Hall Ticket Number:

Department of Animal Sciences

ENTRANCE EXAMINATION, June 2010

M.Sc Animal Biotechnology

Time: 2 hours **Maximum Marks: 100**

INSTRUCTIONS: PLEASE READ BEFORE ANSWERING

1. ***Enter your hall ticket number on this sheet and the answer (OMR) sheet.***
2. ***Answers have to be marked on the OMR answer sheet following the instructions provided there upon.***
3. ***Hand over both the question paper booklet and OMR answer sheet at the end of the examination.***
4. ***All questions carry one mark each. Answer all, or as many as you can.***
5. ***0.33 mark will be deducted for every wrong answer.***
6. ***There are total of 13 pages in this question paper excluding answer sheet. Answer sheet is attached separately. Check this before you start answering.***
7. ***The question paper consists of part "A" and part "B". The marks obtained in part "A" will be taken into consideration in case of tie i.e., when more than one student gets equal marks, to prepare the merit list.***

PART "A"

1. Ninhydrin test is given by

A) Carbohydrates B) Proteins

C) Alkanes D) Alkenes

2. Which immunoglobulin is the principal one found in secretions such as milk?

A) IgG B) IgA

C) IgD D) IgM

3. Non-proliferative phase of cell cycle is

A) G1 —› G0 B) S

C) G1 —›G2 D) M

4. *Leucosolenia* is an example of which class of the phylum Porifera?

A) Hevactinellidae B) Demospongia

C) Calcipongiae D) Euspongia

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5. 12 g of an alkaline earth metal gives 14.8 g of its nitride. Atomic weight of that metal is

A) 20
B) 12
C) 40
D) 14.8

6. What form of nucleotide represents the major currency of a cell?

A) Adenosine-5′-triphosphate
B) 3′-5′cyclic adenosine monophosphate
C) 2′-O-Methyl-adenosine monophosphate
D) Adenosine-5′-diphosphate

7. At physiological pH, the carboxyl and amino groups in an amino acid are in the following form

A) $-COO^-$; $-NH_2$
B) $-COOH$; NH_2
C) $-COOH$; NH_3^+
D) $-COO^-$; NH_3^+

8. Which of the following animals reproduce asexually by fragmentation?

A) Nematodes
B) Sponges
C) Planarians
D) Echinoderms

9. Removal of the Bursa of Fabricius in a chick results in

A) Decrease in the number of T lymphocytes
B) Anemia
C) Delayed-type hypersensitivity
D) Low serum level of antibodies

10. Which of the following does not secrete steroid hormones?

A) Ovary
B) Pituitary
C) Testis
D) Corpus luteum

11. The enzymes which use the energy of ATP hydrolysis to move into and melt double-stranded DNA are

A) DNA ligase
B) DNA helicase
C) DNA primase
D) DNA polymerase

12. Calcitonin is secreted by

A) Thyrotrophs
B) Parafollicular C cells of thyroid
C) β-cells of pancreas
D) Follicular or principal cells of thyroid

13. The conversion of sugar $C_{12}H_{22}O_{11} \rightarrow CO_2$ is

A) Oxidation
B) Reduction
C) oxidation and reduction
D) Neutralization

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14. A mixture of red and blue ink can be separated by

A) Distillation
B) Crystallization
C) Chromatography
D) Sublimation

15. The tertiary structure of a protein refers to the

A) presence of alpha-helices or beta-sheets
B) the sequence of amino acids
C) the unique three dimensional folding of the molecule.
D) interactions of a protein with other sub-units or enzymes

16. The "satiety factors" that regulate food intake is

A) Peptin
B) Leptin
C) Statin
D) Pepsin

17. The atomic weight and atomic number of an element are A and Z, respectively. The number of neutrons in the atom of that element is

A) A
B) Z
C) Z+A
D) A−Z

18. Susceptibility to duodenal ulcers is increased by an infection of the bacterium

A) *Helicobacter pylori*
B) *Escherichia coli*
C) *Pseudomonas aeruginosa*
D) *Staphylococcus aureus*

19. Cholecystokinin is secreted by

A) stomach
B) Liver
C) duodenum
D) Colon

20. The plants which produce only pollen or ovules are called

A) Dichogamous
B) Monoecious
C) Dioecious
D) Monogamous

21. The molarity of a solution containing 5.844 g of NaCl in 100 ml is

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

22. The ability to hum a tune or recall a beautiful sunset in Kanyakumari is a function of

A) Cerebellum
B) Frontal lobe
C) Temporal lobe
D) Parietal lobe

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23. Which of the following terms does NOT refer to an example of a weak force of interaction between two biological molecules?

A) Covalent
B) Hydrophobic
C) Electrostatic
D) Hydrogen

24. CO_2 is mainly transported in the blood in one of the following forms:

A) Carbamino hemoglobin
B) Carbamino plasma protein
C) Dissolved CO_2
D) Bicarbonate

25. An enzyme acts by

A) decreasing the pH
B) increasing the pH
C) reducing the energy of activation
D) increasing the energy of activation

PART "B"

26. Coenzymes FMN and FAD are derived from

A) Vitamin C
B) Vitamin B_6
C) Vitamin B_1
D) Vitamin B_2

27. Glucose is oxidized in the _____ of cells.

A) Cytoplasm
B) Mitochondria
C) Chloroplast
D) Ribosomes

28. Shortage of acetylcholine in brain is associated with

A) Parkinson's disease
B) Alzheimer's disease
C) Huntington's disease
D) Schizophernia

29. In animals, the nervous system is derived from

A) ectoderm
B) Mesoderm
C) endoderm
D) Mesoendoderm

30. Regression of amphibian tail is under the influence of

A) estrogens
B) Thyroxine
C) androgens
D) Insulin

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31. All of the following are true with respect to IgE molecules, <u>except</u>

A) they are the principal immunoglobulin class involved in allergic reactions.
B) they are involved in mediating anti-parasitic immune responses.
C) they will cross the placenta and fix complement.
D) they can stimulate the release of histamine.

32. The percentage of oxygen in NaOH is

A) 40 B) 16
C) 8 D) 1

33. Which one of the following is an essential amino acid?

A) Alanine B) Threonine
C) Aspartic acid D) Glycine

34. The amino acid sequence of a peptide"Q-W-E-D" is

A) Tryptophan-Glutamine-Glutamate-Aspartate
B) Glutamine-Tryptophan-Aspartate-Glutamate
C) Glutamine-Tryptophan-Glutamate-Aspartate
D) Glutamate-Tryptophan-Glutamine-Aspartate

35. Biological oxidation in Kreb's cycle involves

A) N_2 B) CO_2
C) O_2 D) SO_2

36. Cyanide (CN^-) blocks the electron transport chain at

A) Cytochrome b B) Cytochrome a+a3
C) Cytochrome c D) Ubiquinone

37. The metal that can be extracted directly from sea water is

A) K B) Mg
C) Zn D) Ca

38. Which one of the following elements occurs free in nature?

A) Nitrogen B) Phosphorous
C) Arsenic D) Antimony

39. Fight or flight response is associated with

A) Catecholamines B) Indoleamines
C) Opioid peptides D) Acetylcholine

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40. When ΔG is negative, the reaction is

A) exothermic
B) endothermic
C) hypothermic
D) ectothermic

41. Which of the following states that no two species can occupy the same niche indefinitely when resources are limiting?

A) Principle of resource limitation
B) Principle of species resourcing
C) Principle of competitive exclusion
D) Principle of competitive termination

42. The vector responsible for the transmission of *Kala-azar* is

A) House fly
B) Sand fly
C) Mosquito
D) Tsetse fly

43. The loss of an electron by a molecule is called

A) oxidation
B) enthalpy
C) reduction
D) enduced fit

44. White (fast-twitch) fibres differ from red (slow-twitch) fibres in having

A) a relatively large number of mitochondria and high ATPase activity
B) a relatively small number of mitochondria and low ATPase activity
C) a relatively small number of mitochondria and high ATPase activity
D) a relatively small number of mitochondria and low ATPase activity

45. Unsaturated fatty acids is present abundantly in

A) pulses
B) fish
C) meat
D) egg

46. Nitrous oxide, when inhaled in large quantities is fatal as it

A) is a neurotoxin
B) it binds to hemoglobin
C) it causes brain anoxia
D) it causes stroke

47. T vector cloning for a PCR product requires

A) Polynucleotide kinase
B) Terminal transferase
C) Klenow DNA- proof reading polymerase
D) *Taq* DNA polymerase

48. Tay-Sachs disease has clinical impact solely on

A) pancreas
B) liver
C) brain
D) kidney

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49. Hydrophobic interactions are exhibited by

A) ions
B) hydration shells
C) polar molecules
D) non-polar molecules

50. Which of the following genotypes would produce largest variety of gametes if the alleles get assorted independently?

A) aa BB Cc Dd
B) Aa bb CC DD
C) Aa Bb CC Dd
D) AA BB CC DD

51. Ca^{2+} released in response to a stimulus in the skeletal muscle binds to

A) troponin
B) tropomyosin
C) actin
D) Myosin

52. The key enzyme involved in gluconeogenesis is

A) pyruvate dehydrogenase
B) malate dehydrogenase
C) phosphenolpyruvate carboxykinase
D) hexokinase

53. The most serious and fatal form of anthrax is

A) pulmonary anthrax
B) gastrointestinal anthrax
C) cutaneous anthrax
D) ocular anthrax

54. A microbial culture started with 5 cells and reached to a density of 160 cells. How many generations did the cells go through assuming no cell death occurred:

A) 5
B) 6
C) 7
D) 8

55. Which DNA polymerase in eukaryotes is involved in "Okazaki fragments" synthesis after the removal of RNA primer?

A) DNA polymerase α
B) DNA polymerase ε
C) DNA polymerase δ
D) DNA polymerase β

56. Which of the following is considered to be a fibrous protein?

A) Keratin
B) Immunoglobulin
C) Hemoglobulin
D) Myoglobulin

57. Where does endogenous fatty acid synthesis occur in humans?

A) Lactating mammary gland
B) Islets of Langerhans
C) Adipose tissue
D) Intestine

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58. The extra embryonic membrane that gives protection to the developing embryo from shocks is

A) Yolk sac
B) Allantois
C) Chorion
D) Amnion

59. Which one of the following statements is *correct* with reference to ovoviviparity?

A) Ovoviviparity is restricted to few terrestrial forms.
B) Ovoviviparity is a common phenomenon in amphibians only.
C) Ovoviviparity is restricted to few exotic mammalian species.
D) Ovoviviparity is seen in a variety of aquatic forms, reptiles and invertebrates.

60. Which cellular structure in animal cells contain high amount of cholesterol?

A) Cellular/plasma membrane
B) Lysosomes
C) Endoplasmic reticulum
D) Nuclear membrane

61. Adrenaline produced by adrenal medulla is a

A) fatty acid
B) amines
C) peptide
D) steroid

62. Electron microscopes have greater resolving power than light microscopes because

A) the wavelength of electrons is much shorter than the wavelength of visible light
B) the wavelength of electrons is much longer than the wavelength of visible light
C) because the beams in electron microscopes overlap creating a clearer picture
D) electron microscopes have more lenses

63. In certain plants, the embryos in the seed may be produced asexually from the parent plant, which is known as

A) Monomixis
B) Polymixis
C) Holomixis
D) Apomixis

64. Athletes get muscle cramps due to

A) accumulation of lactic acid
B) sudden drop in myosin levels
C) respiratory problem
D) dehydration

65. The urea cycle occurs in the

A) mitochondria and cytoplasm
B) mitochondria and lysosome
C) endoplasmic reticulum and peroxisomes
D) Golgi complex and mitochondria

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66. Spermatogenesis occurs in the

A) uriniriferous tubules
B) epididymis
C) seminal vesicles
D) seminiferous tubules

67. Superphosphate used as a fertilizer is:

A) Calcium phosphate
B) Ammonium phosphate
C) Calcium dihydrogen phosphate
D) Ammonium dihydrogen phosphate

68. In the treatment of asthma, the gases used are a mixture of

A) helium and oxygen
B) neon and oxygen
C) xenon and hydrogen
D) argon and oxygen

69. Assuming the half-life of a substance is 5 days, what will be the amount of the substance left after 15 days if the initial amount is 64 grams?

A) 4 gram
B) 32 gram
C) 8 gram
D) 16 gram

70. In humans, the "Barr Body" is an

A) active X chromosome in females
B) active X chromosome in males
C) inactive Y chromosome in males
D) inactive X chromosome in female

71. Dry ice is

A) solid ice without any water
B) solid sulphur dioxide
C) solid carbon dioxide
D) solid benzene

72. Treatment of root tip meristem cells with the microtubule inhibitor colchicine results in all of the followinf <u>except</u>

A) induction of polyploidy
B) prevention of cytokinesis
C) inhibition of mitotic spindle assembly
D) cessation of DNA replication

73. A silent mutation in a gene results in

A) no change in the nucleotide sequence of mRNA encoded by the gene
B) no change in the amino acid sequence of the protein
C) no expression of the protein encoded by the gene
D) a shift in the translational reading frame

74. "*The descent of man*" was the work done by

A) Alfred Russel Wallace
B) Charles Darwin
C) Malthus
D) Stephan Gould

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75. Nuclides having the same atomic number are known as

A) isomers
B) isotopes
C) isobars
D) isotones

76. Two proteins of molecular masses of 120 kDa and 25 kDa can be easily separated by

A) size exclusion chromatography
B) affinity chromatography
C) ion exchange chromatography
D) adsorption chromatography

77. What process is used to convert vegetable oils into margarine and other solid or semisolid vegetable shortenings?

A) Bromination
B) Hydrolysis
C) Catalytic hydrogenation
D) Oxidation

78. Compound tubular glands found in the duodenum are known as

A) Brunner's gland
B) Bladin's gland
C) Cowper's gland
D) Ebner's gland

79. 90 g of water is equivalent to --- moles?

A) 6.02×10^{23}
B) 45
C) 5
D) 9×10^{2}

80. Proteins synthesized by the rough ER are

A) for internal storage
B) only cytoplasmic proteinss
C) to build more membranes in the cell
D) exported from the cell

81. Heavy water is

A) $H_2{}^{18}O$
B) D_2O
C) water obtained by repeated distillation
D) water at $4^{\circ}C$

82. The most reactive form of carbon is _____.

A) Diamond
B) Graphite
C) Coal
D) Charcoal

83. What is the caloric value of protein meal per gram?

A) 9
B) 4
C) 7
D) 5

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84. Cholesterol that is present in the blood serum is closely associated with

A) hardening of the arteries
B) kidney stones
C) Diabetes
D) Osteoporosis

85. In which of the following class of Subphylum Mandibulata, the head bears maxillae that are fused to form a plate-like structure called gnathochilarium?

A) Crustacea
B) Chilopoda
C) Insecta
D) Diplopoda

86. Which has maximum molecules?

A) 7g N_2
B) 16g O_2
C) 2g H_2
D) 16g NO_2

87. The larvae of mosquito are example for

A) Neckton
B) Neuston
C) Hyponeuston
D) Epineuston

88. Sulphuric acid cannot be used

A) As a pickling agent
B) In lead storage batteries
C) In white paints
D) In manufacture of dyes

89. Which of the following is having strongest covalent bond?

A) H—Cl
B) Cl—Cl
C) C—Cl
D) Na—Cl

90. Which of the following cell compartment is associated with a protein skeleton composed of lamins?

A) Basement membrane
B) Peroxisomes
C) Nucleus
D) Mitochondrion

91. Which of the following amino acid does not undergo phosphorylation?

A) Serine
B) Threonine
C) Tyrosine
D) Alanine

92. Transmembrane and secreted forms of immunoglobulins are generated from the same heavy chain gene by

A) rearrangement of DNA sequences
B) alternate splicing of mRNA transcript
C) proteolytic cleavage of the polypeptide
D) post-translational modification of polypeptide

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93. Which of the following protein is not a part of the nucleosome?

A) H1
B) H2A
C) H3
D) H4

94. A patient with Klinefelter's syndrome will have the following chromosomes

A) 44 , XXX
B) 44, XXY
C) 45, XXY
D) 44, XYY

95. Characteristics that have arisen as a result of common evolutionary descent are said to be

A) Analogous
B) Homologous
C) Hetererogamous
D) Contiguous

96. Lipopolysaccharide (LPS), a potent inducer of cytokine synthesis is

A) endotoxin released by gram-negative bacteria
B) endotoxin released by gram-positive bacteria
C) exotoxin secreted by gram-negative bacteria
D) exotoxin secreted by gram-positive bacteria

97. The DNA from bacteriophage ΦX174 has base composition of 23%A, 32% T, 30% G and 15% C. Which of the following best describes the phenomenon?

A) In viral genomes, the base pairing does not follow the standard Watson-Crick rule
B) Nucleic acids from viruses are tightly complexed with nucleic acid-binding proteins and they cannot base-pair with one another.
C) The genome of bacteriophage ΦX174 is single-stranded
D) Viral genomes are linear and tolerate base-pair mismatches

98. A second mutation in the same gene restores the wild type phenotype. This is known as _____

A) gene conversion
B) epistasis
C) intergenic complementation
D) intragenic suppression

99. When the alleles of a and *a* conform to Hardy-Weinberg expectations and if the frequency of *a* is 0.3, which of the following will be the most common genotype in the population?

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

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100. While expressing an eukaryotic gene in bacteria, cDNA is used rather than genomic DNA, because

A) it is easier to clone cDNA than genomic DNA

B) cDNA is shorter in length

C) most eukaryotic gene promoters do not function in bacteria

D) most eukaryotic genes have introns that cannot be removed in bacteria

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For rough work

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