

4/H—77 (iv) (Syllabus-2015)

2017

(April)

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. (a) What is meant by degeneracy of genetic code? 2
- (b) Define T_m . 2
- (c) What are tRNA synthetases? 2
- (d) What is precipitin? 2
- (e) Define processivity of DNA polymerases. 2
- (f) What is transcription start site? 2

(Turn Over)

(2)

2. What are the functions of the following?
3+2+3+3=11
- (a) snRNPs
 - (b) RNase H
 - (c) Poly (A) tail
 - (d) Spleen
3. (a) Define the terms 'linking number', 'writhe' and 'twist', and explain the negative supercoiling of DNA. 6+2=8
- (b) Why do the polynucleotide chains in double-helical DNA associate in anti-parallel orientation? 3
4. (a) Describe with the help of a neat labelled diagram the secondary structure of *E. coli* tRNA. 4
- (b) Name the subunits of *E. coli* RNA polymerases and describe their functions. 5
- (c) Draw a neat labelled diagram of *E. coli* transcription promoter. 2
5. (a) How did Meselson and Stahl elucidate the semiconservative replication of DNA? 6
- (b) What is thymic education? 5

D72/1509

(Continued)

(3)

6. (a) "Specificity of antigen-antibody interactions depend both on the chemical compositions and the 3-D structures of epitope and paratope." Do you agree with the statement? Give reasons for your answer. 6
- (b) What are the roles of A, P and E sites in translation? 5
7. (a) Explain the concept of operon using the regulation of lactose metabolism in *E. coli* as an example. 6
- (b) How are endogenous antigens processed and presented in immunocompetent animals? 5
8. (a) What is a monoclonal antibody (MAb)? Briefly discuss the applications of MAbs in human health care. 2+4=6
- (b) Differentiate between effector mechanisms of innate immunity and adaptive immunity with the help of suitable examples. 5

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