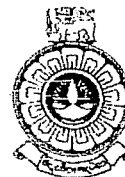


THE OPEN UNIVERSITY OF SRI LANKA

B. Sc. DEGREE PROGRAMME – LEVEL 04  
FINAL EXAMINATION – 2016/17

ZLU2182 – ANIMAL DEVELOPMENT



DATE: 24<sup>th</sup> July 2017

Time: 1.00 p.m. – 3.00 p.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 structured essay question is based on oogenesis and early embryonic development of chick.

1.1 Draw a fully labeled diagram to show a median longitudinal section of a chick egg.

(07 marks)

1.2 Describe the amount and distribution of yolk in chick eggs using technical terms.

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(04 marks)

1.3 List the primary, secondary and tertiary egg membranes in a chick egg.

Primary membranes: .....

Secondary membranes: .....

Tertiary membranes: .....

(05 marks)

1.4 Explain the method of origin of the primary, secondary and tertiary membranes of chick egg.

Primary membranes: .....

Secondary membranes: .....

Tertiary membranes: .....

(06 marks)

1.5 Where does the fertilisation of chick ovum occur?

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(03 marks)

1.6 What is the developmental stage of the chick embryo, when the egg is laid?

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(03 marks)

1.7 How do the main body axes set up in chick embryo?

Dorsal-ventral axis: .....

Anterior-posterior axis: .....

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(06 marks)

1.8 Describe the way that the chick egg undergoes cleavage.

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(06 marks)

1.9 Explain the effect of yolk on the cleavage of chick egg.

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(04 marks)

1.10 Draw a fully labelled diagram of a median longitudinal section of the late blastula of chick embryo.

(06 marks)

1.11 Draw a fate map of late blastula of chick embryo and mark the prospective areas of the different parts of the blastoderm.

(06 marks)

1.12 In the diagram drawn for the Part 1.11, shade and label the areas which will contribute to form the extra-embryonic membranes of chick embryo.

(03 marks)

1.13. Explain how the blastocoel is formed at the beginning of gastrulation.

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(06 marks)

1.14 What is the name given to the new layer that is formed during the establishment of the blastocoel?

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(03 marks)

1.15 What is the system of the embryo that will be formed by the new layer mentioned in Part 1.14? .....

(03 marks)

1.16 Draw a fully labeled diagram of a chick embryo and show the inward movement of mesoderm and notochord during gastrulation. Use arrows to show the movements.

(05 marks)

1.17 Explain how the notochord and neural plate extends backward to cover the whole length of the chick embryo.

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(06 marks)

1.18 Explain how the neural tube and the somites are formed in the chick embryo.

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(06 marks)

1.19 What are the genes responsible for the positional identity of somites in chick embryo?

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(03 marks)

1.20 Explain how the genes mentioned in Part 1.19 are expressed as gastrulation proceeds.

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(06 marks)

1.21 If there is a mutation in a Hox gene, where do you expect the structural defects related to that mutated gene to be expressed?

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(03 marks)

1.22 Explain the reason for the answer given in Part 1.21.

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(03 marks)

2. Describe the process of oogenesis that occurs in a frog. (85 marks)  
How does the process of oogenesis in mammals differ from that of frog? (15 marks)
3. Explain the way by which the sea urchin sperms get attracted towards the eggs and how the sperms penetrate the egg. (100 marks)
4. Outline the process of the development of heart in the frog embryo. (100 marks)
5. Explain the reproductive cloning technology process that was used for the creation of Dolly. (80 marks)  
Compare the reproductive cloning procedure used for creating Dolly with natural sexual reproduction and therapeutic cloning. (20 marks)
6. Write short notes on any 2 of the following;
- (a) Spiral cleavage
  - (b) Role of cytoskeleton in morphogenesis
  - (c) Cell determination
  - (d) Amphibian metamorphosis
- (50 marks for each)
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