

# Sample Question Paper for MSc Biotechnology

## Format of the Entrance Test

The computer based Entrance Test will be of 2 hours duration, and the question paper will have multiple-choice questions in two parts.

**Part A** will have 30 questions carrying one mark each and will have 10+2 level questions from Physics, Chemistry, Biology and Mathematics. Candidates will be expected to attempt all questions from Part A.

**Part B** will consist of 100 questions, out of which 70 questions need to be answered. Each question will carry one mark and will have undergraduate level questions from Biochemistry, Cell Biology, Molecular Biology, Immunology, Animal Sciences, Plant Sciences, Genetics, Microbiology, Biophysics and Biostatistics. If more than 70 questions, are answered the first 70 questions answered will be considered for evaluation.

- This is only a sample paper and only meant to be indicative of the type of questions that will be asked.

## Section-A

1. Which one of the following column chromatography techniques can be used for the purification of a Poly-Arginine tagged protein?
  - a. Affinity chromatography
  - b. Cation-exchange chromatography
  - c. Anion-exchange chromatography
  - d. Size-exclusion chromatography
2. How many ATPs are synthesized during the complete oxidation of a single acetyl-CoA?
  - a. 2
  - b. 10
  - c. 20
  - d. 30

3. Which one of the following groups of amino acids is synthesized from pyruvate?
  - a. Valine, Leucine and Isoleucine
  - b. Glutamine, Proline and Arginine
  - b. Methionine, Threonine and Lysine
  - d. Tryptophan, Phenylalanine and Tyrosine
  
4. How much energy is produced by the complete oxidation of one gram of fatty acid?
  - a. ~0.38 KJ
  - b. ~3.8 KJ
  - c. ~38 KJ
  - d. ~380 KJ
  
5. Which one of the following glucose transporters has the highest  $K_m$  value?
  - a. GLUT1 of all mammalian tissues
  - b. GLUT2 of Liver
  - c. GLUT3 of all mammalian tissues
  - d. GLUT4 of muscle and fat cells
  
6. Glucose-6-phosphate (6C) is converted to ribose-5-phosphate (5C) by Pentose phosphate pathway. Which carbon from glucose-6-phosphate is removed in the form of  $\text{CO}_2$  in this process?
  - a. C6
  - b. C1
  - c. Either C1 or C6
  - d. Any carbon can be removed
  
7. Which one of the following inheritable metabolic defects in humans was discovered first?
  - a. Diabetes
  - b. Phenylketonuria

- c. Obesity
  - d. Lesch Nyhan syndrome
8. Which one of the following citric acid cycle intermediates is a precursor of porphyrins?
- a. Oxaloacetate
  - b. Malate
  - c. Succinyl CoA
  - d.  $\alpha$ -ketoglutarate
9. Which one of the following leukocytes are present in blood in highest numbers?
- a. B cells
  - b. NK Cells
  - c. Eosiniphils
  - d. Neutrophils
10. How many protein chains are there in a fully assembled IgM antibody molecule?
- a. 5
  - b. 20
  - c. 21
  - d. 25

### **Section-B**

11. Which one of the following statements about the antibody molecule is not true?
- a. Immunoglobulin unit has two heavy and two light chains
  - b. Heavy and light chains are bound by the disulfide bond
  - c. Each immunoglobulin unit has two different antigen binding sites
  - d. Constant domains do not participate in antigen binding

12. Virus infected cells are generally eliminated by which kind of immune cells?
- a. A class of T cells
  - b. A class of B cells
  - c. Macrophages
  - d. Neutrophils
13. Which one of the following properties is not associated with natural killer cells?
- a. Killing of tumor cells
  - b. Phagocytosis of virus
  - c. Killing of virus infected cells
  - d. Activation by interferon
14. Graft rejection reaction is mediated by
- a. T cells
  - b. Macrophages
  - c. B cells
  - d. Mast cells
15. Which one of the followings is not required for anti-pollen allergies?
- a. IgE
  - b. IgA
  - c. Mast cells
  - d. Basophils
16. Which one of the following is a central tendency?
- a. Standard deviation
  - b. Median

c. Range

d. Median deviation

17. Interquartile range is

a. Q1

b. Q3

c. Q3-Q1

d.  $(Q3-Q1)/2$

18. A paired t-test is done to identify the difference between

a. two groups

b. three groups

c. one group, before and after a treatment

d. three groups, before and after a treatment