POST-GRADUATE COURSE

Term End Examination — June, 2017

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) Through diagram explain the structure of zona pellucida of a mammalian egg. Give an overview of the mammalian sperm and egg binding mechanism. 3 + 6

   b) How do mutations affect the maternal gene system in *Drosophila* larva ? The posterior pattern is controlled by the gradients of proteins in *Drosophila* embryo. Discuss. 3 + 6

   c) What is *in vitro* fertilization ? Why is it done ? Adapting this methodology, state how fertilization can be accomplished. Mention two risks of IVF. 1 + 3 + 3 + 2

   d) Differentiate between teratogen and teratogenesis. All teratogens are toxins and not all toxins are teratogens. Explain. What are the consequences of the use of thalidomide drug ? 3 + 3 + 3

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

   a) What is potency ? Explain totipotency and pleuropotency with example. 2 + 4

   b) Delineate the zona-binding ability of spermatozoa. 6

   c) Name two hormones involved in insect metamorphosis. Show how both the hormones help in molting of insects. 1 + 5

   d) What is immunocontraception with animals ? What is porcine zona pellucida ? How does PZP prevent pregnancy ? 2 + 2 + 2

   e) Define semen. Where is semen produced in the body ? What are the ingredients of semen ? Is semen high in protein ? 1 + 2 + 2 + 1

   f) Gap genes establish seven broad stripes in *Drosophila* development. Discuss. 6

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

a) Differentiate embryonic stem cells with fetal stem cells. 4

b) Oskar gene has a dual function. Comment on the statement. 4

c) How are oocyte and nurse cells formed in *Drosophila* ? 4

d) Specify the role of prolactin in amphibian metamorphosis. 4

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

a) What are the major changes that occur during capacitation ? 3

b) State the role of calcium in the cortical reaction. 3

c) Write three advantages of immunocontraceptives. 3

d) Differentiate the terms *in vitro* and *in vivo*. 3