

**BIOPHARMACEUTICALS
(BIOT 6153)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as
practicable.*

**Group - A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Which of the following statements best describes pharmacodynamics?
- (a) The study of how drugs reach their target in the body and how the levels of a drug in the blood are affected by absorption, distribution, metabolism and excretion.
 - (b) The study of how drugs can be designed using molecular modelling based on a drug's pharmacophore.
 - (c) The study of how a drug interacts with its target binding site at the molecular level.
 - (d) The study of which functional groups are important in binding a drug to its target binding site and the identification of a pharmacophore.
- (ii) What is meant by the therapeutic ratio or index?
- (a) The ratio of LD₅₀ to ED₉₉
 - (b) The ratio of LD₅₀ to ED₅₀
 - (c) The ratio of LD₁ to LD₅₀
 - (d) The ratio of ED₉₉ to ED₅₀
- (iii) Which of the following is one of the rules in Lipinski's rule of five?
- (a) a molecular weight equal to 500
 - (b) no more than five hydrogen bond acceptor groups
 - (c) no more than 10 hydrogen bond donor groups
 - (d) calculated log P value less than +5.

- (iv) Hybridoma technology was developed by
 (a) Khorana and Kornberg (b) Kohler and Milstein
 (c) Khorana and Nirenberg (d) Beadle and Tatum.
- (v) IL-4 acts to
 (a) suppress antibody production (b) activate macrophages
 (c) suppress cytokine production (d) enhance T cell responses.
- (vi) Which of the following is true of subunit vaccines?
 (a) Lead the immune system to recognise polysaccharide
 (b) Include only the antigens that stimulate the immune system
 (c) Used when a bacterial toxin is the main cause of illness
 (d) Produced by killing the disease-causing microbe by chemicals, heat or radiation
- (vii) Which of the following are potential therapeutic uses of embryonic stem cells?
 (a) Regenerate cells of the immune system
 (b) Replace neurons after an accident
 (c) Repair damage to heart muscle after a heart attack
 (d) All of the above.
- (viii) Cystic fibrosis is related to enzyme
 (a) DNase (b) Urate oxidase
 (c) Galactosidase (d) Lactase.
- (ix) Gout is prevented in presence of
 (a) DNase (b) Urate oxidase
 (c) Galactosidase (d) Asparaginase.
- (x) Lymphotoxin is another name for
 (a) TNF-alpha (b) TNF-beta
 (c) TGF-beta (d) Interleukins.

Group - B

2. (a) Describe briefly the difference between basic and applied research with examples.
 (b) Discuss pre-clinical trials using Parkinson's Disease as a case study.
 (c) Write the five main steps involved in doing pre-clinical trials.
 $4 + 4 + 4 = 12$
3. (a) Write the equation that determines drug binding and its pharmacological effect.

- (b) Describe the assumptions behind this effect.
 (c) What are the differences between functional and chemical antagonism?
 (d) Describe the mechanism of receptor regulation.
 $3 + 3 + 3 + 3 = 12$

Group - C

4. (a) Distinguish Type-I and Type-2 interferons.
 (b) Briefly discuss the effects of cytokines as biopharmaceuticals.
 $4 + 4 + 4 = 12$
5. (a) Briefly explain the mode of action of any one interferon.
 (b) Write a brief note on IGF-1.
 (c) What is interferon toxicity?
 $6 + 4 + 2 = 12$

Group - D

6. (a) Write a brief note on hybridoma technology.
 (b) What do you mean by conjugated vaccine? What is MAPS?
 (c) How can you design a cancer vaccine?
 $4 + (2 + 2) + 4 = 12$
7. (a) What do you mean by adoptive immunotherapy?
 (b) Discuss the role of snake and spider antivenins in polyclonal antibody preparations.
 (c) Why are cord blood cells valuable for medical research?
 $4 + 4 + 4 = 12$

Group - E

8. (a) Briefly explain vascular spasm and different types of blood substitutes.
 (b) Write the mode of action of Asparaginase and urate oxidase.
 $6 + 6 = 12$
9. (a) Write the mode of action of platelet in blood coagulation process.
 (b) What are anticoagulants and write their mode of action.
 $6 + 6 = 12$