

# Question Paper

Exam Date & Time: 02-May-2019 (02:00 PM - 05:00 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

Manipal Academy of Higher Education, Manipal MPharm Theory End-Semester Examinations.  
MPharm - Pharmaceutical Biotechnology Specialization  
MPharm Semester 2 - End-Semester Examination May-2019  
Date : 02/05/2019

### Proteins and Protein Formulations [PBT-MPB201T]

Marks: 75

Duration: 180 mins.

#### SECTION - A

Answer all the questions.

Answer the following (10 marks x 5 = 50 marks)

- 1) Proteins can have maximum of four levels of structure. Discuss the structure of proteins. (10)
- 2) Electrophoresis is a frequently used technique for analysis of proteins. Explain the principle and applications of SDS-PAGE, 2D gel and iso-electric focusing techniques. (10)
- 3) Enlist the potential degradation pathways of proteins and elaborate on analytical methods as a requirement in preformulation studies. (10)
- 4) Explain various factors to be considered in the formulation development of a biopharmaceutical. (10)
- 5) Discuss immunogenicity studies as a requirement in the development of biosimilars. (10)

#### SECTION - B

Answer all the questions.

Answer the following (5 marks x 5 = 25 marks)

- 6) Explain Edman degradation technique of protein sequencing. (5)
- 7) Explain the principle and advantages of liquid-liquid extraction technique in protein purification. (5)
- 8) What is peptidomimetics? Explain the advantages of using peptide therapeutics over other therapeutic modules. (5)
- 9) Write a note on novel formulation approaches for protein pharmaceuticals. (5)
- 10) Briefly discuss the analytical studies for structural characterization of biosimilars. (5)

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