

POST-GRADUATE COURSE

Term End Examination — June, 2017

ZOOLOGY

Paper - 3B : Genetics and Molecular Biology

Time : 2 Hours

Full Marks : 50

(Weightage of Marks : 80%)

Special credit will be given for accuracy and relevance in the answer. Marks will be deducted for incorrect spelling, untidy work and illegible handwriting. The weightage for each question has been indicated in the margin.

1. Answer *two* questions : $9 \times 2 = 18$
 - a) Comment on *X* : A ratio influencing sex determination in *Drosophila melanogaster*. What are the roles of *sxl* and *dsx* genes in sex determination in fruit flies ? $4 + 5$
 - b) What is primary constriction of a chromosome ? How does it differ from secondary constriction ? Characterise Turner syndrome and Klinefelter syndrome found in human. $1 + 2 + 6$
 - c) What is reverse transcriptase ? In which type of organism is this enzyme found ? Comment on RNA editing. $2 + 1\frac{1}{2} + 5\frac{1}{2}$

- d) What is central dogma ? What are the general features of DNA replication ? How does single DNA polymerase III carry out nucleotide polymerization in both the strands of DNA in prokaryotes ?

$$2\frac{1}{2} + 2\frac{1}{2} + 4$$

2. Answer *three* questions : $6 \times 3 = 18$
 - a) Describe the characteristic features of a typical polytene chromosome. How is polytene chromosome formed ? State the significance of Balbiani Ring. $2\frac{1}{2} + 1\frac{1}{2} + 2$
 - b) Give a short note on RNA polymerase of *E.coli*. What do you mean by polycistronic RNA ? $4 + 2$
 - c) State the properties of genetic codon. Comment on wobble hypothesis. $3 + 3$
 - d) What do you mean by contact inhibition ? How is mitotic cell division regulated ? $2 + 4$
 - e) What is C-banding ? How does it differ from G-banding ? $3 + 3$
 - f) What is ionizing radiation ? State cytogenetic effects of ionizing radiation. $2 + 4$

3. Answer *two* questions : $4 \times 2 = 8$
- a) What do you mean by a prototroph ? What type of medium will be needed to grow a prototroph ? Give the definition of minimal medium. $2 + \frac{1}{2} + 1\frac{1}{2}$
- b) What do you mean by DNA fingerprinting ? State its use. $2 + 2$
- c) What is bacterial conjugation ? What is plasmid ? $2\frac{1}{2} + 1\frac{1}{2}$
- d) What is cancer ? State the difference between proto-oncogene and oncogene. $2 + 2$
4. Answer *two* questions : $3 \times 2 = 6$
- a) State the difference between prokaryotic and eukaryotic *mRNA*. State the significance of cap structure of eukaryotic *mRNA*. $2 + 1$
- b) When is Holiday intermediate formed ? What is its significance ? $1 + 2$
- c) State the difference between genetic map and cytological map. What is CM ? $2 + 1$
- d) What do you mean by triploidy and trisomy ? Give an example of trisomic condition in human. $2 + 1$