

Booklet code - A

Hall Ticket Number:

Department of Animal Sciences
ENTRANCE EXAMINATION, JUNE 2011
M. Sc Animal Biotechnology

Time: 2 hours

Maximum Marks: 100

INSTRUCTIONS: PLEASE READ BEFORE ANSWERING!

- Enter your hall ticket number on this sheet and the answer (OMR) sheet.
- Answers have to be marked on the OMR answer sheet following the instruction provided there upon. Make sure that you have clearly mentioned the code (A or B or C) on your OMR sheet.
- Hand over both the question paper booklet and OMR answer sheet at the end of examination.
- All questions carry one mark each. Answer all, or as many as you can.
- 0.33 mark will be deducted for every wrong answer.
- There are a total of **11** pages in this question paper. Answer (OMR) sheet will be provided separately. Check this before you start answering.
- The question paper consists of part "A" and part "B". The marks obtained in Part "A" will be taken in consideration in case of tie i.e., when more than one student gets equal marks, to prepare the merit list.

PART "A"

1. The complete aerobic respiration of glucose produces

- | | |
|-------------------------------|-----------------------|
| A) Lactate and carbon dioxide | B) Water and oxygen |
| C) Water and carbon dioxide | D) Lactate and oxygen |

2. The drug which selectively inhibits DNA polymerases and blocks DNA synthesis-

- | | |
|-----------------------|----------------|
| A) α -Amanitin | B) Aphidicolin |
| C) Actinomycin D | D) Rifampicin |

3. The fetal placenta and umbilical cord are formed from the

- | | |
|-----------------------|--------------------------|
| A) Chorion & amnion | B) Chorion & endometrium |
| C) Chorion & yolk sac | D) Chorion & allantois |

4. Gram positive cells have

- | | |
|--|---|
| A) A second outer membrane that helps to retain the crystal violet stain | B) Multiple layer of peptidoglycan that help to retain the crystal violet stain |
| C) A thick capsule that traps the crystal violet stain | D) A periplasmic space that traps the crystal violet stain |

11-15

5. Which of the following techniques are used for the analysis of restriction fragment length polymorphisms?

- A) Electrophoresis & chromatography B) Restriction enzyme digestion & chromatography
C) Methylation & Restriction enzyme digestion D) Restriction enzyme digestion & electrophoresis

6. Lipid A stimulates the synthesis of which factor?

- A) Transforming growth factor (TGF) B) Platelet derived growth factor (PDGF)
C) Epidermal growth factor (EGF) D) Tumor necrosis factor (TNF)

7. The only living echinoderms which are fully sessile -

- A) Sea lilies B) Sea cucumbers
C) Sand dollars D) Sea urchins

8. Which one of the following agent is commonly used for determining the N-terminal amino acid of a polypeptide?

- A) Trypsin B) Cyanogen bromide
C) Phenyl isothiocyanate D) Aminopeptidase

9. The Michaelis-Menten constant K_m is

- A) Numerically equal to $\frac{1}{2} V_{max}$ B) Independent of pH
C) Dependent on the enzyme concentration D) Numerically equal to substrate concentration that gives half-maximal velocity

10. The unfertilized eggs laid by queen bee develop into

- A) Queens B) Workers
C) Drones D) Hermaphrodite

11. The chromosome composition seen in different syndromes is given below. Identify the pair that is mismatched.

- A) Turner's syndrome - 45 (AA+XO) B) Down's syndrome - 47: Trisomy of 21st chromosome
C) Klinefelter's syndrome - 47 (AA+XXY) D) Patau's syndrome - 45: Monosomy of 13th chromosome

12. Which one of the following sequences shows the correct hierarchy of classification, going from the most inclusive to the least inclusive?

- A) Kingdom, phylum, order, class, family, genus, species B) Kingdom, phylum, class, order, family, genus, species
C) Kingdom, order, phylum, class, family, genus, species D) Kingdom, class, order, family, genus, species

13. Silicon is a

- A) Insulator B) Conductor
C) Semiconductor D) Non-conductor

14. Which of the following disease is not caused by bacteria?

- A) Plague
 B) Cholera
 C) Yellow fever
 D) Tuberculosis

15. If an affected male has all affected daughters, but no affected sons, the trait is likely to be an

- A) X-linked dominant trait
 B) Autosomal recessive trait
 C) Autosomal dominant trait
 D) X-linked recessive trait

16. The molarity of a solution containing 5.844 gram NaCl in 100 mL is

- A) 0.01 M
 B) 0.1 M
 C) 1 M
 D) 10 M

17. The phylum of plants that includes mosses is

- A) Anthocerophyta
 B) Bryophyta
 C) Lycophyta
 D) Pterophyta

18. The premature aging syndrome caused due to the mutation in DNA repair enzymes is

- A) Hutchinson-Gilford Progeria
 B) Dementia
 C) Aphasia
 D) Schizophrenia

19. Which one of the following pairs are analogous structures?

- A) The front leg of horse and a human arm
 B) The front leg of frog and a bat wing
 C) The front flipper of a whale and a human arm
 D) The wings of bird and butterfly wings

20. Hydrolysis of one ATP molecule to ADP releases _____ calories of energy.

- A) 730
 B) 7,300
 C) 68,600
 D) 73,000

21. Which one of the following DNA duplex has highest melting temperature?

- A) 5' ATGGCTCGT 3'
 3' TACCGAGCA 5'
 B) 5' GGCTGGAGA 3'
 3' CCGACCTCT 5'
 C) 5' ATGGGCCCTG 3'
 3' TACCCGGGAC 5'
 D) 5' ATGATACTG 3'
 3' TACTATGAC 5'

22. Receptors for which of the following hormones are found in the cytoplasm of responsive cells?

- A) Thyroid hormone and insulin
 B) Glucagon and estrogen
 C) Insulin and estrogen
 D) Thyroid hormone and estrogen

23. The cooking time for food is reduced in a pressure cooker because

- A) Heat is more evenly distributed in the cooking space
 B) Boiling point of the water involved in cooking is increased
 C) The higher pressure inside the cooker pulverizes the food material
 D) Boiling point of the water involved in cooking is decreased

24. The animals that are genetically constructed to differ at one particular locus are called as

- A) Chimeric
B) Congenic
C) Hybrid
D) Transgenic

25. Sequencing and analysis of rRNA has divided the living world into three domains called

- A) Bacteria, archaea & eukarya
B) Archaea, eukarya & virus
C) Fungi, plants and animals
D) Bacteria, archaea & plants

PART "B"

26. A process in which movement of a molecule across the membrane down its concentration gradient is coupled to the movement of a second molecule up its concentration gradient and across the membrane in opposite direction is called -

- A) Active transport
B) Uniport
C) Antiport
D) Symport

27. The matrix of mitochondria contains

- A) A high concentration of glucose
B) $FADH_2$
C) Citric acid cycle intermediates
D) Glycogen

28. Planarian use _____ for excretion

- A) Flame cells
B) Nephridia
C) Uriniferous tubules
D) Malpighian tubules

29. The occurrence of tetratype in the acetomycete fungi is possible only if the crossing over occurred during the

- A) Four-strand stage
B) G1 phase
C) Two-strand stage
D) S phase

30. In mammals, the diaphragm separates the

- A) Thoracic cavity from the pericardial cavity
B) Peritoneal cavity from the thoracic cavity
C) Peritoneal cavity from pericardial cavity
D) Thoracic cavity from the pelvic cavity

31. Which one of the following metabolites is not directly produced in the hexose monophosphate shunt pathway?

- A) Fructose-6-phosphate
B) Dihydroxyacetone phosphate
C) Erythrose-4-phosphate
D) Gluconolactone-6-phosphate

32. Cytochromes are found in

- A) Inner mitochondrial membrane
B) Cristae of mitochondria
C) Matrix of mitochondria
D) Outer mitochondrial membrane

33. Tapeworms attach to the digestive lining of the host by means of their

- A) Proglottid
B) Stylete
C) Mastax
D) Scolex

34. If the paternal chromosomes have alleles A, B, c and the maternal chromosomes have a, b, C - then the chromosomes that are not a product of crossing over are -

- A) A B C and a b c
 B) A b C and a B c
 C) A b c and a B C
 D) A B c and a b C

35. Nondisjunction involving the X chromosomes may occur during oogenesis and produce two kinds of eggs. If normal sperms fertilize these two types, which of the following pairs of genotypes are possible?

- A) XX and XY
 B) XXY and XO
 C) XXY and YO
 D) XX and XO

36. Methionyl-transfer RNA is used for initiation of protein synthesis by which of the following?

- A) Chloroplast
 B) Eukaryotic cytoplasmic ribosomes
 C) Bacterial ribosomes
 D) Eukaryotic mitochondrial ribosomes

37. Which component in the viral envelope attaches the human deficiency virus (HIV) to host cells?

- A) gp41
 B) p18
 C) gp120
 D) p24

38. Which one of the following could be used to distinguish between an aldose and a ketose?

- A) Br₂ water
 B) Tollen's reagent
 C) Fehling's reagent
 D) Feulgen's reagent

39. Common method used for determination of the three dimensional structure of proteins is

- A) Edman degradation
 B) MALDI TOF analysis
 C) X-ray crystallography
 D) Two dimensional gel electrophoresis

40. Which one of the following is correct?

- A) Animal cells produce cellulase which hydrolyze cellulose
 B) Carbohydrates are absorbed primarily in the form of disaccharides
 C) Glycogen hydrolysis is promoted by the hormone glucagon
 D) Insulin has little effect on carbohydrate metabolism

41. If a phosphodiester bond in one strand of double stranded circular DNA is broken, the DNA is said to be

- A) Digested
 B) Linearized
 C) Cleaved
 D) Nicked

42. The first virus to be purified was

- A) Influenza virus
 B) Tobacco Mosaic virus
 C) Polio virus
 D) Smallpox

43. The amino acid leucine has the following side chain.

- A) CH₃ - CH (CH)₂ -
 B) (CH₃)₂ - CH - CH₂ -
 C) CH₃ - CH (OH) -
 D) CH₃ - CH₂ - CH (CH₃) -

44. Which one of the following is **NOT** a part of the immune system?

- A) Spleen
- B) Thymus
- C) Tonsil
- D) Pancreas

45. Liebermann's reaction is used for detection of

- A) aniline
- B) benzoic acid
- C) nitrobenzene
- D) phenol

46. When an animal cell is placed in 0.5 M sucrose solution, its volume does not alter. When the same cell is transferred to a 0.5 M NaCl solution, the volume of the cell will -

- A) Remain unchanged
- B) Decrease
- C) Increase
- D) Increase and then decrease

47. Which one of the following is **mismatched**?

- A) Matrix - extracellular material in connective tissue
- B) Cardiac muscle cells - multiple nuclei
- C) Adipose cells - found in loose connective tissue
- D) Ligaments - bind muscles to bone

48. The nucleic acid which is highly modified by extensive methylation after synthesis is

- A) hnRNA
- B) mRNA
- C) tRNA
- D) rRNA

49. Which one of the following is an acidic amino acid?

- A) Aspartic acid
- B) Isoleucine
- C) Lysine
- D) Proline

50. Genetic recombination in bacteria occurs through the transfer of

- A) Pili
- B) Plasmids
- C) Endospores
- D) Gametes

51. The second messenger which plays a crucial role in regulating the synthesis and breakdown of glycogen in liver and muscle cells is

- A) cAMP
- B) cGMP
- C) DAG
- D) IP₃

52. What blocks myosin from binding to actin, when the muscle is at rest?

- A) Acetylcholine
- B) ATP
- C) Troponin
- D) Tropomyosin

53. Which one of the following is not a cancer drug?

- A) Isoniazid
- B) Cisplatin
- C) Methotrexate
- D) Daunorubicin

54. Isotypes defer to variation in the

- A) Light chain variable region
- B) Light chain constant region
- C) Heavy chain variable region
- D) Heavy chain constant region

55. When chromosome breakage occurs and the broken segment rotates by 180° degrees before reunion, the resulting chromosome aberration is known as

- A) Insertion
B) Translocation
C) Inversion
D) Frame shift

56. A common method for separating cell organelles and insoluble material from soluble proteins is

- A) Filtration
B) Column chromatography
C) Polyacrylamide gel electrophoresis
D) Differential centrifugation

57. Cystic fibrosis is caused by _____ mutation.

- A) Autosomal recessive
B) Autosomal dominant
C) Sex-linked recessive
D) Sex-linked dominant

58. In sensory neurons, stimuli are conducted through

- A) Axons
B) Dendrites
C) Cell body
D) Myelin sheath

59. According to molecular definition of a gene, which one of the following is not a part of eukaryotic gene?

- A) Promoter
B) Poly (A) tail
C) Enhancer
D) Polyadenylation signal

60. At room temperature formaldehyde changes into

- A) Trioxane
B) Paraldehyde
C) Acetaldehyde
D) Acetic acid

61. Which one of the following is part of the gynoecium?

- A) Filament
B) Carpel
C) Stamen
D) Sepal

62. The major class of insoluble fibrous protein present in the extracellular matrix and in connective tissue is

- A) Actin
B) Cadherin
C) Collagen
D) Fibronectin

63. The following method helps in determining the genotype of an individual for a particular trait

- A) Test cross
B) Back cross
C) Monohybrid cross
D) Dihybrid cross

64. The rhythmic beating of the heart is initiated by the

- A) Purkinje fibers
B) Bundle of His
C) Atrioventricular node
D) Sinoatrial node

65. Which one of the following is an innate immune cell type?

- A) B lymphocyte
B) T lymphocyte
C) Macrophage
D) NKT cells

66. Which one of the following is not characteristic of members of the plant kingdom?

- A) Carotenoids
B) Chlorophyll c
C) Chlorophyll a
D) Chlorophyll b

67. Releasing hormones (TRH, GnRH etc.) in higher animals are synthesized and secreted by

- A) Adenohypophysis
B) Neurohypophysis
C) Hypothalamus
D) Pars-intermedia

68. The neurotransmitter at the neuromuscular junction is-

- A) Dopamine
B) Serotonin
C) Acetyl choline
D) Epinephrine

69. Which one of the following is not a primary alcohol?

- A) Methanol
B) Ethanol
C) Benzyl alcohol
D) Isopropyl alcohol

70. Green algae, recently been investigated as food source in several nations is

- A) *Volvox*
B) *Chlorella*
C) *Chlamydomonas*
D) *Pseudomonas*

71. The virus commonly used for the management of insect pests as well as a vector for production of recombinant proteins is

- A) Retrovirus
B) Adenovirus
C) Parvovirus
D) Baculovirus

72. Two antagonistic hormones are-

- A) MSH & TSH
B) Calcitonin & Parathormone
C) ADH & GH
D) Oxytocin & Prolactin

73. Which has the maximum percentage of Cl?

- A) Neoprene
B) PVC
C) BHC
D) DDT

74. The inflammatory response includes all of the following except

- A) Vessel constriction
B) Temperature increase
C) Increased blood flow
D) Phagocytic attack

75. World's natural gas reservoirs are primarily produced by

- A) Anaerobic fungi
B) Actinomyces
C) Primitive protists
D) Archaeobacteria

76. Components of animal cell cytoskeleton found in cilia and flagella that direct chromosomal movement during cell division are

- A) Microtubules
B) Microfilaments
C) Intermediary filaments
D) Microtubules and microfilaments

77. Solid CO₂ is an example of

- A) Ionic crystal
B) Metallic crystal
C) Covalent crystal
D) Molecular crystal

78. The following are epimers of glucose

- A) Galactose and fructose
B) Mannose and galactose
C) Mannose and fructose
D) Sucrose and fructose

79. Enzymes from the following organelle are involved in the oxidation of fatty acids, but the released energy is not used for ATP synthesis

- A) Mitochondria
B) Lysosomes
C) Peroxisomes
D) Ribosomes

80. While most of the insects have four wings, the following have only two

- A) Cockroach
B) Housefly
C) Butterfly
D) Honeybee

81. Enzyme produced in the kidney, which catalyzes the cleavage of angiotensinogen present in the blood-

- A) Angiotensin
B) Bradykinin
C) Kynurenine
D) Renin

82. Cerebellum regulates

- A) Body temperature
B) Movement and balance
C) Sleep-wake cycle
D) Learning and memory

83. If radioactive sulphur is added to culture medium of *E. coli*, the radioactive label after 48 hours will be localized in

- A) Enzymes
B) RNA
C) DNA
D) Phospholipid

84. Vertebrate lungs are derived from

- A**) Ectoderm
B) Epiderm
C) Endoderm
D) Mesoderm

85. Glucokinase

- A) Is widely distributed in most of the mammalian tissues
B) Has high K_m for glucose
C) Is inhibited by glucose-6-phosphate
D) Catalyzes a reversible reaction

86. Humans can digest starch and not cellulose. Both of them contain monomeric glucose units. Starch is digested due to specificity of the intestinal enzymes for

- A) α 1->4 linkage
B) β 1->4 linkage
C) α 1->6 linkage
D) β 1->6 linkage

87. Drugs that prevent the formation of bacterial cell wall are

- A) quinolones
B) beta-lactams
C) tetracycline
D) Aminoglycosides

88. Heat shock proteins, originally identified as proteins expressed in response to stress, also function as

- A) Protein kinase
 B) GTPase activating proteins
 C) Proteases degrading ubiquitin-tagged proteins
 D) Molecular chaperones, which assist in *de novo* protein folding

89. When a lead storage battery is discharged

- A) SO_2 is evolved
 B) Lead sulfate is consumed
 C) Lead is formed
 D) Sulphuric acid is consumed

90. The genome of an organism contains 20% adenine residue. Which one of the following statement is correct?

- A) G + C content is 20%
 B) G + C content is 40%
 C) G + C content is 60%
 D) G + C content is 80%

91. If one mL of 0.01 M HCl is diluted to 100 mL at 25° C, what will be the pH of the resulting solution?

- A) 2
 B) 4
 C) 5
 D) 7

92. Which one of the following pathway is very active in the tissues involved in lipogenesis and nucleic acid biosynthesis?

- A) Glycolysis
 B) TCA cycle
 C) β oxidation
 D) HMP shunt pathway

93. Which one of the following is a human cell line?

- A) CHO
 B) Hela
 C) BHK-21
 D) Sf-9

94. When a gasoline is given "octane number" 80, it means it contains

- A) 80% octane
 B) 80% iso-octane
 C) 20% iso-octane
 D) 20% benzene

95. The bacteria which utilize CO_2 as the sole carbon source and obtains energy by oxidation and reduction of inorganic substances are called as

- A) Chemolithotrophs
 B) Photoautotrophs
 C) Chemoheterotrophs
 D) Photoheterotrophs

96. Human albinism is caused by recessive gene 'a'. A child has albinism, although none of the parents are affected. What is the genotype of parents?

- A) AA and AA
 B) Aa and AA
 C) Aa and Aa
 D) Aa and aa

97. Viral replication within cells is inhibited by

- A) IL-1
 B) IL-4
 C) IFN- γ
 D) TNF- α

98. In the mitochondrial genome, the stop codon is

- A) AGA
 B) UGA
 C) UUU
 D) UAA

