

THE OPEN UNIVERSITY OF SRI LANKA

B. Sc. DEGREE PROGRAMME – LEVEL 04  
FINAL EXAMINATION – 2013/14



ZLU2182/ZOU2166 – ANIMAL DEVELOPMENT

DATE: 10<sup>th</sup> June 2014

Time: 9.30 a.m. – 11.30 a.m.

Index No: .....

ANSWER QUESTION (1) AND ANY THREE (3) OF THE OTHER 5 QUESTIONS

ANSWERS TO QUESTION (1) SHOULD BE WRITTEN IN THE SPACES PROVIDED ON THE QUESTION PAPER.

ANSWERS OF QUESTIONS (2) – (6) SHOULD BE ILLUSTRATED WITH CLEARLY LABELLED DIAGRAMS, WHERE NECESSARY.

(1) This question is based on the embryonic development of amphibians.

(a). Provide below the technical terms used to describe the frog egg based on the amount and distribution of yolk.

Amount of yolk - .....

Distribution of yolk - .....

(06 marks)

(b). State the three major ways by which the cytoplasm of frog egg gets modified, during differentiation.

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(06 marks)

(c). What is the name given for the stage of development of an egg, when it is undergoing differentiation?

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(03 marks)

(d) Draw a fully labeled longitudinal section of a matured frog egg to show the distribution of organelles in it.

(06 marks)

(e) What is the name given for the stage of development of frog egg, when it is released from ovary?

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(03 marks)

(f) How do frogs ensure fertilization of their eggs?

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(03 marks)

(g) Just after the fertilization of frog egg, a gray crescent area appears on the surface of the egg. Explain the way by which this area is formed?

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(06 marks)

(h) Describe the position of first cleavage furrow of frog egg, in relation to the gray crescent.

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(03 marks)

(i) Usually eggs at late blastula stage are used to construct fate maps of embryos.

State the importance of constructing fate maps at this stage?

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(06 marks)

(j) What is gastrulation?

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(06 marks)

(k) What are the two major movement types that occur in frog embryo during gastrulation?

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(06 marks)

(l) What is the first visible sign of gastrulation in the blastula of a frog?

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(03 marks)

(m) How do the gastrulation movements proceed in frog early gastrula?

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(06 marks)

(n) Explain how the lips of the blastopore are established in a frog gastrula.

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(06 marks)

(o) Draw a fully labeled median section of a frog mid-gastrula to show its internal structure.

(06 marks)

(p) Explain how the mesoderm moves into the gastrula.

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(06 marks)

- (q) Draw a fully labeled diagram to show how the mesodermal mantle moves as gastrulation proceeds.

(06 marks)

- (r) In an experiment, the dorsal lip of the blastopore of gastrula of the newt *Triton cristatus* (unpigmented species) was grafted to the ventral region of a gastrula of the newt *Triton taeniatus* (pigmented species). The grafted blastopore material triggered formation of an entire secondary embryo where the grafting was done. The pigmentation of the secondary embryo was similar to that of host than the grafted tissue. What did it indicate about the properties of the grafted dorsal lip tissue?

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(04 marks)

- (s) What is the name given to the dorsal lip area to indicate its nature mentioned in the Question (1) Part (r)?

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(03 marks)

- (t) When selecting a donor gastrula and a recipient gastrula for the experiment given in Question (1) Part (r), a pigmented gastrula and an unpigmented gastrula of two closely related species were chosen. Why was it necessary to select gastrulae in this way?

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(03 marks)

- (u) Why was it necessary to select gastrulae of two closely related species for the experiment given in Question (1) Part (r)?
- .....

(03 marks)

(Total 100 marks)

2. (i) Describe the major events that takes place during spermatogenesis. (75 marks)
- (ii) Discuss the structural adaptations seen in a spermatozoon that makes it ideally suited to perform its function. (25 marks)
3. Discuss the effect of quantity and distribution of yolk on cleavage of eggs. (100 marks)
4. Outline the process of wing development of chick embryo. (100 marks)
5. (i) Describe an experiment which proved that the determination of neural plate takes place at the late gastrula stage of the frog embryo. (50 marks)
- (ii) Describe an experiment which proved that the cells of the three germ layers separated and mixed in different ways, re-aggregate to reflect their embryonic positions. (50 marks)
6. Write short notes on **any 2** of the following;
- (a) Prevention of polyspermy in sea urchin
  - (b) Chick extra-embryonic membranes
  - (c) Hormonal regulation in insect metamorphosis
  - (d) Transgenic technology
- (50 marks for each)
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