2018

M.Sc. 2nd Semester Examination

ZOOLOGY

PAPER—ZOO-203

Subject Code—35

Full Marks : 40

Time : 2 Hours

The figures in the margin indicate full marks.

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

Illustrate the answers wherever necessary.

Group–A

(Molecular Biology)

1. Answer any *two* questions of the following : 2×2

(a) What catalyses the opening and placement of sliding clamps on the DNA ?

(b) What is split gene ?

(c) What is the key to the high processivity of prokaryotic DNA polymerase ?

(d) State the function of Shine-Dalgarno's sequence.

2. Answer any *two* questions of the following : 2×4

(a) Why Telomerase is called a novel DNA polymerase ?

(b) What is a primosome ? State its functions. What essential enzymes are present in the primosome ? 1+1+2

(c) The mmm operon, which has a sequence A, B, C and D (which may be structural genes or regulatory sequences), encodes enzymes 1 & 2. Mutation in sequence A, B, C and D have the following effects :

Mutation in sequence	Mmm absent		Mmm present	
	Enzyme 1	Enzyme 2	Enzyme 1	Enzyme 2
No mutation	+	+	–	–
A	–	+	–	–
B	+	+	+	+
C	+	–	–	–
D	–	–	–	–

(i) Is the mmm operon inducible or represible ? State reason.

(ii) Indicate which sequence (A, B, C, D) is part of the following components of operon and explain.

Regulator gene _____

Promoter _____

Structural gene for enzyme 1 _____

Structural gene for enzyme 2 _____

(d) Discuss the role of chaperones in proper folding of polypeptides.

3. Answer *one* question of the following : 1×8

(a) A Northern blot experiment is carried out with mRNA from E. coli, using a DNA probe corresponding to the lac A gene which is adjacent to Z– and lac Y– mutations are simple nucleotide substitution mutation that encode inactive protein. The lac Z^* and lac Y^* mutations are deletions : lac Z^* missing 2kb and lac Y^* missing 0.5 kb and neither allele produce a polypeptide product (5 kb). The mRNA from the following six genotypes is analyzed via northern blot in either the presence (+) or the

absence (–) of inducer. For each genotype under both inducing (+) and the non-inducing (–) conditions, indicate in the gel diagram where an mRNA band would be expected

(i) lac I^+ O^+ Z^+ Y^+

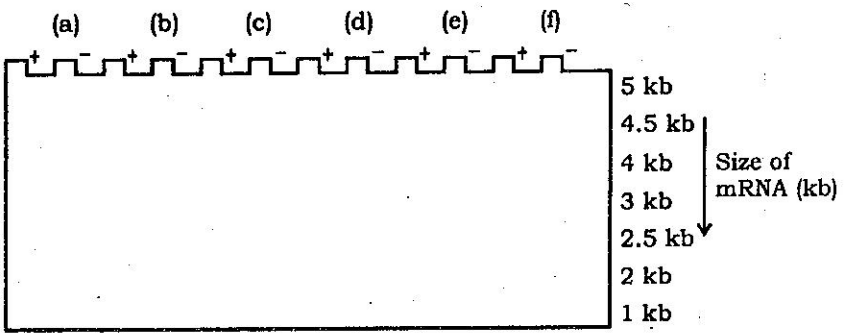
(ii) lac I^- O^+ Z^- Y^-

(iii) lac I^- O^+ Z^* Y^*

(iv) lac I^+ O^C Z^- Y^*

(v) F lac I^+ O^C Z^* Y^- / lac I^+ O^+ Z^- Y^*

(vi) F lac I^+ O^+ Z^* Y^+ / lac I^+ O^C Z^- Y^*



(b) (i) Why is chromation remodaling needed ?

(ii) How does it occur ?

(iii) State the chemical modification of DNA and Histores involved in this process. 1+2+5

Group–B

(Histochemistry)

4. Answer any *two* questions of the following : 2×2

(a) What are the physical methods of flixation ?

(b) State the function of Lysochromes.

(c) Distinguish between Avidin and Biotin.

(d) Write a note on : SBB (Sudon Black-B)

5. Answer any *two* questions of the following : 2×4

(a) "Formaldehyde reacts with several parts of Protein molecules" — justify your answer with example.

(b) Mention the classification of dyes by chromophoric systems with the help of examples.

(c) "Enzymes are classified on the basis of chemical reaction they catalyse" — justify the statement with the help of a wet histochemical method.

(d) Write notes on : 2×2

(i) Wave fixation

(ii) Perfusion fixation.

6. Answer *one* question of the following : 1×8

(a) Explain how one can demonstrate nucleic acid in a biological laboratory ? What in DAPI ? 7+1

(b) Write short notes on the following (any *four*) : 2×4

(i) Mordant dye

(ii) Vital staining

(iii) Metachromasia

(iv) 'ABC' method

(v) Fluorochrome

(vi) Spectral shift.

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