QP Code: 24/PT/14/VIIA

POST-GRADUATE DEGREE PROGRAMME

Term End Examination — December, 2024

ZOOLOGY

Paper-7A : DEVELOPMENTAL 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) Differentiate between totipotency and pluripotency. Briefly describe the molecular mechanism for maintenance of pluripotency of Inner Cell Mass (ICM). What is oligopoent stem cell ? 3 + 4 + 2

   b) Define molting, instars and stadium. Discuss the hormonal control of molting and metamorphosis in the tobacco hornworm moth with appropriate illustration. 3 + 6

   c) Explain the role of ZP proteins in fertilization of mammals. Discuss the importance of capacitation of sperm in mammals. Highlight upon the major limitation of IVF. 2 + 4 + 3

   d) Briefly describe about the Germ cell migration and production of sperm or egg in *Drosophila*. How does Bicoid gene influence the anterior-posterior axis formation in *Drosophila* larva ? 6 + 3

2. Answer *three* questions : $6 \times 3 = 18$

   a) Describe the role of epididymis, urethra and seminal vesicles as accessory reproductive structures. 2 + 2 + 2

   b) Discuss the mechanisms adapted by sea urchin to prevent polyspermy.

   c) How does nurse cell and follicular cell assist in yolk production in *Drosophila* ?

   d) Describe genetic teratogenesis in human beings. Give two examples of teratogenic drugs. 4 + 2

e) How does prolactin influence metamorphosis in tadpoles ? Briefly explain the regulation of molecular events by thyroid hormones in the metamorphosis of tadpoles. 2 + 4

f) Discuss the role of Zygotic segmentation genes in the development of *Drosophila.*

3. Answer *two* questions : $4 \times 2 = 8$

a) Write a short note on Stem cell therapy.

b) What will happen if the fuzzy onions (fzo) gene is mutated in *Drosophila melanogaster* ?

c) Summarize the physical events in mammalian fertilization.

d) What is immunocontraception ? How does immunocontraception work ? 1 + 3

4. Answer *two* questions : $3 \times 2 = 6$

a) How does immunocontraception differ from contraception ?

b) What are the roles of homeotic genes in *Drosophila* ?

c) Write a short note on : The acrosome reaction.

d) Write the role of Asymmetric Cell Division (ACD) in cellular differentiation.