

2019

ZOOLOGY — HONOURS

First Paper

(Unit – II)

[Cell Biology and Genetics]

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.*Answer **question no. 1** and **any one** from **Group – A** and **any three** from **Group – B**.**1.** Answer the short questions (**any five**):

2×5

- (a) What is flip flop movement?
- (b) What is hyperchromic shift?
- (c) What is alternative splicing?
- (d) What is dosage compensation?
- (e) What is Chargaff's rule?
- (f) Distinguish between outer and inner membranes of mitochondria.
- (g) Cite four differences between light and electron microscope.
- (h) How can you distinguish a missense mutation from a nonsense mutation?

Group – A

- 2.** (a) What is SRP? Discuss its role in protein transportation.
- (b) What is chemiosmotic coupling? Discuss the mechanism with reference to electron transport chain in mitochondria. (2+2)+(2+4)
- 3.** (a) What do you mean by "Zonula occludens"? Mention its functional significance.
- (b) Define "Hemidesmosomes" and "Belt desmosomes".
- (c) What is porin? Mention its location and function. (1½+2½)+(1½+1½)+(1+2)
- 4.** Write short notes on **any two** of the following: 5×2
 - (a) Liposomes
 - (b) Mitochondrial DNA ✓
 - (c) Protein trafficking
 - (d) Fluid Mosaic Model of Plasma membrane

Please Turn Over

Group - B

5. (a) What is polysome?
 (b) Explain the model for intron removal by the spliceosome with illustration.
 (c) What are ribozymes? 1½+(5+2)+1½
6. (a) Define "C value paradox".
 (b) "DNA replication is semi-conservative". — Justify with a suitable experiment.
 (c) Explain the process of discontinuous synthesis of DNA on lagging strand with neat diagram. 2+4+(2½+1½)
7. (a) What is Wobble Hypothesis?
 (b) Explain the detection of mutation using "attached X" method.
 (c) Distinguish between ionizing and non-ionizing radiations as mutagens.
 (d) Mention the role of "Y chromosome" in sex determination of *Drosophila* and human. 1½+3+2+3½
8. (a) What are the roles of *msl*, *mle* and *roX* genes in dosage compensation in *Drosophila* sp?
 (b) Distinguish between rho dependent and rho independent transcription termination. (2+2+2)+(2+2)
9. In a cross that includes three Loci in *Drosophila* the non-wild type alleles are *sc* (scute), *ec* (echinus) and *vg* (vestigial). If we cross "*sc ec vg*" flies with homozygous wild type and test cross the F₁ females which are *sc/+ ec/+ vg/+*, we obtain the following results :

<i>sc ec vg</i>	235
<i>+++</i>	241
<i>sc ec +</i>	243
<i>++ vg</i>	233
<i>sc + vg</i>	12
<i>+ ec +</i>	14
<i>sc ++</i>	14
<i>+ ec vg</i>	16

- (a) Determine the gene order and construct the genetic map based on recombination distances. What is the co-efficient of coincidence?
- (b) Calculate the level of interference in the above cross. (2+4+2)+2