M.Sc.

2017

2nd Semester Examination

ZOOLOGY

PAPER—ZOO-203

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Answer *all* questions of the following.

Group–A

(*Molecular Biology*)

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

(a) What is polymerase switching ?

(b) Show the base pairing between the Shine-Dalgarno sequence in a prokaryotic mRNA and a complementary sequence near 3'terminus of 16s rRNA.

(c) What effect will deletion of the trp L region of the trp operon have on the rate of synthesis of the enzymes ?

(d) What are the two key substrates for the synthesis of DNA?

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

(a) Briefly describe the role of palm domain of *E.coli* DNA polymerase.

(b) Mention the function of the RNA component of Telomerase with the help of a diagram.

(c)

Genotype	β-galactosidase		β-galactoside permease	
	–inducer	+inducer	–inducer	+inducer
$i^+o^+z^+Y^+$	0·2	100	0·2	100
$i^-o^+z^+Y^+$	100	100	100	100
$i^+o^cz^+Y^+$	75	100	75	100
$i^+o^+z^+Y^-/f^1i^-o^+z^+Y^+$	200	200	100	100
$i^-o^cz^-Y^+/F^1i^+o^+z^+Y^+$	—	—	—	—

Based on the data given in the table for genotypes 1 through 4, fill in the level of activity that would be expected for genotype 5.

(d) Describe the process of translocation of the ribosome along the mRNA to position the next codon in the A site.

3. *Write one question from the following :* 1×8

(a) The fox operon which has sequence A, B, C and D that encodes enzyme 1 and 2

Mutated Sequence	Fox absent		Fox present	
	Enzyme1	Enzyme2	Enzyme1	Enzyme2
No mutation	–	–	+	+
A	–	–	–	–
B	–	–	–	+
C	–	–	+	–
D	+	+	+	+

(i) In the Fox operon inducible or repressible ?

(ii) Regulator gene—

Promoter gene—

Structural gene for enzyme 1

Structural gene for enzyme 2

(iii) Do the following events during bacterial translation occur primarily within 30s, within 50s or at the interface.

(a) mRNA–tRNA recognition

(b) Peptidyl-transferase reaction

(c) Exit of the polypeptide chain from ribosome

(d) binding of IF 1, IF 2 and IF 3.

(b) (i) In lac^{-I}/lac^{+} partial diploid, lac enzymes are produced constitutively even in presence of normal repressor—Why ?

(ii) Which transcription factor is responsible for the release of RNA polymerase II from the promoter in Eukaryote and how does it work ?

(iii) Mention the role of GTP in sliding clamp loading.

(iv) Why presence of tryptophan leads to formation of hairpin structure in Trp-operon ? 3+3+3+3

Group–B

(*Histochemistry*)

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

(a) Write briefly on the criteria of a good fixative.

(b) Distinguish between Haematoxylin and Haematein.

(c) Write in short about the substance you have studied which act. both as fixative and stain.

(d) Write note on : Mordant.

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

(a) What are phosphatases? Write briefly on the histochemical localization of any one of them. 1+3

(b) How does formal dehyde react with biomolecules and site example. 4

(c) Distinguish between Azo-dye and Nitro-dye. State the factors (any three) involved in tissue-dye interaction. 2+2

(d) Write notes on :

(i) Synthetic dye

(ii) Faa Fixative 2+2

6. Answer any *one* questions from the following : 1×8

(a) What is the chemical nature of Biotin? Describe the ABC method for immuno histochemical detection of an antigen. Write a note on : Colloidal Gold. 2+4+2

(b) Answer any *four* of the following : 4×2

(i) Vascular perfusion technique.

(ii) Fluorescent markers.

(iii) Secondary liquefaction.

(iv) Microwave fixation.

(v) Vital staining.

(vi) SBB staining for Lipid molecules.
