ENTRANCE EXAMINATION FOR ADMISSION, MAY 2011.

M.Sc. (MEDICAL BIOCHEMISTRY)

COURSE CODE : 502

Register Number :

Signature of the Invigilator
(with date)

COURSE CODE : 502

Time : 2 Hours Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you –1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. Reed Frost Model is a mathematical model of

(A) Infectious disease transmission and herd immunity

(B) Health insurance and community premium

(C) Infant mortality rate and life expectancy

(D) Consanguinity and congenital abnormalities

2. Allocation concealment is related to

(A) Cross sectional surveys (B) Case control studies

(C) Prospective studies (D) Randomized controlled trials

3. Berkson's Bias is a form of

(A) Selection Bias (B) Observer Bias

(C) Classification Bias (D) Recall Bias

4. Data cleaning is usually done

(A) At every data entry (B) Before Master Chart preparation

(C) After Master Chart preparation (D) If analysis points to outliers

5. One of the following is NOT an effect measure

(A) Attributable fractions (B) Risk differences

(C) Rate ratios (D) Exposure association

6. The distribution used to describe the occurrence of rare events in a large population is

(A) Log normal distribution (B) Skewed distribution

(C) Geometric distribution (D) Poisson distribution

7. Control group is used in experiments to reduce the impact of

(A) Randomization (B) Methodological flaws

(C) Small sample size (D) Extraneous variables

8. Which one is a measure of variation?

(A) Median (B) Mode

(C) Mean (D) Standard Deviation

9. What does 'P' in "P value" mean?

(A) Proportionate (B) Probability

(C) Percentile (D) Predetermined

10. Random allocation refers to assigning animals to different

(A) Groups alternatively
(B) Treatments randomly
(C) Cages randomly
(D) Experiments hapazhardly

11. Power of a study is calculated from

(A) Level of significance
(B) Type 2 error
(C) Confidence interval
(D) Type 1 error

12. Frequency polygon is obtained by joining the mid-points of

(A) Pie chart
(B) Simple bar chart
(C) Multiple bar chart
(D) Histogram

13. The following statements are true of null hypothesis EXCEPT

(A) It states that the relationship predicted in the experimental hypothesis does not exist
(B) The results obtained are not due to consistent relationship between two variables
(C) The experimenter has to support this hypothesis to prove his prediction
(D) The null hypothesis is different from experimental hypothesis

14. All of the following conditions should be met before applying 'f test EXCEPT

(A) The data should follow normal distribution
(B) Populations should have equal SO
(C) Samples must be chosen randomly
(D) The data must be nominal type

15. Incidental sampling technique

(A) Is the same as random sampling
(B) Is difficult to do
(C) Easily accessible subjects are not selected
(D) Mayor may not be representative of the population

16. Which of the following is NOT a principle of medical ethics?

(A) Ambiguity
(B) Beneficence
(C) Non maleficance
(D) Justice and equality

17. In a single blind study of a drug

(A) The examiner does not know the treatment allocation

(B) The participant does not know the treatment allocation

(C) The principal investigator does not know the treatment allocation

(D) The funding agency does not know the treatment allocation

18. Which of the following is true regarding a case-control study?

(A) A group of study subjects are followed up after recruiting

(B) Confounding factors can be controlled and there is no chance for bias

(C) Usually retrospective

(D) Very expensive and time consuming

19. How many genes constitute the human genome?

(A) More than 1 million

(B) 4 Mb

(C) About 30,000

(D) 23 pairs

20. A discrete collection of gene fragments on a stamp-sized chip is called

(A) Reference sequence

(B) SNP profile

(C) Gene microarray

(D) Semiconductor

21. Serum sickness is a hypersensitivity reaction classified as

(A) Type I

(B) Type II

(C) Type III

(D) Type IV

22. Micro RNAs are known to bind and restrict

(A) mRNA

(B) tRNA

(C) rRNA

(D) ssDNA

23. An enzyme that is commonly used therapeutically as a fibrinolytic agent is

(A) Streptokinase

(B) Cytochrome P450

(C) Vito K epoxidase

(D) Hyaluronidase

24. Ghrelin, the hunger hormone, is most abundantly synthesized by

(A) Liver

(B) Pancreas

(C) Hypothalamus

(D) Stomach

25. Aggregates of beta amyloid are characteristically found in lesions seen in

(A) Nieman Pick disease
(B) Von Gierke disease
(C) Alzheimer disease
(D) Multiple myeloma

26. In xeroderma pigmentosum DNA damage is seen due to a low activity of

(A) Mismatch repair
(B) Nucleoside excision repair
(C) Base excision repair
(D) Double strand break repair

27. S. Adenosyl methionine is the methyl donor in all the following conversions EXCEPT

(A) Dump → TMP
(B) Carnosine → Anserine
(C) Guanidoacetate → Creatine
(D) Norepinephrine → Epinephrine

28. The amino acid which has the highest value in the hydropathy scale for side chains is

(A) Histidine
(B) Isoleucine
(C) Cysteine
(D) Phenylalanine

29. The Penta peptide KFERQ sequence in proteins is needed

(A) To transport them into mitochondria
(B) For lysosomal degradation during starvation
(C) To attach protein to cell membrane
(D) For intracellular stability of proteins

30. Dolichol pyrophosphate is involved in the biosynthesis of

(A) Deoxy-ribonucleotides
(B) Bile acids
(C) Polyamines
(D) Oligosaccharides

31. Chaulmoogric acid, a cyclic fatty acid, is used in the treatment of

(A) Diabetes mellitus
(B) Hansen's disease
(C) Malabsorption syndrome
(D) Hypertension

32. All the following aminoacids are catabolised to form succinyl CoA **EXCEPT**

(A) Valine
(B) Methionine
(C) leucine
(D) Isoleucine

33. The entry of pyruvate across mitochondrial membrane is with

(A) Symport with proton
(B) Antiport with proton
(C) Symport with malate
(D) Antiport with malate

34. Alphafetoprotein is closely related in structure with

(A) Prothrombin
(B) Albumin
(C) Collagen
(D) Lambda light chain

35. Most proteins bind Sodium Dodecyl Sulfate (SDS) in the approximate ratio of one SDS molecule for

(A) One amino acid
(B) Two amino acids
(C) Three amino acids
(D) Four amino acids

36. Serum CA 125 level is used in the diagnosis and monitoring of carcinoma of

(A) Stomach
(B) Breast
(C) Ovary
(D) Liver

37. The Co-factor required for activity of sulfite oxidase is

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

38. The carnitine shuttle to transport long chain acyl groups into mitochondria is inhibited by

(A) Acetyl CoA
(B) Malonyl CoA
(C) Glucagon
(D) Epinephrine

39. Deficiency of which vitamin can cause of lactic acidosis

(A) Pyridoxal phosphate
(B) Thiamin
(C) Riboflavin
(D) Retinol

40. Which among the following is **NOT** a cause of Niacin deficiency?

(A) Prolonged use of antibacterial drugs (B) Carcinoid syndrome

(C) Vitamin B6 deficiency (D) Hartnup disease

41. Isocratic elution in chromatography refers to the elution when the mobile phase composition

(A) Remains constant (B) Changes continuously

(C) Changes in a stepwise manner (D) Changes in a logarithmic manner

42. Increasing which among the following increases the number of theoretical plates in column chromatography?

(A) Length of the column

(B) Mobile phase flow rate

(C) Average particle size of stationary phase

(D) Particle size distribution

43. The microsomal fraction consists of the following **EXCEPT**

(A) Plasma membrane (B) Lysosomes

(C) Free ribosomes (D) Golgi complex

44. The list of proteolytic inhibitors used during the homogenization of tissues include the following **EXCEPT**

(A) Benzamidine hydrochloride (B) Phenyl methane sulfonyl fluoride

(C) Dithiothreitol (D) EDTA

45. Which among the following is the best test for cell viability?

(A) Oxygen uptake

(B) Survival and growth in tissue culture

(C) Dye exclusion

(D) Protein synthesis

46. Pulsed-field gel electrophoresis is based on the alteration of which of the following parameters during the course of electrophoresis?

(A) Voltage applied (B) Current applied

(C) Ionic strength of buffer used (D) Direction of electric field applied

47. Inner filter effect in flurorometry refers to

(A) Deviation from linear relationship between fluorophor concentration and fluorescence

(B) Gain of excitation intensity across the cuvet path length

(C) Radiationless energy loss from excited molecules

(D) Quenching of fluorescence by the medium in which the fluorophor is dissolved

48. As a general rule in spectrophotometry, for the peak absorbance readings to be around 99% of true values, the spectral bandwidth should be The natural bandwidth

(A) Equal to

(B) More than 50% of

(C) Double

(D) Less than 10% of

49. The flame emission method is less applicable for the measurement of calcium in biological samples because

(A) Calcium is not available in free form

(B) Calcium is less excited in the ordinary flame

(C) Of the interference by similar substances

(D) Wide fluctuations in emission intensity with calcium

50. Among the following which has the greatest effect on the rate of sedimentation of a particle during centrifugation?

(A) Density of the particle

(B) Size of the particle

(C) Viscosity of the medium

(D) Shape of the particle

51. Triplex therapy refers to the use of oligonucleotides that will bind to

(A) mRNA E

(B) DNA

(C) rRNA

(D) tRNA

52. Germ cell gene therapy is NOT possible in humans at present because

(A) The prognosis of the diseases is not predictable

(B) The target cells cannot be identified

(C) It carries the risk of transmitting genetic alterations to the offspring

(D) The regulatory regions of the genes could not be defined

53. Which among the following statements is **FALSE** regarding p53 gene product?

(A) It is a transcriptional regulator

(B) Its level increases after exposure to agents that damage DNA

(C) It is required for normal cell development

(D) It binds various viral proteins

54. Which among the following enzymes is the most sensitive index of early viral hepatitis?

(A) GGT (B) AST

(C) ALT (D) Alkaline phosphatase

55. Which among the following is a cause for primary hyperparathyroidism?

(A) Reduced dietary intake of Vitamin D

(B) Impaired metabolism of vitamin D to calcitriol

(C) Adenoma of the parathyroid gland

(D) Inactivation of vitamin D due to anticonvulsant therapy

56. Cytochrome P450 is an example of a

(A) Transferase (B) Mono oxygenase dth

(C) Lyase (D) Reductase

57. Dinitrophenol produces its effect on mitochrondrial respiration by

(A) Inhibiting electron transport and ATP synthesis

(B) Dissociating oxidation in the respiratory chain from phosphorylation

(C) Inhibiting electron transport without affecting ATP synthesis

(D) Specifically inhibiting cytochrome b

58. All of the following statements regarding transamination reactions are true **EXCEPT**

(A) They interconvert pairs of alpha-amino and alpha-keto acids

(B) They require pyridoxal phosphate as a coenzyme

(C) All amino acids can undergo transamination

(D) They are readily reversible

59. The two main by-products of the hexose monophosphate shunt pathway are

(A) Pentose sugar and NADPH (B) Fatty acid and acetyl CoA

(C) Amino acid and pentose sugar (D) Pentose sugar and FAD

60. An ion that inhibits cytochrome oxidase of the electron transport chain is

(A) Cyanide
(B) Bromide
(C) Sulphide
(D) Hydroxyl

61. Folic acid deficiency results in the development of

(A) Iron-deficiency anaemia
(B) Megaloblastic anaemia
(C) Pernicious anaemia
(D) Hypochromic anaemia

62. Which of the following is both a Bronsted acid and a Bronsted base in water?

(A) H2PO4
(B) H2CO3
(C) NH3
(D) NH4

63. Proteins may be separated according to size by

(A) Polyacrylamide gel electrophoresis
(B) Iso electric focusing
(C) Molecular exclusion chromatography
(D) Ion exchange chromatography

64. Aldolase is

(A) An oxido reductase
(B) A transferase
(C) A lyase
(D) A ligase

65. All of the following are formed from tyrosine **EXCEPT**

(A) Melanin
(B) Dopamine
(C) Acetoacetate
(D) Phenylalanine

66. The preservative commonly used for blood glucose is

(A) Benzoic acid
(B) Sodium fluoride
(C) Citric acid
(D) Potassium oxalate

67. Pick the WRONG statement about haemoglobin

(A) It is tetrameric
(B) It contains iron in the ferric state
(C) It acts as a buffer
(D) It helps in CO2 transport

68. Southern blotting is a technique that can be used to detect mutations in

(A) Proteins
(B) Messenger RNA
(C) Ribosomal RNA
(D) DNA

69. The site of synthesis of ketone bodies is the

(A) Liver
(B) Adipose tissue
(C) Kidney
(D) Muscle

70. One of the enzymes involved in the formation of uric acid from purines is

(A) Amido transferase
(B) Uricase
(C) Urease
(D) Xanthine oxidase

71. Glutathione consists of

(A) Glutamine, cysteine and glycine
(B) Glutamic acid, cysteine and glycine
(C) Glutamine, cysteine and threonine
(D) Glutamic acid, methionine and glycine

72. A vitamin that can be synthesized from an amino acid is

(A) Thiamine
(B) Riboflavin
(C) Niacin
(D) Biotin

73. An example of a provitamin is

(A) Retinal
(B) Carotene
(C) Manaquinone
(D) Cholecalciferol

74. An example of an essential fatty acid is

(A) Stearic acid
(B) Oleic acid
(C) Butyric acid
(D) Linoleic acid

75. The sugar that is converted into sorbitol in the polyol pathway is

(A) Ribose
(B) Fructose
(C) Glucose
(D) Galactose

76. An example of an aromatic amino acid is

(A) Cysteine
(B) Serine
(C) Threonine
(D) Tyrosine

77. The proteins that are closely associated with DNA are

(A) Globulins
(B) Histones
(C) Heat-shock proteins
(D) Metallothionein

78. Ion channels in membranes, that allow selective entry of various ions, are formed by

(A) Peripheral membrane proteins
(B) Apolipoproteins
(C) Transmembrane proteins
(D) Beta globulins

79. The enzyme of RNA polymerase DOES NOT contain subunit

(A) α (Alpha)
(B) β (Beta)
(C) β' (Beta prime)
(D) σ (sigma)

80. How many bases of nascent RNA form DNA-RNA hybrid in a transcription bubble?

(A) 22
(B) 17
(C) 12
(D) 7

81. The site of action of rifampicin on RNA polymerase is

(A) α (Alpha)
(B) β (Beta)
(C) β' (Beta prime)
(D) σ (sigma)

82. RNA polymerase that is most sensitive to α-amanitin is

(A) RNA polymerase I
(B) RNA polymerase II
(C) RNA polymerase III
(D) Procaryotic RNA polymerase

83. Which of the following inhibits protein synthesis in both prokaryotes and eucaryotes?

(A) Chloramphenicol
(B) Cyclohexamide
(C) Erythromycin
(D) Puromycin

84. What is the fate of LDL receptor-mediated endocytosis?

(A) Receptor is recycled and LDL also is recycled
(B) Receptor is recycled and LDL is degraded
(C) Receptor is degraded and LDL is also degraded
(D) Receptor is degraded but LDL is recycled

85. How many connexins are required to form a gap junction, a cell-to-cell channel?

(A) 12
(B) 8
(C) 6
(D) 4

86. Which of the following molecule contains a signal sequence?

(A) Preproinsulin
(B) Proinsulin
(C) Insulin
(D) A-chain of insulin

87. Which of the following statement is **NOT** true about Ribonucleotide reductase?

(A) It synthesizes deoxyribonucleotides
(B) It contains a free radical in its action rate
(C) It is an unregulated enzyme
(D) Thioredoxin is an electron donor to this enzyme

88. Which of the following is **NOT** an end product of pyrimidine catabolism?

(A) Urate
(B) CO2
(C) NH3
(D) β-aminoisobutyrate

89. Which of the following congenital adrenogenital hyperplasia is accompanied by virilization?

(A) 21-hydroxylase deficiency
(B) 17 -hydroxylase deficiency
(C) 3-β-dehydrogenase deficiency
(D) Desmolase deficiency

90. Which of the following lipoproteins DOES NOT contain Apo B 1 DO?

(A) VLDL
(B) IDL
(C) LDL
(D) HDL

91. Which of the following tissue prefers acetoacetate to glucose as its fuel?

(A) Muscle
(B) Brain
(C) Heart
(D) RBC

92. Which of the following pairs of aminoacids are purely ketogenic?

(A) Isoleucine and phenylalanine
(B) Tryptophan and tyrosine
(C) Methinine and valine
(D) Leucine and lysine

93. Thiamine pyrophosphate is NOT a prosthetic group of

(A) Pyruvate dehydrogenase
(B) α-ketoglutarate dehydrogenase
(C) Isocitrate dehydrogenase
(D) Transketolase

94. Which of the following citric acid cycle is FAD dependant but not NAD dependant?

(A) α-ketoglutarate dehydrogenase
(B) Isocitrate dehydrogenase
(C) Succinate dehydrogenase
(D) Malate dehydrogenase

95. Which of these is NOT a steroid?

(A) Cortisol
(B) Androgens
(C) Epinephrine
(D) Progesterone

96. Glycogen is all of these EXCEPT

(A) It has a branched structure
(B) A homopolysaccharide
(C) It has beta 1-4 glycosidic bonds
(D) It has alpha 1-6 glycosidic bonds

97. Which amongst these contains iodine?

(A) Thyroxine
(B) Thyrotrophin
(C) Threonine
(D) Tyrosine

98. Deficiency of which vitamin leads to poor wound healing?

(A) Vitamin K
(B) Niacin
(C) Pyridoxine
(D) Ascorbic acid

99. The carbon atoms of cholesterol are all derived from

(A) Acetyl CoA
(B) Malonyl CoA
(C) Aceto-acetyl CoA
(D) Propionyl CoA

100. Prokaryotic cells, but NOT eukaryotic cells, have

(A) Endoplasmic reticulum
(B) Histones
(C) Nucleoid
(D) A nucleus