

NATIONAL UNIVERSITY OF IRELAND, GALWAY
Ollscoil na hÉireann, Gaillimh

SEMESTER I EXAMINATIONS

BIOCHEMISTRY BI314, BI316 (Unit value: 12 ECTS)

External Examiner: Dr. David Apps

Time allowed: *Three* hours

Answer *five* questions

1. Eukaryotic mRNA undergoes extensive post-transcriptional processing. Describe how the primary mRNA transcript is modified, illustrating how the modifications may play a role in regulating gene expression.
2. Describe the various routes taken by proteins synthesised at the rough endoplasmic reticulum in eukaryotic cells.
3. Write notes on *three* of the following:
 - (a) Gel filtration chromatography,
 - (b) Anion-exchange chromatography,
 - (c) Sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE),
 - (d) Information that can be obtained from protein sequence data,
 - (e) Helix-loop-helix functional motifs in proteins.
4. Give a detailed description of the main structural features of protein α -domains and β -domains. Explain how structure relates to function.
5. Giving examples, describe the main structural and functional properties of oligosaccharides and polysaccharides.
6. With the aid of diagrams, outline the structure and function of motor proteins. Detail the mechanisms of action of one motor protein and describe its role in the cell.
7. Outline the role of the *p53* tumour suppressor gene in the development of human cancer.
8. Write an essay on retroviruses with emphasis on HIV.