

Booklet code - B

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.

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**PART "A"**

**1. The complete aerobic respiration of glucose produces**

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

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

- |                       |                |
|-----------------------|----------------|
| A) $\alpha$ -Amanitin | B) Rifampicin  |
| C) Actinomycin D      | D) Aphidicolin |

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

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

**4. Gram positive cells have**

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

V-15

## Booklet code - B

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

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

**6. Lipid A stimulates the synthesis of which factor?**

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

**7. The only living echinoderms which are fully sessile**

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

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

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

**9. The Michaelis-Menten constant  $K_m$  is**

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

**10. The unfertilized eggs laid by queen bee develop into**

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

**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) Patau's syndrome - 45: Monosomy of 13<sup>th</sup> chromosome  
C) Klinefelter's syndrome - 47 (AA+XXY)      D) Down's syndrome - 47: Trisomy of 21<sup>st</sup> 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, order, phylum, class, family, genus, species  
C) Kingdom, phylum, class, order, 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) Yellow fever  
C) Cholera  
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 recessive trait  
B) Autosomal recessive trait  
C) Autosomal dominant trait  
D) X-linked dominant trait

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

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

**17. The phylum of plants that includes mosses is**

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

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

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

**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 wings of bird and butterfly wings  
D) The front flipper of a whale and a human arm

**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' ATGATACTG 3'  
3' TACTATGAC 5'  
D) 5' ATGGGCCCTG 3'  
3' TACCCGGGAC 5'

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

- A) Thyroid hormone and insulin  
B) Thyroid hormone and estrogen  
C) Insulin and estrogen  
D) Glucagon 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 decreased  
C) The higher pressure inside the cooker pulverizes the food material  
D) Boiling point of the water involved in cooking is increased

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

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

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

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

**27. The matrix of mitochondria contains**

- A) Citric acid cycle intermediates  
B) FADH<sub>2</sub>  
C) A high concentration of glucose  
D) Glycogen

**28. Planarian use \_\_\_\_\_ for excretion**

- A) Nephridia  
B) Flame cells  
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) G<sub>1</sub> phase  
B) Four-strand stage  
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 pericardial cavity  
**C)** Peritoneal cavity from the thoracic 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) Gluconolactone-6-phosphate  
C) Erythrose-4-phosphate  
D) Dihydroxyacetone phosphate

**32. Cytochromes are found in**

- A) Cristae of mitochondria  
B) Inner mitochondrial membrane  
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) Scolex  
D) Mastax

- 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) XX and XO                              D) XXY and YO
- 36. Methionyl-transfer RNA is used for initiation of protein synthesis by which of the following?**
- A) Chloroplast                              B) Eukaryotic mitochondrial ribosomes  
C) Bacterial ribosomes                      D) Eukaryotic cytoplasmic ribosomes
- 37. Which component in the viral envelope attaches the human deficiency virus (HIV) to host cells?**
- A) gp120                                      B) p18  
C) gp41                                      D) p24
- 38. Which one of the following could be used to distinguish between an aldose and a ketose?**
- A) Fehling's reagent                      B) Tollen's reagent  
C) Br<sub>2</sub> water                              D) Feulgen's reagent
- 39. Common method used for determination of the three dimensional structure of proteins is**
- A) Edman degradation                      B) Two dimensional gel electrophoresis  
C) MALDI TOF analysis                      D) X-ray crystallography
- 40. Which one of the following is correct?**
- A) Animal cells produce cellulase which hydrolyzes cellulose                      B) Glycogen hydrolysis is promoted by the hormone glucagon  
C) Carbohydrates are absorbed primarily in the form of disaccharides                      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) Nicked  
C) Cleaved                                      D) Linearized
- 42. The first virus to be purified was**
- A) Influenza virus                              B) Smallpox  
C) Polio virus                                      D) Tobacco Mosaic virus
- 43. The amino acid leucine has the following side chain.**
- A) (CH<sub>3</sub>)<sub>2</sub> - CH - CH<sub>2</sub> -                      B) CH<sub>3</sub> - CH (CH)<sub>2</sub> -  
C) CH<sub>3</sub> - CH (OH) -                      D) CH<sub>3</sub> - CH<sub>2</sub> - CH (CH<sub>3</sub>) -

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

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

**45. Liebermann's reaction is used for detection of**

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

**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) Increase  
C) Decrease  
D) Increase and then decrease

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

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

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

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

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

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

**50. Genetic recombination in bacteria occurs through the transfer of**

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

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

- A) IP<sub>3</sub>  
B) cGMP  
C) DAG  
D) cAMP

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

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

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

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

**54. Isotypes defer to variation in the**

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

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

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

**57. Cystic fibrosis is caused by \_\_\_\_\_ mutation.**

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

**58. In sensory neurons, stimuli are conducted through**

- A) Axons  
B) Cell body  
C) Dendrites  
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) Acetic acid  
B) Paraldehyde  
C) Acetaldehyde  
D) Trioxane

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

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

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

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

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

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

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

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

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

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

## Booklet code - B

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

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

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

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

**68. The neurotransmitter at the neuromuscular junction is-**

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

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

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

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

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

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

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

**72. Two antagonistic hormones are-**

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

**73. Which has the maximum percentage of Cl?**

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

**74. The inflammatory response includes all of the following except**

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

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

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

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

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



**77. Solid CO<sub>2</sub> is an example of**

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

**78. The following are epimers of glucose**

- A) Galactose and fructose  
B) Mannose and fructose  
C) Mannose and galactose  
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) Peroxisomes  
B) Lysosomes  
C) Mitochondria  
D) Ribosomes

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

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

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

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

**82. Cerebellum regulates**

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

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

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

**84. Vertebrate lungs are derived from**

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

**85. Glucokinase**

- A) Is widely distributed in most of the mammalian tissues  
B) Is inhibited by glucose-6-phosphate  
C) Has high Km for glucose  
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)  $\alpha$  1- $\rightarrow$ 4 linkage  
B)  $\beta$  1- $\rightarrow$ 4 linkage  
C)  $\alpha$  1- $\rightarrow$ 6 linkage  
D)  $\beta$  1- $\rightarrow$ 6 linkage

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

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

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

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

**89. When a lead storage battery is discharged**

- A)  $\text{SO}_2$  is evolved  
 B) Sulphuric acid is consumed  
 C) Lead is formed  
 D) Lead sulfate 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) 7  
 B) 5  
 C) 4  
 D) 2

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

- A) Glycolysis  
 B) HMP shunt pathway  
 C)  $\beta$  oxidation  
 D) TCA cycle

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

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

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

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

**95. The bacteria which utilize  $\text{CO}_2$  as the sole carbon source and obtain energy by oxidation and reduction of inorganic substances are called as**

- A) Chemolithotrophs  
 B) Chemoheterotrophs  
 C) Photoautotrophs  
 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) IFN- $\gamma$   
 C) IL-4  
 D) TNF- $\alpha$

**98. In the mitochondrial genome, the stop codon is**

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

**99. Which one of the following is a polyatomic cation?**

- A)  $Mg^{2+}$
- B)  $OH^-$
- C)  $Cu^{2+}$
- D)  $NH_4^+$

**100. Human embryonic stem cells are commonly derived from**

- A) Inner cell mass (ICM)
- B) Trophoblast
- C) Complete blastocyst
- D) Cord blood cells

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**For rough work**

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