

Hall Ticket Number:

Booklet Code: A

## ENTRANCE EXAMINATIONS – 2016

M.Sc. Animal Biology & 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 instructions provided there upon. Make sure that you have clearly mentioned the Booklet Code (A or B or C) on your OMR sheet.
- Hand over OMR answer sheet at the end of the 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 sheet (OMR) 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 a tie i.e., when more than one student gets equal marks, to prepare the merit list.

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### PART "A"

1. The most ancient of the living birds is

- |            |            |
|------------|------------|
| A) Crow    | B) Sparrow |
| C) Penguin | D) Ostrich |

2. Which molecule has the greatest dipole moment

- |                      |                       |
|----------------------|-----------------------|
| A) CH <sub>3</sub> I | B) CH <sub>3</sub> Br |
| C) CH <sub>3</sub> F | D) CH <sub>3</sub> Cl |

3. Which one of the following organelles shows high degree of polymorphism without compromising with its function?

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

4. Genetic variability is caused by

- |              |                  |
|--------------|------------------|
| A) Mutation  | B) Selection     |
| C) Migration | D) Genetic drift |

5. How many  $\mu$  moles will be there in 100  $\mu$ l of 0.1M of NaCl and CaCl<sub>2</sub> solution?

- A) 100  $\mu$  moles of NaCl and 200  $\mu$  moles of CaCl<sub>2</sub>      B) 100  $\mu$  moles of NaCl and 100  $\mu$  moles of CaCl<sub>2</sub>  
C) 10  $\mu$  moles of NaCl and 10  $\mu$  moles of CaCl<sub>2</sub>      D) 10  $\mu$  moles of NaCl and 20  $\mu$  moles of CaCl<sub>2</sub>

6. "Habits form second nature" was quoted by

- A) Kenneth R. Miller      B) Jean Baptist Lamarck  
C) Charles Darwin      D) Alfred Russel Wallace

7. Which one of the following statement is false about propane

- A) The compound is combustible      B) Each carbon is sp<sup>3</sup> hybridized  
C) The compound undergoes polymerisation to give polypropylene      D) All bond angles are 109.5°

8. Which one of the following is a correct food chain?

- A) Phytoplanton → zooplankton → fish → bird      B) Fallen leaves → bacteria → insect → frog  
C) Zooplankton → nekton → phytoplankton → fish      D) Grass → insect → snake → fox

9. Which of the hydrocarbons has acidic hydrogens?

- A) 1-Butyne      B) 1-Butene  
C) 2-Butene      D) 2-Butyne

10. The hormones epinephrine and glucagon are involved in the regulation of the following pathways

- A) Activates gluconeogenesis and glycogenesis      B) Inhibits gluconeogenesis and activates glycolysis  
C) Activates gluconeogenesis and inhibits glycolysis      D) Activates glycogenesis and glycolysis

11. Which of the following compounds react fastest with Lucas reagent?

- A) 1-propanol      B) 2-methyl-2-propanol  
C) 2-methyl-1-propanol      D) 2-propanol

12. Histones have high content of amino acids such as

- A) Arginine and lysine      B) Tryptophan and leucine  
C) Glutamine and asparagine      D) Phenyl alanine and histidine

13. Which one of the following statistical test is not a non-parametric test?

- A) Kruskal- Wallis      B) Student  
C) Mann-Whitney      D) Wilcoxon

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**14. Which of the following do not have skin that is impermeable to water?**

- A) Mammals
- B) Birds
- C) Amphibians
- D) Reptiles

**15. The compound with lowest boiling point is**

- A)  $\text{CH}_3\text{CH}_2\text{CH}_3$
- B)  $\text{CH}_3\text{OCH}_3$
- C)  $\text{CH}_3\text{CH}_2\text{OH}$
- D)  $\text{H}_2\text{O}$

**16. The co-enzymes FMN and FAD are derived from vitamin**

- A) C
- B) B6
- C) B1
- D) B2

**17. The best example of a man made ecosystem is**

- A) Herbarium
- B) Aquarium
- C) Animarium
- D) Forest

**18. Which one of the following is a hemochorial organ?**

- A) Uterus
- B) Placenta
- C) Prostate
- D) Vagina

**19. Biodiversity**

- A) Increases towards the equator
- B) Decreases towards the equator
- C) Remains the same throughout the planet
- D) Has no effect on change in latitude

**20. The X-ray diffraction studies that led to the discovery of the structure of DNA was conducted by**

- A) McClintock
- B) Franklin
- C) Meselson and Stahl
- D) Chargaff

**21. In ruminants mineral absorption takes place largely in**

- A) Small intestine
- B) Large intestine
- C) Omasum
- D) Abomasum

**22. Translation of protein in prokaryotes can be inhibited by**

- A) Pencillin
- B) Puromycin
- C) p-amino salicylic acid
- D) Methicillin

**23. When  $\Delta G$  is negative the reaction is**

- A) Endergonic
- B) Exergonic
- C) Catabolic
- D) Anabolic

**24. Myelination of neurons in the peripheral nervous system is provided by**

- A) Microglia
- B) Oligodendroglia
- C) Satellite cells
- D) Schwann cells

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**25. Extraembryonic membrane that stores urinary waste and helps in mediating gas exchange is known as**

- A) Amnion
- B) Allantois
- C) Choriovitelline
- D) Yolk sac

**PART "B"**

**26. Glycogen is received in blood circulation from all tissues except**

- A) Adipose
- B) Muscle
- C) Liver
- D) Pancreas

**27. Keto-enol tautomerism is shown by**

- A) Benzaldehyde
- B) Acetic acid
- C) Benzophenone
- D) Acetone

**28. Cold adapted bacteria growing at temperatures below  $-15^{\circ}\text{C}$  and  $+10^{\circ}\text{C}$  are called**

- A) Thermophiles
- B) Halophiles
- C) Psychrophiles
- D) Capnophiles

**29. Which is not intensive property?**

- A) Boiling point
- B) Volume
- C) Molarity
- D) Refractive index

**30. Which of the following is a form of sexual reproduction?**

- A) Budding
- B) Fission
- C) Hermaphroditism
- D) Regeneration

**31. Which has maximum entropy of vapourisation?**

- A) Toulene
- B) Diethyl ether
- C) Acetone
- D) Water

**32. Winter bottom syndrome is caused by**

- A) *Leishmania donovani*
- B) *Trypanosoma brucei*
- C) *Taenia solium*
- D) *Ancylostoma duodenale*

**33. Restriction endonucleases used in recombinant DNA technology is obtained generally from**

- A) Bacteria
- B) Bacteriophage
- C) Yeast
- D) Virus

**34. The abiotic components are almost similar in**

- A) Grassland and microbial ecosystems
- B) Aquatic and terrestrial ecosystems
- C) Grassland and pond ecosystems
- D) Terrestrial and wet land ecosystems

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35. The number of bones present in human body is

- A) 206  
B) 215  
C) 225  
D) 230

36. Identify the food chain shown below:

Dead animal → Fly maggots → Toad → Snake

- A) Detrital food chain  
B) Decomposer food chain  
C) Grazing food chain  
D) Predator food chain

37. Transcription by RNA polymerase in *E. coli* requires the following except

- A) Primnow box  
B) Sigma factor  
C) Rho factor  
D) Concensus sequence at -35 position

38. Molecular interaction between molecules is in order

- A) solid < gas < liquid  
B) solid < liquid < gas  
C) liquid < solid < gas  
D) gas < liquid < solid

39. Albinos have visual problem in bright light because they lack

- A) Melanin  
B) Rods  
C) Cones  
D) Pupil

40. Organs where similarity arises from being derived from a common ancestral structures are called

- A) Analogous  
B) Autologous  
C) Homologous  
D) Orthologous

41. Conjugate acid of  $\text{HF}_2^-$  is

- A)  $\text{HF}$   
B)  $\text{H}^+$   
C)  $\text{F}_2^-$   
D)  $\text{H}_2\text{F}_2$

42. Evolutinary theory of population genetics includes all except

- A) Random mating  
B) No genotypes have selective advantage over another  
C) No influx of genes from other populations  
D) The size of the population needs to be small

43. Humoral immunity was discovered by

- A) Robert Koch  
B) Paul Ehrlich  
C) Jules Bordet  
D) Edward Jenner

44. A 100ml of 1M of monobasic acid ( $\text{pK}_a=5$ ) is neutralized by  $\text{Ca}(\text{OH})_2$  at the equivalence point pH.

- A) 6  
B) 4.5  
C) 7  
D) 9.5

45. Rate of photosynthesis is highest in

- A) Red light  
B) Blue light  
C) Yellow light  
D) White light

46. The Tyndall effect is not observed in

- A) Colloidal solution  
B) True solution  
C) Emulsion  
D) Suspension

47. Which one of the following belongs to "living fossils"?

- A) Pinus  
B) Ginkgo  
C) Riccia  
D) Gnetum

48. Smoke is a dispersion of

- A) Solid in gas  
B) Gas in solid  
C) Liquid in gas  
D) Gas in gas

49. Which one of the following is generally not considered as a potential bioweapon?

- A) *Yersinia pestis*  
B) *Bacillus anthracis*  
C) *Streptococcus pyogenes*  
D) *Clostridium botulinum*

50. Epsom salt is chemically known as

- A) Calcium sulphate  
B) Copper sulphate  
C) Ferrous sulphate  
D) Magnesium sulphate

51. The cell membrane is selectively permeable to ions and organic molecules and controls the movement of substances in and out of cells. It consists of the phospholipid bilayer with embedded proteins. The phospholipids in this bilayer have a polar head group and non-polar tail. The polar head in these phospholipids is made up of

- A) A phosphate and an alcohol  
B) An alcohol and a fatty acid  
C) Fatty acid and phosphate  
D) Fatty acids only

52. Primary lymphoid organs include

- A) Thymus and spleen  
B) Thymus and bone marrow  
C) Thymus, bone marrow and spleen  
D) Bone marrow and lymphnodes

53. Natural rubber is polymer derived from

- A) Ethylene  
B) Butadiene  
C) Isoprene  
D) Propylene

54. Which one of the following plant is used for green manuring in India?

- A) Corn  
B) Wheat  
C) Sunflower  
D) Sunhemp

55. Which one of the following is transparent?

- A) Tendon  
B) Hyaline cartilage  
C) Fibrous cartilage  
D) Fibrous muscle

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**56. Starch and cellulose are two very similar polymers. They both are made from the same monomer, glucose and have the same glucose-based repeat units. The main difference between the two is**

- A) Starch is a polymer of D-glucose units while cellulose is a polymer of L-glucose units  
B) Starch is a linear polymer of D-glucose units while cellulose is a branched polymer of D-glucose units  
C) Starch consists of alpha 1-4 glycosidic linkages while cellulose has both alpha 1-4 and 1-6 linkages  
D) Starch consists of alpha 1-4 and 1-6 glycosidic linkages while cellulose has only beta 1-4 linkages.

**57. When an animal population produced a substance harmful to competing population, the interaction is known as**

- A) Allelopathy  
B) Antibiosis  
C) Interference  
D) Pathogenesis

**58. Correct order of geological time scale is**

- A) Paleozoic → mesozoic → coenozoic  
B) Coenozoic → paleozoic → Arachaezoic  
C) Mesozoic → Arachaezoic → coenozoic  
D) Arachaezoic → mesozoic → paleozoic

**59. Trypsinogen is converted into active trypsin by**

- A) Enterokinase  
B) Secretin  
C) Ptylin  
D) Enterocrinin

**60. Identify the odd combination of the habitat and particular animal concerned**

- A) Sunderban- Royal Bengal Tiger  
B) Periyar-elephant  
C) Rann of Kutch-wild ass  
D) Dachigam national park-snow leopard

**61. The succinate dehydrogenase is located in one the following compartments of animal cell**

- A) Cytosol  
B) Ribosomes  
C) Endoplasmic reticulum  
D) Mitochondria

**62. Mammary gland without teats are found in**

- A) Prototheria  
B) Metatheria  
C) Eutheria  
D) Metatheria and Eutheria

**63. Cyanide (CN) blocks the electron transport chain at**

- A) Cytochrome-b  
B) Cytochrome a+a<sub>3</sub>  
C) Cytochrome-c  
D) Ubiquinone

**64. Bauxite is an ore of**

- A) Aluminium  
B) Copper  
C) Iron  
D) Zinc

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65. Notochord is derived from

- A) Neural ectoderm
- B) Epidermal ectoderm
- C) Mesoderm
- D) Endoderm

66. Which one of the following has maximum density?

- A) Benzene
- B) Chloroform
- C) Water
- D) Xylene

67. The following amino acids are both ketogenic and glucogenic

- A) Leucine and lysine
- B) Tyrosine and tryptophan
- C) Isoleucine and leucine
- D) Lysine and glycine

68. In tuberculosis, the pathogen resides in

- A) RBCs
- B) Macrophages
- C) Basophils
- D) Mast cells

69. Mammals arose from the

- A) Pelycasaur
- B) Therapsid
- C) Thecodont
- D) Dinosaurs

70. IgE levels are notably high in

- A) Tuberculosis
- B) Helminth infections
- C) *Vibrio cholera* infections
- D) Diphtheria

71. Which one of the following is known as artificial silk?

- A) Nylon
- B) Rayon
- C) Terylene
- D) Tasar

72. The Michaelis constant  $K_m$  is

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

73. Lamin proteins are present in which compartment of the cell?

- A) Mitochondria
- B) Chloroplast
- C) Nucleus
- D) Endoplasmic reticulum

74. Larva of sponge is known as

- A) Amphiblastula
- B) Glochidium
- C) Planula
- D) Trochophore

75. The vitamin that is essential for blood clotting

- A) A
- B) B
- C) C
- D) K



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**76. In individuals with Down's syndrome, all cells contain ..... chromosomes**

- A) 47  
B) 22  
C) 24  
D) 45

**77. Which one of the following is non-myelinated nerve fibre?**

- A) Autonomic nerve  
B) Optic nerve  
C) Cranial nerve  
D) Spinal nerve I

**78. Next to rodents, the largest order of mammals belongs to**

- A) Carnivores  
B) Insectivores  
C) Bats  
D) Primates

**79. A 1L flask contains 32g O<sub>2</sub> gas at 27°C. What mass of O<sub>2</sub> must be released to reduce the pressure in the flask to 12.315 atm?**

- A) 4g  
B) 24g  
C) 8g  
D) 16g

**80. An allele is**

- A) Synonym of gene  
B) A homozygous genotype  
C) A heterozygous genotype  
D) One of the several possible forms of the gene

**81. The nitrogenous waste which is primarily excreted in cockroach is**

- A) Urea  
B) Uric acid  
C) Ammonia  
D) Ammonia and urea

**82. Relaxin is secreted from**

- A) Pituitary  
B) Ovary  
C) Testis  
D) Adrenals

**83. The membrane fluidity is normally high due to**

- A) Low proportion of *cis* unsaturated fatty acids in the glycerophosphate molecules  
B) High proportion of *cis* unsaturated fatty acids in the glycerophosphate molecules  
C) Low proportion of *trans* unsaturated fatty acids in the glycerophosphate molecules  
D) High proportion of *trans* unsaturated fatty acids in the glycerophosphate molecules

**84. Which one of the following metabolite is not directly produced in the hexose monophosphate pathway?**

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

**85. An aqueous solution has molality of 11.11. The mole fraction of solute in the solution is**

- A) 0.60  
B) 0.40  
C) 0.167  
D) 0.833

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- 86. During which phases of cell division the morphology of the chromosomes is best studied?**  
A) Telophase and anaphase  
B) Prophase and anaphase  
C) Metaphase and anaphase  
D) Telophase and metaphase
- 87. Which one of the following is not a unique feature of the birds?**  
A) Four chambered heart  
B) Hollow bones  
C) Keeled breast bone  
D) Constant direction of airflow through lungs
- 88. Threshold energy is also called**  
A) Potential energy  
B) Kinetic energy  
C) Sum of potential and kinetic energy  
D) Work function
- 89. Ribosomes were first discovered by**  
A) Laveran  
B) Palade  
C) Grassi  
D) Robert Brown
- 90. Which is not an autosomal dominant disorder?**  
A) Huntington chorea  
B) Retinblastoma  
C) Tay-sacs disease  
D) Brachydactyly
- 91. Fats differ from waxes by virtue of having**  
A) A glycerol backbone  
B) Longer fatty acids  
C) Higher melting points  
D) More unsaturation
- 92. Pearl mother layer is known as**  
A) Prismatic layer  
B) Periostracum  
C) Nacre  
D) Mantle
- 93. Which one of the cells provide mechanical support to plant body**  
A) Xylem cells  
B) Phloem cells  
C) Sclerenchyma cells  
D) Parenchyma cells
- 94. Which one of the following has two unpaired electrons?**  
A) S, Fe  
B) S, Si  
C) Si, Mg  
D) S, Mg
- 95. Amphibians bearing the live young one's are found among the**  
A) Caecilians  
B) Frogs  
C) Toads  
D) Salamanders
- 96. A frog with body temperature of 25°C is transferred to an area with 15°C temperature. What will be its body temperature few hours after the transfer?**  
A) 25°C  
B) 20°C  
C) 15°C  
D) Fluctuates between 15°C and 25°C

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**97. How many ATP molecules are generated after oxidation of one molecule of NADPH<sub>2</sub> during electron transport?**

- A) 2  
B) 4  
C) 3  
D) 5

**98. In propene there are**

- A) 6  $\sigma$  bonds and 3  $\pi$  bonds  
B) 7  $\sigma$  bonds and 2  $\pi$  bonds  
C) 8  $\sigma$  bonds and 1  $\pi$  bond  
D) 7  $\sigma$  bonds and 1  $\pi$  bond

**99. Which of the following is a vertebrate animal?**

- A) Cray fish  
B) Cuttle fish  
C) Globe fish  
D) Star fish

**100. Tandem repeat variability in a DNA molecule is highly useful for**

- A) Production of monoclonal antibody  
B) Stem cell culture  
C) Recombinant DNA technology  
D) DNA finger printing

**For rough work**