

2 0 2 1

( July )

BIOTECHNOLOGY

( Honours )

( **Molecular Biology and Immunology** )

Marks : 56

Time : 3 hours

*The figures in the margin indicate full marks  
for the questions*

Answer Question No. **1** which is compulsory  
and *any four* from the rest

1. Justify the following statements giving reasons : 3×4=12

- (a) DNA replication is bidirectional.
- (b) Graft rejection is an immune response.
- (c) The genetic code is a triplet code.
- (d) Infection increases the rate of haematopoiesis.

- 2. (a) What is complement activation? Describe the alternative pathway of complement activation. 6  
(b) Write a short note on the different secondary structures of nucleic acids. 5
- 3. What is the role of promoter in RNA synthesis? Explain the process of initiation of RNA synthesis in prokaryotes. 11
- 4. (a) Explain the splicing mechanism of pre-mRNA. 6  
(b) Describe the cytosolic pathway of antigen processing and presentation. 5
- 5. (a) Discuss the Meselson and Stahl experiment to prove semiconservative nature of DNA replication in *E. coli*. 6  
(b) Give an account of MHC polymorphism. 5
- 6. What is charging of tRNA? Explain how tRNA acts as an adaptor molecule. Describe the correlation between tRNA structure and its adaptor function. 3+4+4=11
- 7. (a) Distinguish between innate and adaptive immunity. 6  
(b) What is meant by transcription activators? How do they function? 1+4=5

( 3 )

8. Explain the following : 3+3+5=11

- (a) Monoclonal antibody
- (b) Antibody-dependent cell-mediated cytotoxicity
- (c) *E. coli* will use lactose only after glucose is exhausted from the medium.

★ ★ ★