

The Open University of Sri Lanka
Faculty of Natural Sciences
B.Sc/ B. Ed Degree Programme



Department	: Zoology
Level	: 4
Name of the Examination	: Final Examination
Course Code and Title	: ZLU2182 – Animal Development
Academic Year	: 2019/20
Date	: 28.12.2019
Time	: 1.30 – 3.30 p.m.
Duration	: 2 hours
Index Number	:

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **06** questions given in 05 pages.
3. Answer **question 01 and 03 other questions** only. All questions carry equal marks.
4. Answer for each question should commence from a new page.
5. **Draw fully labelled diagrams where necessary.**
5. Relevant log tables are provided where necessary.
6. Having any unauthorized documents/ mobile phones in your possession is a punishable offense.
7. Use blue or black ink to answer the questions.
8. Circle the number of the questions you answered in the front cover of your answer script.
9. Clearly state your index number in your answer script

1. This question is based on reproduction of sea urchin, which is an echinodermate living in marine habitats.

(i) Sea urchin release large number of small eggs. Fertilized eggs produce pluteus larvae, which later metamorphose into adults.

(a) Where do the eggs of sea urchin fertilize?

.....
(03 marks)

(b) Give a rough estimate about the number of eggs that a female produces at a time.

.....
(03 marks)

(c) Give the scientific term that describe the amount of yolk in the eggs.

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(03 marks)

(d) Give the scientific term that describe the yolk distribution in these eggs.

.....
(03 marks)

(e) What is the reason for the development of larvae from their eggs?

.....
(03 marks)

(ii) The eggs of sea urchin are covered by a gelatinous egg membrane containing some chemicals. The sperms of sea urchin get attracted to eggs due to chemotaxis of one of these chemicals.

(f) What is the type of chemical attractant involved in attracting the sperms towards ova of sea urchins?

.....
(03 marks)

(g) Explain the way by which the sperms get attracted to ova.

.....
.....
.....

(06 marks)

- (h) The sperms that attracted towards eggs get attached on to the surfaces of gelatinous coat. This triggers the acrosomal reaction, which helps the sperm to penetrate the egg membrane. Explain how the acrosomal reaction is triggered.

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(08 marks)

- (i) Explain how the egg membrane is perforated and an opening created to expose vitelline membrane?

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.....

(08 marks)

- (j) Explain the formation of the structure that convey the sperm nucleus into the egg

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.....
.....

(08 marks)

- (k) Draw a fully labelled diagram to illustrate the attachment of the structure mentioned in Part (ii) (j) on to the vitelline membrane of egg.

(8 marks)

(l) How does the attachment mentioned in Part (ii) (k) help to recognize the sperm of the same species?

.....
.....

(4 marks)

(iii) The digestion of vitelline membrane leads to the direct contact of sperm head with the plasma membrane of egg and fusion of the two plasma membranes. This activates the egg to embark on its developmental process.

(m) Mention three important events that occur due to the activation of egg.

- 1.
- 2.
- 3.

(6 marks)

(n) Of the three events mentioned in Part (iii) (m), which is the one that causes changes in plasma membrane of egg?

..... (3 marks)

(o) What is the importance of the event mentioned in Part (iii) (n)?

.....

(3 marks)

(p) How does the event mentioned in Part (iii) (n) cause a quick change to the plasma membrane to repel extra sperms?

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.....
.....

(6 marks)

(q) How does the event mentioned in Part (iii) (n) occur to cause a permanent change in the plasma membrane to stop entering of extra sperms?

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.....
.....

(6 marks)

- (r) Draw a fully labelled diagram to illustrate the process occurring to cause the permanent change in the plasma membrane.

(10 marks)

- (s) Mention three changes that occur in vitelline membrane due to the process causing the permanent change in plasma membrane.

1.
2.
3.

(6 marks)

2. Describe the process of oogenesis in (eutherian) mammals including the follicle development. (100 marks)
3. (i) How does the two-layered blastula of chick embryo form from the single-layered blastoderm? (25 marks)
(ii) Describe the process of gastrulation in chick embryo. (75 marks)
4. Outline the process of wing development in chick embryo. (100 marks)
5. (i) Explain how the fate maps and specification maps are constructed and what are the effects of these construction methods on the results obtained? (20 marks)
(ii) Explain how the three germ layers are specified in early frog embryos. (80 marks)
6. Write short notes on **any 2** of the following;
- (a) Spiral cleavage
 - (b) Amphibian metamorphosis
 - (c) Cell-cell recognition and adhesion
 - (d) Therapeutic cloning
- (50 marks each)
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