which one of the following statements is not true ?

(A) Rh factor is an antigen present on RBC's

(B) Anti-D is naturally present in Rh negative persons

(C) Rh factor was first found in Rhesus monkey and thus named after it

(D) Persons having D-antigen on their RBC's are called Rh positive

50. Which one of the following is not true for a synapse ?

(A) In an electrical synapse there is a direct exchange of ions between pre synaptic and post synaptic neurons

(B) In a chemical synapse there is direct exchange of ions between pre synaptic and post synaptic neurons

(C) There is a space called synaptic cleft between pre synaptic and post synaptic neurons in a chemical synapse

(D) Synapse can be classified on anatomical and functional basis

51. Which one of the following statements regarding the thyroid gland is not true ?

(A) Synthesis of thyroid hormones takes place in the thyroglobulin secreted by follicular cells

(B) Thyroid gland secretes three hormones

(C) Thyroid hormones can be stored for several months in conjugation with thyroglobulin

(D) Thyroglobulin is released in the blood under the influence of TSH

52. Which one of the following is not true regarding absorption of calcium ?

(A) Absorption is increased by vitamin D

(B) Acidity favors calcium absorption

(C) Deficiency of bile favors absorption of calcium

(D) Basic amino acids increase calcium absorption

53. The rate of flow of water through xylem is regulated by :

(A) passive transport in the pith

(B) force of transpiration; pull

(C) number of companion cells in the phloem

(D) active transport by the sieve-tube members

54. Which would you expect to increase the rate of photosynthesis ?

(A) increasing the carbon dioxide concentration

(B) decreasing the intensity of exposure to red light

(C) increasing the oxygen concentration

(D) decreasing the duration of exposure to red light

55. This plant hormone inhibits the effects of other hormones :

(A) Auxins (B) Cytokinin

(C) Ethylene (D) Abscisic acid

56. Plant stems bend toward the light as a result of increased :

(A) chlorophyll synthesis on the side of the stem near the light source

(B) cell division on the side of the stem near the light source

(C) cell elongation on the side of the stem near the light source

(D) cell elongation on the side of the stem away from the light source

57. Faraday's laws of electrolysis are related to the :

(A) atomic number of the cation (B) atomic number of the anion

(C) equivalent weight of the electrolyte (D) speed of the cation

58. Which one of the following is fully correct statement ?

(A) Combustion is an endothermic redox reaction. Redox reactions are those that involve the complete transfer of electrons from one chemical species to another. The chemical species that gains electrons is known as the oxidant or oxidising agent.

(B) Combustion is an exothermic redox reaction. Redox reactions are those that involve the complete transfer of electrons from one chemical species to another. The chemical species that gains electrons is known as the oxidant or oxidising agent.

(C) Combustion is an exothermic redox reaction. Redox reactions are those that involve the complete transfer of electrons from one chemical species to another. The chemical species that gains electrons is known as the reductant or reducing agent.

(D) Combustion is an exothermic redox reaction. Redox reactions are those that involve the complete transfer of electrons from one chemical species to another. The chemical species that loses electrons is known as the oxidant or oxidising agent.

59. Which of the following statements is correct ?

(A) A dissociative mechanism is a 2-step mechanism with the leaving group departing in the second step

(B) An associative mechanism is a 2-step mechanism; the intermediate has a lower coordination number than the starting complex

(C) In a dissociative interchange mechanism, bond breaking dominates over bond formation

(D) In an associative interchange mechanism, the entering group associates with the substrate after the leaving group has departed

60. Which statement is *incorrect* about the mechanisms of electron transfer ?

(A) Electron transfer may occur by an inner or outer-sphere mechanism depending on the system

(B) Long range electron-transfers such as in cytochromes are most likely to occur by outer-sphere mechanisms

(C) Marcus-Hush theory applies to inner-sphere mechanisms

(D) In an inner-sphere mechanism, electron transfer between two metal centres involves a bridging ligand

Clinical Biochemistry

1. The 2010 Nobel prize in physiology and medicine was awarded to :
   (a) Venkataraman Ramakrishnan (b) Carol W. Greider
   (c) Barak Obama (d) Robert G. Edwards

2. Choose the odd one out :
   (a) Twitter (b) Orkut
   (c) Google (d) Facebook

3. The company manufacturing the iPod and Apple computers was co-founded in 1976 by :
   (a) Bill Gates (b) Steve Jobs
   (c) Henning Kagermann (d) Shantanu Narayen

4. The spontaneous exergonic reactions are usually associated with :
   (a) Loss of free energy (b) Gain of free energy
   (c) Positive ΔG (d) No change in free energy

5. Test of hypothesis; $H_0 : \mu = 70$ vs $H_1 : \mu > 70$ leads to :
   (a) One sided left tailed test (b) One sided right tailed test
   (c) Two tailed test (d) None of the above

6. A sample of 12 blood specimens taken from a normal population is expected to have a mean 50mg/cc of a given substance. The sample has a mean 64mg/cc with variance of 25. To test the hypothesis $H_0 : \mu = 50$ vs $H_1 : \mu \neq 50$, the test reveals that for $\alpha = 0.05$, H_0 should be : [Given $t_{0.05,11} = 2.201$]
   (a) Rejected (b) Accepted
   (c) Left undecided (d) None of the above

7. Average wages of workers of a factory are Rs. 550 per month and the standard deviation of wages is 110. The coefficient of variation is :
   (a) C.V. = 30% (b) C.V. = 15%
   (c) C.V. = 500% (d) C.V = 20%

8. The tools of Bioinformatics are least useful when one wants to :

(a) Deduce the three dimensional structure of a protein

(b) Determine the amino acid sequence of a protein whose gene is known

(c) To express a gene

(d) To design the DNA probe

9. All the following amino acids present in proteins contain the chiral α - carbon, except :

(a) Glycine (b) Alanine

(c) Histidin (d) Proline

10. Which of the following forces stabilize the tertiary structure of a protein ?

(a) Van der Waals interactions (b) Hydrogen bonds

(c) Covalent bonds (d) All of the above

11. Which of the following techniques will provide the highest resolution structural information of proteins ?

(a) NMR spectroscopy (b) X-ray Crystallography

(c) Electron Microscopy (d) Electrophoresis

12. A typical C-C covalent bond has a length of :

(a) 154 pico-meters (b) 10.4 nanometers

(c) 1.54 nanometers (d) 15.4 pico-meters

13. Which of the following statements about competitive enzyme inhibitors is not true ?

(a) It acts by decreasing the number of free enzyme molecules available to bind the substrate

(b) Its effect can be reversed by increasing the substrate concentration

(c) It binds irreversibly to the substrate binding site of the enzyme

(d) It does not alter the V_{max}, but raises the apparent K_m for the substrate

14. Which of the following statements is not true for catalysis ?

(a) A catalyst remains unchanged in mass and chemical composition at the end of the reaction

(b) A catalyst does not initiate the chemical reaction

(c) Catalyst can change the nature of the products of the reaction

(d) In a reversible reaction, a catalyst can establish the equilibrium early, but it cannot alter the position of the equilibrium

15. Which of the following contribute least to the buffering capacity of blood ?

(a) Bicarbonate
(b) Plasma proteins
(c) Hemoglobin
(d) Phosphates

16. In accordance with International Union of Biochemists (IUB) guidelines, the enzyme commonly known as 'hexokinase' is designated as :

(a) ATP : D-hexose-6-phosphotransferase
(b) ATP : D- hexose-1-phosphotransferase
(c) ADP : D- hexose-6- phosphotransferase
(d) ADP : D-hexose-1-phosphotransferase

17. Which of the following is a false statement for Prostaglandins ?

(a) They act as local hormones in many mammalian tissues
(b) They are associated with important physiological and pharmacological activities
(c) They belong to poly-saturated fatty acids
(d) They are synthesized in-*vivo* by cyclization of the center of carbon chain of 20 carbon polyunsaturated fatty acids

18. Which of the following statements about the mammalian mitochondria is true ?

(a) It carries a small closed circular double-stranded DNA
(b) It carries a small linear double-stranded DNA
(c) It carries an open circular single-stranded DNA
(d) Mammalian mitochondria do not carry any DNA

19. In which phase of the cell cycle a Barr body may be observed ?

(a) Metaphase
(b) S-phase
(c) Interphase
(d) Telophase

20. All are the common features of the prokaryotic and eukaryotic cells, except :

(a) Ribosomes
(b) Mitochondria
(c) Deoxyribonucleic acid
(d) Lipids

21. All of the following statements about Acetyle-CoA are true, except :

(a) It is generated by β-oxidation of fatty acids

(b) It is not the precursor for the synthesis of fatty acids

(c) It is generated by the metabolism of glucose

(d) It is the precursor for the synthesis of cholesterol

22. The type-I glycogen storage disorder (i.e., Von Gierke's disease) is due to the deficiency of :

(a) Phosphofractokinase (b) Muscle Phosphorylase

(c) Glucose-1- phosphatase (d) Glucose-6-phosphatase

23. Which of the following is the essential fatty acid ?

(a) Stearic acid (b) Oleic acid

(c) Linoleic acid (d) Palmitic acid

24. All are used to calculate BMR, except :

(a) Food (b) Weight

(c) Height (d) Age

25. Which of the following statements is most appropriate ?

(a) Genes always code for proteins (b) Genes often code for proteins

(c) Genes never code for proteins (d) Genes seldom code for proteins

26. The genes carry mainly the following information about the encoded proteins :

(a) The primary structure of a protein

(b) The secondary structure of a protein

(c) The tertiary structure of a protein

(d) The genes do not code for the structure of a protein

27. Which of the following statement is true for a gene promoter ?

(a) A promoter is a transcription factor that promotes the gene expression

(b) A promoter is a protein that inhibits the gene silencing process

(c) A promoter binds to the RNA polymerase

(d) A promoter is the region of DNA to which the DNA-polymerase interacts

28. The coding strand nucleotide sequence that reads 5′-GTGCAGC-3′ in DNA, will be represented in the mRNA as :

(a) 5′-CACGUCG-3′ (b) 5′-GCUGCAC-3′

(c) 5′-GTGCAGC-3′ (d) 5′-GUGCAGC-3′

29. The pathogenic bacteria develop multi-drug resistance by acquiring the (MDR) gene that codes for :

(a) An enzyme that degrades most of the available antibiotics

(b) An inhibitor that blocks the uptake of antibiotics by the bacterial cell

(c) An enzyme that detoxifies the antibiotics

(d) A trans-membrane transporter that drives the antibiotics out of the bacterial cell

30. Which of the following statements about HIV genome is correct ?

(a) It is a single stranded circular DNA

(b) It is a single stranded circular (–) RNA

(c) It is segmented single stranded (–) RNA

(d) It is segmented single stranded (+) RNA

31. Which among the following is a DNA virus ?

(a) Rota virus (b) Herpes virus

(c) Hepatitis A virus (d) Polio virus

32. The anti-bacterial mode of action of Streptomycin is :

(a) It binds to 30S ribosomal subunit and inhibits protein synthesis initiation

(b) It binds to formyl-methionyl-tRNA and inhibits protein synthesis initiation

(c) It binds to DNA polymerase and inhibits replication

(d) It perforates the bacterial cell wall leading to its lysis

33. The least contribution to the immune system is by :

(a) Erythrocytes (b) B-lymphocytes

(c) T-lymphocytes (d) Macrophages

34. The class of antibodies that is predominantly present in nasal secretions is :

(a) IgG1 (b) IgG2b

(c) IgE (d) IgM

35. Which of the following is not the part of an immunoglobulin ?

(a) Fab fragment (b) Fc region

(c) Epitope (d) Antigen binding site

36. What about T-Lymphocytes is not true ?

(a) T-Lymphocytes are important constituents of vertebral immune system

(b) T-Lymphocytes play role in anti-cancer immune response

(c) T-Lymphocytes secrete antibody molecules present in lymph

(d) T-Lymphocytes are WBCs

37. The human genome consists of nearly :

(a) 150'000 genes (b) 200'000 genes

(c) 35'000 genes (d) 10'000 genes

38. A man heterozygous for blood group -A antigen marries a woman with blood group-O. Which of the following statements is true ?

(a) The probability that they will have children with blood group-O is 25%

(b) The probability that they will have children with blood group-O is 50%

(c) None of their children will have the blood group-O

(d) All of their children will have the blood group-A

39. In Mendel's garden peas, the smooth allele (W) is dominant over the wrinkled allele (w), and green pod allele (Y) is dominant over the yellow pod allele (y). What is the genotype of a heterozygous green pod allele that shows wrinkled phenotype ?

(a) WWYY (b) WwYy

(c) WWYy (d) wwYy

40. If a plant with the heterozygous genotype Ww is crossed with another plant also with heterozygous Ww genotype, what would be the proportion of offspring that would be heterozygous ?

(a) 1/2
(b) 1/4
(c) 3/4
(d) All will be heterozygous

41. A nucleic acid upon analysis was found to be composed of 32.5% adenine, 17.5% cytosine, 18% guanine and 32% thymine. The nucleic acid most likely is :

(a) A double stranded RNA
(b) A double stranded DNA
(c) A single stranded DNA
(d) Any of the above

42. The cloning vector that can incorporate the largest insert DNA is :

(a) Plasmid
(b) Cosmid
(c) BAC
(d) Phagemid

43. All of these involve recombinant DNA technology, except :

(a) Development of Dolly
(b) Development of pest-resistant crops
(c) Development of passive immunity
(d) Development of DNA vaccine

44. The 5′-end of the gene codes for :

(a) The 3′- end of the mRNA
(b) The N′ -termini of the polypeptide
(c) The C′- termini of the polypeptide
(d) The 3′-poly-A tail in the eukaryotic mRNA

45. The enzyme not measured in LFT is :

(a) SGOT
(b) SGPT
(c) ALP
(d) CK

46. Which of the following disease is not associated to the altered protein conformation ?

(a) Alzheimer's disease (b) Prion disease

(c) Skilled cell anemia (d) α-Thalassemia

47. All of the following constitute the ketone bodies formed in liver, except :

(a) Acetone (b) α-keto glutarate

(c) Acetoacetate (d) 3-hydroxybutyrate

48. Which of the following is having the lowest density ?

(a) Chylomicron (b) HDL

(c) LDL (d) VLDL

49. The chemical nature of insulin hormone can be best characterized as :

(a) Polysaccharide (b) Polypeptide

(c) Steroid (d) Proteoglycan

50. The average life span of a Red Blood Cell is :

(a) 30 hours (b) 90 days

(c) 120 days (d) 120 hours

51. Heart rate is maximum in a normal :

(a) Adult (b) Child

(c) Newborn (d) Fetus

52. Which of the following is responsible for propelling of Chyme in small intestines ?

(a) Haustrations (b) Segmentation

(c) Peristalsis (d) Migratory motor complexes

53. All of the following are associated with mitochondrion except :

(a) Oxidative phosphorylation (b) Inner membrane

(c) Ribosome (d) Calvin cycle

54. In TCA cycle, CO_2 release is catalyzed by :

(a) Thiokinase
(b) Citrate dehydrogenase
(c) Isocitrate dehydrogenase
(d) Alpha-ketoglutrate

55. All of these are plant growth regulators, except :

(a) Auxins
(b) Gibberellins
(c) Cytokinins
(d) Epidermal Growth Factors

56. The activity of the *Cytochrome c oxidase* can be blocked by :

(a) Antimycin-A
(b) Piericidin-A
(c) Oligomycin
(d) Cyanide

57. Which of the following statements is wrong for the following reaction :

$N_2(g) + O_2(g) + 43.2$ Kcal $\rightleftharpoons$ 2 NO (g)

(a) The formation of nitric oxide will be favored by raising the temperature
(b) The formation of nitric oxide will be favored by raising the pressure
(c) The formation of nitric oxide will be favored by increasing the concentration of N_2 and O_2
(d) The formation of nitric oxide is an endothermic process

58. An unshielded hydrogen nucleus covalently bound to an electron-withdrawing oxygen or nitrogen atom can interact with an unshared electron pair on another oxygen or nitrogen atom to form a :

(a) Covalent bond
(b) A partial ionic bond
(c) A hydrogen bond
(d) An electrovalent bond

59. A biochemical oxidation reaction is not associated with :

(a) Gain of electrons
(b) Loss of electrons
(c) Gain of an oxygen atom
(d) Loss of a hydrogen atom

60. Which of the following elements will have [$3d^{10}$, $4S^2$] as the outer most electronic configuration ?

(a) Copper
(b) Nickel
(c) Zinc
(d) Iron

Clinical Biochemistry - 2010

1. The cholesterol ($C_{27}H_{46}O$) content of a blood sample is 325 mg in 10.0 mL. What is the molarity of cholesterol ? (Atomic weights: C= 12.01, H = 1.008, O = 16.00).
   (a) 0.0841 (b) 0.841
   (c) 8.41 (d) 84.1

2. Which of the following compounds has zero dipole moment ?
   (a) Cis-2-Butene (b) Trans-2-Butene
   (c) 1-Butene (d) 2-methyl-1-propene

3. Which of the following compound would be optically active ?
   (a) ter-Butanol (b) sec-Butanol
   (c) n-Butanol (d) 1-Chloro-4-hydroxy butane

4. What is the pH value of M/1000 HCI solution ?
   (a) 1.5 (b) 2.5
   (c) 3.0 (d) 3.5

5. Numbers are stored and transmitted inside a computer in :
   (a) Decimal form (b) ASCll code form
   (c) Alphanumeric form (d) Binary form

6. Which of the following is not a computer antivirus ?
   (a) Symantec (b) AVG
   (c) Norton (d) None of the above

7. Glucose and Galactose are epimers that differ in configuration at :
   (a) C2 (b) C3
   (d) C4 (d) C5

8. Arachadonic acid contains :
   (a) 2 double bonds (b) 3 double bonds
   (c) 4 double bonds (d) 5 double bonds

9. Cyclopentano-phenanthrene is the nucleus of :
   (a) Cholesterol (b) Ceramides
   (c) Amino sugars (d) Gangliosides

10. Which of the following acids has the strongest conjugate base ?
    (a) CH_3COOH (b) H_2SO_4
    (c) HCOOH (d) HIO_4

11. A man wants to swallow a very bitter tablet. He must avoid the contact of the tablet with the :
    (a) Back of the tongue (b) Tip of the tongue
    (c) Sides of the tongue (d) Under the surface of the tongue

12. Rhodopsin is also is also called :
    (a) Visual red (b) Visual green
    (c) Visual purple (d) Visual violet

13. Which of the following is the most important marker for myocardial damage ?
    (a) Troponin (b) Lactate dehydrogenase
    (c) Alkaline phosphatase (c) Myoglobin

14. In Alkaptonuria there is defect in catabolism of which amino acid ?
    (a) Arginine (b) Alanine
    (c) Phenylalanine (d) Proline

15. Aspartate transaminase is also called :
    (a) Serum glutamic aspartic transaminase
    (b) Serum glutamic oxaloacetic transaminase
    (c) Serum aspartic oxaloacetic transaminase
    (d) Serum glutamine acetate transaminase

16. If two parents are homozygous for a genetically inherited recessive trait, what is the probability that they will have a child who does not have this trait in his or her phenotype ?
    (a) 0% (b) 25%
    (c) 7.5% (d) 100%

17. In humans pointed eyebrows are dominant to smooth eyebrows and widow's peak (downward pointed frontal hairline) is dominant to continuous hairline. What phenotypic ratio would you expect in the offspring from a cross between an individual heterozygous for both genes and an individual homozygous recessive for both genes ?
    (a) 9:3:3:1 (b) 9:3:4
    (c) 1:1:1:1 (d) 9:7

18. BMR (Basal Metabolic Rate) :
    (a) Increases with age
    (b) Decreases with age
    (c) Remains the same
    (d) No correlation between the BMR and age

19. Choose the odd one :
    (a) Pentose phosphate pathway
    (b) Hexose monophosphate shunt
    (c) Phosphogluconate pathway
    (d) None of the above

20. Which of the following is not a product of citric acid cycle ?
    (a) NADH
    (b) FADH2
    (c) ATP
    (d) Co2

21. The electrons in electron transport chain move from one carrier to another because :
    (a) Carriers are present in decreasing order of reduction potential
    (b) Carriers are present in increasing order of reduction potential
    (c) Carriers are present in increasing order of oxidation potential
    (d) None of the above

22. Palmitoyl-CoA (16 carbon) undergoes :
    (a) 6 rounds of β oxidation
    (b) 7 rounds of β oxidation
    (c) 8 rounds of β oxidation
    (d) 9 rounds of β oxidation

23. Ketone bodies originate from :
    (a) Acetoacetate
    (b) Acetone
    (c) Beta hydroxy butyrate
    (d) Acetyl Co A

24. Which of the following is not a true statement ?
    (a) β oxidation occur in mitochondria
    (b) Fatty acid biosynthesis occur in cytoplasm
    (c) Fatty acid biosynthesis starts with Acetyl Co-A
    (d) None of the above

25. Urea cycle occurs in :
    (a) Mitochondria only
    (b) Cytosol only
    (c) Mitochondria & cytosol
    (d) Mitochondria, cytosol, Lysosomes

26. Uric acid is :
    (a) Purine
    (b) Pyrimidine
    (c) Both (a) & (b)
    (d) Protein

27. Inosine monophosphate gives rise to :
    (a) ATP
    (b) GTP
    (c) Both (a) & (b)
    (d) None of the above

28. Binding of inhibitor directly to the enzyme substrate complex but not to free enzyme is an example of :
    (a) Competitive inhibition
    (b) Un-competitive inhibition
    (c) Allosteric inhibition
    (d) None of the above

29. If many enzymes catalyze the same reaction, what would be the basis for choosing the best one to perform the reaction for you ?
    (a) Low Km value
    (b) High Km value
    (c) Intermediate value of Km
    (d) None of the above

30. Group 3 enzymes according to enzyme classification are :
    (a) Oxido redutases
    (b) Transferases
    (c) Hydrolases
    (d) Lyases

31. High density lipoproteins are the carriers of :
    (a) Endogenous cholesterol from tissue to liver
    (b) Endogenous triacylglycerol from tissue to liver
    (c) Endogenous cholesterol from liver to tissue
    (d) Endogenous triacylglycerol from liver to tissue

32. Symport indicates :
    (a) Transport of two different molecules in opposite direction
    (b) Transport of same molecules in opposite direction
    (c) Transport of two different molecules in same direction
    (d) Transport of molecule against concentration gradient

33. P53 is a :
    (a) Tumor inducer gene
    (b) Tumor suppressor gene
    (c) Mutagen which leads to tumors
    (d) None of the above

34. Which form of DNA is left handed ?

(a) A-DNA (b) B-DNA
(c) C-DNA (d) Z-DNA

35. While deciphering genetic code, Marshall Niemberg used which of the following polynucleotides ?

(a) Cytosine (b) Adenine
(c) Gaunine (d) Uracil

36. Which mode of replication is ruled out after first generation in Meselson and Stahl experiment ?

(a) Conservative (b) Dispersive
(c) Semi conservative (d) All of the above

37. Which of the following is not outcome of glycolysis ?

(a) NADH (b) ATP
(c) Pyruvate (d) None of the above

38. Which antibody is present as a pentamer ?

(a) IgA (b) IgG
(c) IgM (d) IgE

39. MHC II (Major Histocompatibility Complex) presents antigens to T-Cells which are :

(a) Endogenous in nature (b) Exogenous in nature
(c) Both (a) & (b) (d) None of the above

40. Complement system kills the bacteria mostly by :

(a) Lysozymes (b) Formation of pores
(c) Removing the cell wall (d) All of the above

41. Choose the odd one :

(a) Macrophage (b) B-lymphocytes
(c) T-lymphocytes (d) None of the above

42. The α helix of proteins contain :

(a) 1.6 residues per turn (b) 2.6 residues per turn
(c) 3.6 residues per turn (d) 4.6 residues per turn

43. When DNA is denatured its UV absorbance capacity :

(a) Increases (b) Decreases

(c) Remains same (d) DNA does not absorb UV

44. Choose the odd one :

(a) AUU (b) AUC

(c) AUA (d) AUG

45. The callus is defined as a mass of cells in which there is :

(a) Auxin concentration greater than Cytokinin concentration

(b) Auxin concentration less than Cytokinin concentration

(c) Auxin concentration is equal to Cytokinin concentration

(d) None of the above

46. Which of the following is not the feature of a cloning vector ?

(a) Origin of replication (b) Selectable marker

(c) Restriction sites (d) None of the above

47. The most common media used for plant tissue culture is

(a) Eagles media (b) Whites media

(c) Murashige and Skoog media (d) B5 media

48. Stearic acid contains :

(a) 16 carbons (b) 18 carbons

(c) 20 carbons (d) 22 carbons

49. Which of the following activities is/are associated with DNA polymerase 1 ?

(a) $3 \rightarrow 5$ exonuclease activity (b) $5 \rightarrow 3$ exonuclease activity

(c) Adding nucleotides (d) All of the above

50. Which organelle sorts the cellular proteins ?

(a) Endoplasmic reticulum (b) Peroxisomes

(c) Golgi body (d) All of the above

51. Nucleolus contains :

(a) DNA (b) RNA

(c) Proteins (d) All of the above.

52. If an individual is suffering from Xeroderma Pigmentosum then there is problem in :
    (a) Melanin biosynthesis
    (b) Regulation of lipid biosynthesis
    (c) Inability to repair the UV induced DNA Damage
    (d) All of the above

53. The role of sigma factor in transcription is :
    (a) To recognise the promoter sequence
    (b) To carry out polymerization
    (c) To terminate the process of transcription
    (d) None of the above

54. Which type of cap does not exist in eukaryotic m-RNA ?
    (a) Cap-0 (b) Cap-1
    (d) Cap-2 (d) None of the above

55. Choose the group containing only the peptide hormones :
    (a) Vasopressin, Oxytocin, Epinephrine
    (b) Vasopressin, Testosterone, Glucagon
    (c) Oxytocin, Vasopressin, Throxine
    (d) Oxytocin, Vasopressin, Somatostatin

56. Icosahedral symmetry is most prevalent in :
    (a) Bacteria (b) Viruses
    (c) Fungi (d) All of the above

57. Ciprofloxacin acts on :
    (a) DNA gyrase (b) DNA Polymerase
    (c) Reverse transcriptase (d) Amino acyl t-RNA synthase

58. Which of the following is not the property of Ascorbate ion in human body ?
    (a) Acts as an anti-oxidant
    (b) Acts as a cofactor
    (c) Acts in the biosynthesis of collagen
    (d) None of the above

59. What is the molality of a solution made by dissolving 120 g of $MgSO_4$ in 200.0 mL of water (Molecular weight of $MgSO_4$ is 120) ?

(a) 5 (b) 10

(c) 15 (d) 20

60. Watson and Crick bonding specificity between bases can be observed at the level of :

(a) Free bases in solution (b) Mononucleotide solution

(c) Polynucleotide solutions (d) All of the above

CLINICAL CHEMISTRY

1. What is the control units function in the CPU ?

   (A) To decode program instructions

   (B) To transfer data to primary storage

   (C) To perform logical operations

   (D) All of the above

2. The CPU can perform read and write operations at any point in time in :

   (A) ROM

   (B) PROM

   (C) RAM

   (D) None of the above

3. Magnetic tape can serve as :

   (A) Input media

   (B) Output media

   (C) Secondary storage media

   (D) All of the above

4. What is the alternative name for application software ?

   (A) Utility software

   (B) End user software

   (C) Practical software

   (D) None of the above

5. Menadione, the synthetic analogue of Vitamin K is also known as :

   (A) Vitamin K_1

   (B) Vitamin K_2

   (C) Vitamin K_3

   (D) None of the above

6. Catalase is an enzyme that :

(A) Converts hydrogen peroxide to water in the presence of glutathione

(B) Converts hydrogen peroxide to water in the presence of selenium

(C) Converts hydrogen peroxide to water in the absence of glutathione.

(D) None of the above

7. Succus entericus is synthesized in :

(A) Rectum

(B) Stomach

(C) Duodenum

(D) None of the above

8. Which of the following hormones stimulates the release of Insulin ?

(A) Vasoactive intestinal polypeptide

(B) Secretin

(C) CCK-PZ

(D) None of the above

9. What is the major intracellular cation ?

(A) Calcium

(B) Magnesium

(C) Sodium

(D) Potassium

10. Bilirubin is *not* excreted in urine in :

(A) Obstructive Jaundice

(B) Hepatic Jaundice

(C) Hemolytic Jaundice

(D) None of the above

11. Evaluation of Asparatate transaminase is indicative of :

(A) Myocardial infaraction

(B) Hepatic disorder

(C) Skeletal muscle disorder

(D) All of the above

12. In primary hyperthyroidism :

(A) T_3 and TSH is raised

(B) T_3 and TSH is depressed

(C) T_3 is increased but TSH is depressed

(D) None of the above

13. The compound that facilitate the release of oxygen from oxyhemoglobin is :

(A) 2-3 BPG

(B) H^+

(C) Cl^-

(D) All of the above

14. Which of the following hormones is an amino acid derivative ?

(A) Epinephrine

(B) Norepinephrine

(C) Both (A) and (B)

(D) None of the above

15. Which of the following is a measure of central tendency ?

(A) Geometric mean

(B) Median

(C) Mode

(D) All of the above

16. The variance of first n natural numbers is :

(A) $(n^2 + 1)/12$

(B) $(n + 1)^2 /12$

(C) $(n^2 - 1)/12$

(D) None of the above

17. In a discrete set of values, the correct relation between deviation and standard deviation is :

(A) M.D. > S.D.

(B) M.D. < S.D.

(C) M.D. ≤ S.D.

(D) M.D. ≥ S.D.

18. Assume that a Chi-square test is to be performed on contingency table with four rows and four columns. How many degree of freedom should be use ?

(A) 6

(B) 8

(C) 9

(D) 16

19. Saliva contains especially large quantities of :

(A) Sodium and Magnesium ions

(B) Magnesium and Potassium ions

(C) Potassium and Bicarbonate ions

(D) None of the above

20. Oxytoxin, a hormone produced by the posterior pituitary causes :

(A) Milk ejection from breasts

(B) Uterine contractions

(C) Both (A) and (B)

(D) None of the above

21. In the vision cycle, 11 cis retinal automatically recombines with which of the following to reform Rhodopsin.

(A) Photopsin

(B) Scotopsin

(C) Lumirhodopsin

(D) Metarhodopsin

22. End feet is a term generally referred to :

(A) Synaptic cleft

(B) Presynaptic terminal

(C) Post-synaptic terminal

(D) None of the above

23. Short hand notation 8 : 0 is assigned to which of the following carboxylic acid :

(A) Caprylic acid

(B) Capric acid

(C) Caproic acid

(D) None of the above

24. Chain A of the insulin hormone is made up of :

(A) 20 amino acids

(B) 30 amino acids

(C) 51 amino acids

(D) None of the above

25. The strong acidic medium in the stomach aid in :

(A) Irreversible denaturation of proteins

(B) Protonation of amino acids

(C) Both (A) and (B)

(D) None of the above

26. The molecular mass of glucokinase and hexokinase is respectively :

(A) 55 KD and 110 KD

(B) 110 KD and 55 KD

(C) 55 KD only

(D) None of the above

27. In non-competitive inhibition :

(A) V_{max} is lowered

(B) Km is unaltered

(C) Both (A) and (B)

(D) None of the above

28. Which of the following drugs acts by competitive inhibitions in biological systems ?

(A) Allupurinol

(B) Sulphonamides

(C) Both (A) and (B)

(D) None of the above

29. Biurett reactions can be shown by :

(A) Proline

(B) Aspartic acid

(C) Histidine

(D) None of the above

30. Hyaluronic acid is a polymer of :

(A) N Acetyl galactosamine and D glucuronic acid

(B) N Acetyl glucosamine and D glucuronic acid

(C) N Acetyl glucosamine and D galactouronic acid

(D) None of the above

31. Vitamin B_5 is also referred to as :

(A) Pyridoxine

(B) Liopoic acid

(C) Biotin

(D) None of the above

32. Krebs-Henseleit cycle is also known as :

(A) Citric acid cycle

(B) Glyoxylate cycle

(C) Corny cycle

(D) None of the above

33. The urine of patients suffering from the following disease has a mousy odour :

(A) Cystinuria

(B) Protinuria

(C) Alkaptonuria

(D) None of the above

34. Iron may be stored in the body as :

(A) Haemoglobin

(B) Haemosiderin

(C) Both (A) and (B)

(D) None of the above

35. Which of the following is DNA viruses that are implicated in cancers ?

(A) Feline sarcoma virus

(B) Avian erythroblastosis virus

(C) Herpes virus

(D) All of the above

36. Under physiological conditions, the DNA structure is predominantly as :

(A) Z form

(B) B form

(C) A form

(D) D form

37. PCR technique was first introduced by :

(A) Weber and Osborn

(B) W. Southern

(C) Joseph Denys

(D) None of the above

38. A child is born with extra chromosome on each of his cell. This condition is the result of :

(A) Synapsis

(B) Crossing over

(C) Non-disjunction

(D) Disjunction

39. Chromosome number of Down's syndrome is :

(A) 46

(B) 47

(C) 45

(D) 24

40. Termination codons for protein synthesis are :

(A) AUU, AUG, GUU

(B) UGA, UAU, UAG

(C) UAU, UAG, UGG

(D) None of the above

41. Degeneracy of genetic code was discovered by :

(A) M. Nirenberg

(B) S. Ochoa

(C) G. Mcclintok

(D) H. Khorana

42. In Tryptophan operon, the transcript folds itself into a particular stem loop like structure for the attenuation which is basically :

(A) 1-2 sequence base pairing

(B) 2-3 sequence base pairing

(C) 3-4 sequence base pairing

(D) None of the above

43. Enhancers involved in gene regulation in eukaryotes are :

(A) Trans acting elements

(B) Cis acting elements

(C) Both (A) and (B)

(D) None of the above

44. Topoisomeases alter the linking number of DNA through the involvement of :

(A) Hydrogen bond

(B) Phosphate bond

(C) Phoshphotyrosine bond

(D) None of the above

45. How many different classes of cyclin CDK complexes are associated with either G1, S or M phase ?

(A) Two

(B) Three

(C) Four

(D) Five

46. Which of the following enzymes are used in DNA cloning ?

(A) Nuclease S1

(B) DNA ligase

(C) Restriction endonuclease

(D) All of the above

47. Addition of which of the following synthetic inducer rapidly stimulates transcription of lactose operon structural gene :

(A) Isopropyl β D thioglucopyranoside

(B) Isopropyl β D thiogalactopyranoside

(C) Isopropyl α D thioglucopyranoside

(D) Isopropyl α D thiogalactopyranoside

48. The codon AAA codes for :

(A) Arginine

(B) Glutamine

(C) Lysine

(D) Asparagine

49. Cell theory was put forward by :

(A) Sutton and Boveri

(B) M. Shapiro

(C) H. Purkinje

(D) None of the above

50. Cytochrome oxidase is also referred to as :

(A) Complex I

(B) Complex II

(C) Complex III

(D) None of the above

51. The presence of phosphomannose on the protein targets in to which of the following destinations :

(A) Lysosome

(B) Extracellular medium

(C) Plasma membrane

(D) Mitochondria

52. Major immunoglobulin isotype associated with allergic reaction are :

(A) IgA

(B) IgD

(C) IgE

(D) None of the above

53. Clonal selection theory was given by :

(A) Karl Landstainer and Snel

(B) Kohler and Milstein

(C) Porter and Edelman

(D) Medawer and Burnett

54. The process of opsonization is related with :

(A) Rapid uptake of antigen by phagocyte

(B) Coating of microbe with antibody

(C) Coating of microbe with complement

(D) All of the above

55. Which of the following enzymes can be used as a marker enzyme for outer membrane in mitochondria ?

(A) Sulfite oxidase

(B) Adenylate cyclase

(C) Carnitine tranferase

(D) None of the above

56. In which of the following molecules, the van der Waals force is likely to be the most important in determining the melting point and boiling point ?

(A) CO

(B) H_2S

(C) Br_2

(D) HCl

57. The molecule which has the largest dipole moment amongst the following is :

(A) CH_4

(B) $CHCl_3$

(C) CCl_4

(D) CH_2Cl_2

58. Blood is isotonic with :

(A) 0.12 M NaCl

(B) 0.16 M NaCl

(C) 23% NaCl

(D) None of the above

59. The oxidation number of carbon in $C_{12}H_{22}O_{11}$ is :

(A) 0

(B) +22

(C) + 6

(D) – 6

60. The difference in the frequency of radiation between incident and scattered radiation is known as :

(A) Frank shift

(B) Raman shift

(C) Plancks shift

(D) None of the above

CLINICAL CHEMISTRY

1. The Median of the series 3, 6, 3, 7, 4, 3, 9 is :

   (A) 2.6

   (B) 4.0

   (C) 3.6

   (D) None of the above

2. Which of the following is a measure of central value ?

   (A) Median

   (B) Standard deviation

   (C) Mean deviation

   (D) None of the above

3. A series showing the sets of all values in classes with their corresponding frequencies is known as :

   (A) Grouped frequency distribution

   (B) Simple frequency distribution

   (C) Cumulative frequency distribution

   (D) None of the above

4. Which of the following is/are computer logical gate ?

   (A) OR

   (B) AND

   (C) NOT

   (D) All of the above

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