ENTRANCE EXAMINATION FOR ADMISSION, MAY 2013.

M.Sc. (BIOCHEMISTRY AND MOLECULAR BIOLOGY)

COURSE CODE : 368

Register Number : [ ]

Signature of the Invigilator
(with date)

COURSE CODE : 368

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. Pernicious anemia is developed due to deficiency of:

(A) Erythropoetin (B) Vitamin B12

(C) Iron (D) Vitamin B6

2. Choose the drug which is a H2-receptor antagonist:

(A) Omeprazole (B) Pirenzepine

(C) Carbenoxolone (D) Ranitidine

3. Vasopressin possesses the following:

(A) Antidiuretic property

(B) Vasodilatation property

(C) Release of a thyroid hormone into the plasma

(D) Diuretic property

4. Loosening of teeth, gingivitis and hemorrhage occur in the deficiency of:

(A) VitaminK (B) VitaminB1

(C) Vitamin B6 (D) Vitamin C

5. Mechanism of Rifampin action is:

(A) Inhibition of mycolic acids synthesis

(B) Inhibition of DNA dependent RNA polymerase

(C) Inhibition of topoisomerase II

(D) Inhibition of cAMP synthesis

6. Half life (t ½) is the time required to:

(A) Change the amount of a drug in plasma by half during elimination

(B) Metabolize a half of an introduced drug into the active metabolite

(C) Absorb a half of an introduced drug

(D) Bind a half of an introduced drug to plasma proteins

7. What is the preferred specimen for analysis of glucose (sugar) in blood?

(A) Heparinised plasma (B) Fluoride oxalate plasma

(C) Serum (D) EDTA plasma

8. Fasting plasma true glucose level is:

(A) 70-110 mg/100ml (B) 80-120 mg/100ml

(C) 100-140 mg/100ml (D) 150-250 mg/100ml

9. Diabetes mellitus can be detected by which test using urine specimen?

(A) Rothera's test (B) Benedict's test

(C) Hay's test (D) Benzidine test

10. Blood cholesterol is elevated in which of the following condition?

(A) Hypothyroidism (B) Hyperthyroidism

(C) Hypoinsulinism (D) None of the above

11. Estimation of serum triglycerides is of diagnostic importance in:

(A) Multiple myeloma (B) Hyperlipidemias

(C) Nephrotic syndrome (D) Jaundice

12. Bence jones proteins may be excreted in urine of patients suffering from:

(A) Diabetic mellitus (B) Multiple myeloma

(C) Diabetes insipidus (D) Hematuria

13. A competitive inhibitor of an enzyme

(A) ↑ses K_m without affecting V_{max} (B) ↓ses K_m without affecting V_{max}

(C) ↑ses V_{max} without affecting K_m (D) ↓ses V_{max} without affecting K_m

14. Insulin does all of the following except:

(A) Enhance glucose transport into muscle

(B) Enhance glycogen formation by liver

(C) Enhance amino acid transport into muscle

(D) Enhance gluconeogenesis in liver

15. Triglycerides are digested in the intestine by the enzyme

(A) Amylase (B) Protease (C) Cellulose (D) Lipase

16. RNA molecules that exhibit catalytic activity are called

(A) mRNAs (B) ribonucleases (C) ribosomes (D) ribozymes

17. In addition to proteins, major components of very low density lipoproteins (VLDL) circulating in the blood of a normally fed mammal include

(A) Triacylglycerol, cholesterol, and phospholipid

(B) Triacylglycerol, squalene and phospholipids

(C) Triacylglycerol, squalene and sphingosine

(D) Monoacylglycerol, cholesterol, and phospholipids

18. The rate limiting step of fatty acid synthesis is catalyzed by

(A) Acetyl CoA carboxylase (B) ATP – citrate lyase

(C) Malic enzyme (D) Pyruvate dehydrogenase

19. The depletion in the Ozone layer is caused by:

(A) Nitrous oxide. (B) Carbon dioxide.

(C) Chlorofluorocarbons. (D) All of the above.

20. Acid rain is formed due to contribution from the following pair of gases:

(A) Methane and ozone (B) Oxygen and nitrous oxide

(C) Methane and sulfur dioxide (D) Carbon dioxide and sulfur dioxide

21. How many joules are in 1 kWh?

(A) 3.6×10^6 (B) 2.6×10^6

(C) 1.6×10^6 (D) None of the above

22. Who is known as the father of India's "Green revolution"?

(A) Dr. M.S. Swaminathan (B) Dr. Norman Borlang

(C) Dr. K.V. Kurien (D) None of the above

23. Carboxyhemoglobin is formed in the blood due to the exposure to

(A) CO (B) CO_2 (C) O_2 (D) O_3

24. What is 'Minamata' disease?

(A) Disease caused by mercury poisoning

(B) Disease caused by chromium poisoning

(C) Disease caused by manganese poisoning

(D) Disease caused by magnesium poisoning

25. Which one of the below given enzymes is not considered as a liver function enzyme?

(A) Alkaline phophatase
(B) Alanine transaminase
(C) Aspartate transaminase
(D) Amylase

26. What is a teratogen?

(A) A teratogen is an agent that can disturb the development of the embryo or fetus
(B) A teratogen is an agent that can disturb the carbohydrate metabolism of the embryo or fetus
(C) A teratogen is an agent that can disturb the protein metabolism of the embryo or fetus
(D) A teratogen is an agent that can disturb all the metabolisms of the embryo or fetus

27. What is a xenobiotic?

(A) Any substance foreign to living systems
(B) A biological product synthesized by the human liver
(C) Excessive biological activity after consuming certain drugs
(D) Scientific name of a frog that secretes toxins

28. Mechanisms that contribute to transmembrane movement of chemicals include all the following EXCEPT:

(A) the process of passive diffusion.
(B) the process of active transport.
(C) the process of biotransformation.
(D) the process of filtration.

29. Cytochrome P_{450} monooxygenases catalyze all the following reactions EXCEPT:

(A) sulfation
(B) hydroxylation
(C) O-dealkylation
(D) epoxidation

30. Conjugation reactions:

(A) always yield an inactive metabolite.

(B) tend to decrease the molecular weight of many toxicants.

(C) tend to yield more water-soluble products.

(D) include hydroxylation and glucuronidation.

31. The immune system is composed of all the following EXCEPT:

(A) serum albumin.

(B) interleukins

(C) T lymphocytes

(D) B lymphocyctes.

32. Which of the following ionizing radiations has the shortest range (i.e., travels the shortest distance in tissue) for the same initial energy?

(A) alpha particle

(B) beta particle

(C) gamma ray

(D) x ray

33. Polyploidy occurs when a cell contains:

(A) multiple copies of specific RNA

(B) multiple copies of specific DNA

(C) multiple copies of the nucleus of the cell

(D) multiple copies of all chromosomes.

34. Agonists are chemicals that:

(A) bind to a membrane receptor and prevent a response.

(B) bind to a membrane receptor and initiate a response.

(C) are always poorly bound to a receptor.

(D) exert a response in all tissues in the body.

35. Choose the correct statement about the genetic code.

(A) includes 61 codons for amino acids and 3 stop codons

(B) three bases per codon

(C) some amino acids are coded by multiple codons

(D) all of the above

36. X-chromosome inactivation

(A) normally takes place in males but not females

(B) takes place in female mammals where one of the two copies of the X chromosome is made transcriptionally inactive

(C) takes place in humans so that the same X chromosome is inactive in all of the cells of a female

(D) is the cause of the Y chromosome being genetically inactive mammals

37. DNA ligase is:

(A) an enzyme that joins DNA fragments

(B) an enzyme involved in protein synthesis

(C) an enzyme of bacterial origin which cuts DNA at defined base sequences

(D) an enzyme that facilitates transcription of specific genes

38. An Hfr strain of E. coli contains:

(A) a vector of bacterial origin which is used in rDNA technology

(B) a bacterial chromosome with a human gene inserted

(C) a bacterial chromosome with the F factor inserted

(D) a bacterial chromosome with a phage inserted

39. In which phase of the cell cycle does DNA replication occur?

(A) G_0 (B) G_1 (C) S (D) G_2

40. Antibiotics such as Ciprofloxacin and Flouroquinolines work by inhibiting a specific enzyme that normally relieves torsional strain that is caused by the unwinding of the helix during replication. What is the name of this enzyme?

(A) DNA ligase (B) Topoisomerase (DNA Gyrase)

(C) single-stranded binding protein (D) primase

41. Which of the following techniques is primarily undertaken to amplify DNA?

(A) PCR (B) Microarrays

(C) Northern Blotting (D) Southern Blotting

42. In Polymerase Chain Reaction (PCR) all of the following are used in EXCEPT:

(A) Taq polymerase (B) Restriction enzymes

(C) Oligonucleotide primers (D) Deoxynucleoside triphosphates

43. The following are features of DNA replication EXCEPT:

(A) Semi-conservative

(B) Semi-discontinuous

(C) unidirectional

(D) chain growth in the 5' –> 3' direction

44. Which out of the following mechanisms is involved in the production of variety of immunoglobulins each specific for a specific antigen?

(A) Gene replacement
(B) Gene amplification
(C) Gene rearrangement
(D) RNA editing

45. Which out of the followings is a common enzyme for de novo as well as salvage pathway of purine biosynthesis?

(A) Amidotransferase
(B) PRPP synthetase
(C) HGPRTase
(D) Adenylosuccinate synthetase

46. Which out of the followings is an example of post transcriptional modification?

(A) Splicing
(B) Class switching
(C) Subunit aggregation
(D) Base modification

47. Ergosterol Is a precursor of

(A) Vitamin D
(B) Acyl protein
(C) Coenzyme A
(D) Lanosterol

48. Eicosanoids are formed from

(A) 20-carbon polyunsaturated fatty acids
(B) 22-carbon monounsaturated fatty acids
(C) Phosphadidate
(D) Monoacyl glycerol

49. Perilipin is present

(A) Periplasmic space in E.coli
(B) Adipocytes
(C) Hepatocytes
(D) Neuron

50. Aspirin inhibits the function of

(A) Cyclooxygenases
(B) Lipooygenases
(C) Cytochrome P450
(D) Acyl transferases

51. Essential fatty acids are the precursors for

(A) Arachidonate
(B) Phosphadidate
(C) Cardiolipin
(D) Platelet activating factor

52. Chylomicrons are

(A) formed in liver (B) formed in kidney

(C) formed in intestinal cells (D) formed in lungs

53. Insulin promotes

(A) Lipolysis (B) Fatty acid biosynthesis

(C) Ketogenesis (D) Gluconeogenesis

54. Hormone sensitive lipases are activated by

(A) insulin (B) estrogens

(C) glucagon (D) Prostaglandins

55. The proton-sugar transporter in bacteria is

(A) Uniport (B) Symport (C) Antiport (D) Diport

56. The major plant hormone auxin causes

(A) Shoot growth and shoot initiation (B) Splitting of the internode

(C) Cell expansion (D) Internodal elongation

57. Ovule is attached to placenta by a slender stalk called

(A) Pedicel (B) Petiole (C) Placenta (D) Funicle

58. Sugars that contain a free aldehyde or ketone group in the open-chain configuration are called

(A) Reducing sugars (B) Non reducing sugars

(C) ketotrioses (D) Stereoisomers

59. Nematode is a

(A) Round worm (B) Tape worm (C) Fluke (D) Hooklet

60. Ascorbic acid may be associated with all of the following EXCEPT:

(A) iron absorption.

(B) bone formation.

(C) wound healing.

(D) participation in hydroxylation reactions.

61. The characteristic that all lipids have in common is

(A) they are all made of fatty acids and glycerol.

(B) none of them is very high in energy content.

(C) they are all acidic when mixed with water.

(D) none of them dissolves in water.

62. What best explains the observation of substrate specificity?

(A) There is a precise compatibility between an enzyme's active site and the substrate molecule

(B) Molecules and active sites vary in size; only properly sized molecules can fit.

(C) Reaction-specific enzymes, such as hydrolases, assume a fit by folding around the most numerous substrate molecules.

(D) Polarity compatibilities; active sites contain electronegative atoms while substrates tend to carry slight positive charges.

63. Which of the following hormones has the broadest range of targets?

(A) ADH (B) TSH (C) epinephrine (D) ACTH

64. Which of the following hormones have antagonistic (opposing) effects?

(A) thyroxin and calcitonin (B) insulin and glucagon

(C) growth hormone and epinephrine (D) ACTH and glucocorticoids

65. When the levels of juvenile hormone (JH) are maintained at artificially high levels, insects will

(A) be unable to molt.

(B) bypass some larval stages and pupate prematurely.

(C) molt more frequently.

(D) be unable to advance to a pupal stage.

66. It takes much longer for sex hormones and other steroids to produce their effects than it takes nonsteroid hormones. Why?

(A) Steroids are bigger, slower molecules.

(B) Steroids usually must be carried longer distances by the blood.

(C) Steroids cause target cells to make new proteins, which takes time.

(D) Steroids must relay their message via a second messenger.

67. The 2 nitrogen atoms in urea are contributed by

(A) Ammonia and glutamate
(B) Glutamine and glutamate
(C) Ammonia and aspartate
(D) Ammonia and alanine

68. All the following are functions of prostaglandins except

(A) Lowering of B.P
(B) Introduction of labour
(C) Anti inflammatory
(D) Prevention of myocardial infraction

69. Calcitriol synthesis involves

(A) Both liver and kidney
(B) Intestine
(C) Adipose tissue
(D) Muscle

70. The activity of tocopherols is destroyed by

(A) Commercial cooking
(B) Reduction
(C) Conjugation
(D) All of these

71. Vitamin K is involved in posttranslational modification of the blood clotting factors by acting as cofactor for the enzyme:

(A) Carboxylase
(B) Decarboxylase
(C) Hydroxylase
(D) Oxidase

72. Sterilised milk lacks in

(A) Vitamin A
(B) Vitamin D
(C) Vitamin C
(D) Thiamin

73. An example of ligases is

(A) Succinate thiokinase
(B) Alanine racemase
(C) Fumarase
(D) Aldolase

74. LDH1 and LDH2 are elevated in

(A) Myocardial infarction
(B) Liver disease
(C) Kidney disease
(D) Brain disease

75. A non-functional plasma enzyme is

(A) Psudocholinesterase
(B) Lipoprotein lipase
(C) Proenzyme of blood coagulation
(D) Lipase

76. Cori disease (Limit dextrinosis) is caused due to absence of

(A) Branching enzyme (B) Debranching enzyme

(C) Glycogen synthase (D) Phosphorylase

77. A lipotropic factor is

(A) Choline (B) Palmitic acid

(C) Calcium (D) Vitamin C

78. Fatty liver is also caused by

(A) CH_3Cl (B) CCl_4 (C) Na_2SO_4 (D) Riboflavin

79. Molecular iron is

(A) Stored primarily in the spleen

(B) Exreted in the urine as Fe^{2+}

(C) Stored in the body in combination with ferritin

(D) Absorbed in the ferric form

80. Hormone that bind to cell surface receptor and require the second messenger camp is

(A) Antidiuretic hormone (B) Cholecystokinin

(C) Calcitriol (D) Gastrin

81. Erythromycin acts on ribosomes and inhibit

(A) Formation of initiation complex (B) Binding of aminoacyl tRNA

(C) Peptidyl transferase activity (D) Translocation

82. The half-life of a protein depends upon its

(A) Signal sequence (B) N-terminus amino acid

(C) C-terminus amino acid (D) Prosthetic group

83. Carrier protein can

(A) Transport only one substance (B) Transport more than one substance

(C) Exchange one substance to another (D) Perform all of these function

84. A lipid bilayer is permeable to

(A) Urea (B) Fructose (C) Glucose (D) Potassium

85. Mutarotation refers to change in

(A) pH (B) Optical rotation

(C) Conductance (D) Chemical properties

86. Tautomerisation is

(A) Shift of hydrogen (B) Shift of carbon

(C) Shift of both (D) None of these

87. The enzyme used in polymerase chain reaction (PCR) is

(A) Taq polymerase (B) RNA polymerase

(C) Ribonuclease (D) Endonuclease

88. Which of the following is a microsomal enzyme inducer?

(A) Indomethacin (B) Clofibrate

(C) Tolbutamide (D) Glutethamide

89. Identify the correct molecule which controls the biosynthesis of proteins in living organisms.

(A) DNA (B) RNA (C) Purines (D) Pyrimidines

90. The tear secretion contains an antibacterial enzyme known as

(A) Zymase (B) Diastase (C) Lysozyme (D) Lipase

91. Identify one of the canbonic anhydrase inhibitor that inhibit only luminal carbonic anhydrase enzyme.

(A) Methazolamide (B) Acetazolamide

(C) Dichlorphenamide (D) Benzolamide

92. Group transferring Co-enzyme is

(A) CoA (B) NAD+ (C) NADP+ (D) FAD+

93. The co-enzyme containing an automatic hetero ring in the structure is

(A) Biotin (B) TPP

(C) Sugar Phosphate (D) Co-enzyme

94. The example of hydrogen transferring Co-enzyme is:

(A) B6-PO4 (B) NADP+

(C) TPP (D) ATP

95. Enzyme catalyzed hydrolysis of proteins produces amino acid of the form

(A) D (B) DL (C) L (D) Racemic

96. Transaminase activity needs the Coenzyme:

(A) ATP (B) B6-PO4 (C) FADT (D) NAD+

97. The biosynthesis of urea occurs mainly in the liver:

(A) Cytosol (B) Mitochondria

(C) Microsomes (D) Nuclei

98. Which of the following organisms is not represented in Locus Link?

(A) Mouse (B) Fly

(C) Human (D) Escherichia coli

99. Raw DNA sequences (other than Refseq) in the EMBL and NCBI databases:

(A) Overlap entirely

(B) Overlap to a substantial degree but have distinct sequences

(C) Have a little overlap

(D) None of the above

100. Which is the first sequenced free-living bacterial genome?

(A) Phage154 genome (B) Caenorhabditis elegans

(C) Escherichia coli (D) Haemophilus influenza