

2020

**BIOCHEMISTRY — HONOURS**

**Sixth Paper**

**(Module - XII)**

**Full Marks : 50**

*The figures in the margin indicate full marks.*

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

1. Answer the following questions : 2×5
- (a) Distinguish between DNA pol I and Klenow fragment.
  - (b) Name two inhibitors of replication in prokaryotes.
  - (c) What is transduction?
  - (d) What are codons and anticodons?
  - (e) What is the difference between transcription and reverse transcription?

**Unit - I**

Answer *any one* question.

2. (a) What are the functions of  $\sigma^{70}$  and  $\sigma^{32}$  factors?  
(b) How do telomeres help in replication?  
(c) Explain the difference between nonsense and missense mutation with a suitable example.  
(d) Describe briefly how mismatch repair occurs.  
(e) What is a promoter? Name the elements present in the promoters in *E.coli*.  
(f) What information about the genetic material was available from the results of the experiments of Hershey and Chase and how? 3+3+3+3+(2+2)+(2+2)
3. (a) What is the effect of bisulphite on DNA?  
(b) Explain 'Catabolite Repression' with an example.  
(c) Describe briefly how you can conclude whether a sequence element in an operon is cis-dominant.  
(d) Explain the difference in the functions of Dna B helicase and Dna A protein in DNA replication.  
(e) Describe briefly the mechanism of spliceosome mediated RNA splicing with proper diagrams.  
(f) Describe briefly the rolling circle model of DNA replication with a diagram. 3+3+4+2+4+4

**Please Turn Over**

Unit - II

Answer *any one* question.

4. (a) What is conjugation?
- (b) What are Restriction enzymes? Classify restriction enzymes on the basis of differences between recognition sequence and cleavage site.
- (c) What are the functions of IF1, IF2 and IF3 in *E.coli*.
- (d) What is a pilus? What is its function?
- (e) From a cross between pea plants having green seeds and yellow seeds the following progeny were obtained :
- F<sub>1</sub> : Only plants with yellow seeds.
- F<sub>2</sub> : 6022 plants with yellow seeds and 2001 plants with green seeds
- 519 F<sub>2</sub> plants with yellow seeds were self fertilized with following results :
- 166 bred true for yellow
- 353 produced F<sub>3</sub> ratio of  $\frac{3}{4}$  yellow and  $\frac{1}{4}$  green.
- Give an explanation for the results obtained and show the crosses using suitable diagrams.
- (f) What is an “open reading frame”? 3+(2+3)+4+(1+1)+(2+2)+2
5. (a) Explain why formylation of the initiator Methionine is important during translation in prokaryotes.
- (b) What is the function of T<sub>i</sub> plasmid? Name the organism from which it is isolated.
- (c) What is the difference between generalized transduction and specialized transduction?
- (d) What is the function of calcium chloride during artificial transformation of bacteria?
- (e) Explain how termination of translation occurs in prokaryotes.
- (f) Explain briefly the principle of Western Blotting.
- (g) Draw the structure of t-RNA and label the regions which are important for translation. 3+(3+2)+3+3+2+2+2
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