

This question paper contains 4 printed pages]

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S. No. of Question Paper : 6303

Unique Paper Code : 223505

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Name of the Paper : Developmental Biology—ZOHT-509

Name of the Course : B.Sc. (Honours) Zoology

Semester : V

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt five questions in all including Question No. 1, which is compulsory.

Answer all parts of the question in sequence.

Begin your answer for a new question on a fresh page.

Draw suitable well labelled diagrams wherever necessary.

1. (a) Describe (in one line each) the terms given below :

5

(i) Grey crescent

(ii) Koller's sickle

(iii) Progeria

(iv) Spiral cleavage

(v) Centrolecithal egg.

(b) Expand the following :

3

(i) FGF

(ii) TNF

(iii) AEC.

P.T.O.

(c) Mentioned below are structures in frog embryo; give the corresponding homologue seen in chick embryo : 3

- (i) Blastopore
- (ii) Dorsal lip of the blastopore
- (iii) Lateral lips of the blastopore.

(d) Distinguish between the following pairs of terms : 6

- (i) Primary neurulation and secondary neurulation
- (ii) Morphogen and teratogen
- (iii) Progenesis and neoteny.

(e) Match the columns A and B : 3

‘A’

‘B’

- | | |
|-----------------|---|
| (i) Waddington | (a) Embryogenesis in sea squirt |
| (ii) Harvey | (b) Role of thyroid in frog metamorphosis |
| (iii) Pander | (c) Biogenetic law |
| (iv) von Baer | (d) Discovery of germ layers |
| (v) Gudernatsch | (e) Ex oovomnina |
| (vi) Conklin | (f) Epigenesis. |

(f) Indicate the germ layer from which each one mentioned is derived : 3

- (i) GI tract lining
- (ii) Lens
- (iii) Lung
- (iv) Kidney
- (v) Pancreas
- (vi) Dentine.

- (g) Fill in the blanks with appropriate terms : 4
- (i) Cerebrum is derived from region of the embryonic brain.
 - (ii) Failure of closure of anterior neuropore results in an anomaly called
 - (iii) Estrogen is secreted by cells in ovaries.
 - (iv) At birth, mammalian eggs are all arrested at stage of meiosis.
2. (a) Discuss the process involved in converting a spermatogonium into a mature spermatozoon. Add information on the role of non-germinal cells in support. 7
- (b) Write note on vitellogenesis. 3
- (c) Draw a neat diagram of the fate map of chick blastoderm. 2
3. (a) Explain regeneration by morphallaxis with a suitable animal model. Add a line on how it differs from epimorphosis. 6
- (b) Is there a medical implication to research in regeneration ? 1
- (c) What is polyspermy and why should it be blocked ? What are the various means that serve to block it ? 5
4. (a) What is the critical period in gestation that is vulnerable to teratogens and why ? Detail the ill-effects of retinoic acid, thalidomide and heavy metals causing teratogenesis in the foetus. 6
- (b) Illustrate by serial diagrams the formation of all the extra embryonic membranes in an amniote. Add a line each on their function. 6
5. (a) Describe in detail the process of gastrulation in an amphibian. Support your answer with well labelled drawings. 9
- (b) What are BMP inhibitors and what is their role in neural induction ? 3

6. (a) How many patterns of metamorphosis are seen in insects ? Give *one* example each. Give a flow chart of the role of various hormones controlling insect metamorphosis; explain in detail the experimental proofs supporting the role of each hormone. 9
- (b) What are the *three* principal phases in amphibian metamorphosis and the changes seen in each thereof (no explanation required) ? 3
7. Write short notes on any *three* of the following : 4,4,4
- (a) Fertilization in sea urchin
- (b) Evolutionary hypothesis of ageing
- (c) Types of placenta
- (d) Hormonal control of amphibian metamorphosis
- (e) In-vitro fertilization.

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