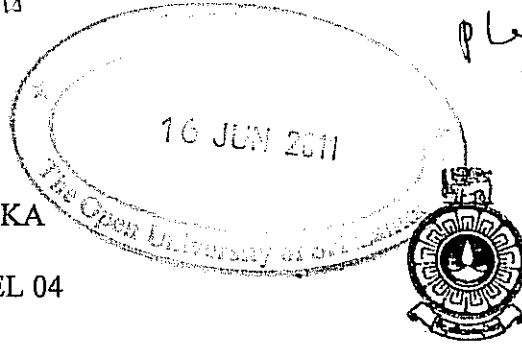


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THE OPEN UNIVERSITY OF SRI LANKA

B. Sc. DEGREE PROGRAMME – LEVEL 04

ZLU2182 – ANIMAL DEVELOPMENT
CAT 1 (NO BOOK TEST)

DATE: 25th September 2010

Time: 11.00 a.m. – 12.00 noon

REGISTRATION NUMBER:

Answer all questions.

This paper consists of two parts, Part A & B.

Part A - Q 1 contains 20 multiple choice questions. Tick the correct answers for these questions on the answer sheet provided below.

Part B has two questions, Q 2 & Q 3. Answers for these questions should be written on the space provided.

Answer Sheet for Part A - Q 1

	(a)	(b)	(c)	(d)
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
1.10				

	(a)	(b)	(c)	(d)
1.11				
1.12				
1.13				
1.14				
1.15				
1.16				
1.17				
1.18				
1.19				
1.20				

Part A

Q. 1

- 1.1 The theory which states that ontogeny is a recapitulation of phylogeny is the
- (a) Biogenetic theory.
 - (b) theory of Epigenesis.
 - (c) Germ layer theory.
 - (d) Baer's law.
- 1.2 In oogenesis of vertebrates,
- (a) ovulation occurs at the secondary oocyte stage.
 - (b) primary oocytes differentiate and form secondary oocytes.
 - (c) two polar bodies are produced after the first meiotic division.
 - (d) all oogonia become primary oocytes.
- 1.3 The three germ layers of an embryo are established
- (a) by morphogenetic cell movements.
 - (b) by migrating part of the blastoderm of the surface to interior of embryo.
 - (c) by displacing the cavity in the blastula by a new one.
 - (d) by all of the above.
- 1.4 The release of gonadotrophins by anterior pituitary is controlled by the Gonadotrophin releasing hormone secreted by
- (a) Sertoli cells
 - (b) Epididymis
 - (c) Tunica albuginea
 - (d) Hypothalamus
- 1.5 Membranes secreted by the follicle cells while the egg is in the ovary are
- (a) primary egg membranes.
 - (b) secondary egg membranes.
 - (c) tertiary egg membranes.
 - (d) accessory egg membranes.
- 1.6 Acrosomal filament is formed by
- (a) polymerization of actin molecules situated behind the nucleus
 - (b) polymerization of actin molecules situated behind the acrosomal granule
 - (c) the flagellum of the sperm
 - (d) fusion of golgi bodies of sperm
- 1.7 The third cleavage furrow of amphibians is a
- (a) horizontal one going slightly above the equator.
 - (b) meridional one perpendicular to the first cleavage furrow.
 - (c) horizontal one shifted considerably towards the animal pole.
 - (d) oblique one shifting micromeres towards the right side.

- 1.8 Select the correct response about cleavage.
- (a) Later cleavage divisions are synchronous.
 - (b) Constituent parts of the cell cytoplasm are displaced during cleavage.
 - (c) No cell growth occurs between cleavage divisions.
 - (d) Nuclear-cytoplasm ratio gradually decreases during cleavage.
- 1.9 Formation of NADP from NAD during activation of eggs is an indication of the
- (a) inactivation of transport systems.
 - (b) preparation of egg for the synthesizing activities.
 - (c) presence of anaerobic conditions.
 - (d) inability to synthesize proteins.
- 1.10 Which of the following substances released by the cortical granules causes the vitelline membrane to expand to form the fertilization membrane?
- (a) proteases
 - (b) hyaline protein
 - (c) peroxidase enzyme
 - (d) mucopolysaccharides
- 1.11 Change of membrane potential of sea urchin egg, in response to the fusion of sperm to it, is caused by
- (a) changing the resting value of membrane from -60 mV to $+20$ mV.
 - (b) releasing the contents of cortical granules to the extra cellular fluid.
 - (c) the transient influx of K^+ into the cell.
 - (d) the release of Ca^{2+} to the egg cytoplasm.
- 1.12 What is the importance of cytoplasmic rearrangement occurs in activated eggs?
- (a) It helps the two pro-nuclei to fuse together.
 - (b) It directs the morphogenetic determinants to appropriate places to determine the future areas.
 - (c) It stops the fusing of cortical granules with the plasma membrane.
 - (d) It stimulates the metabolic pathways to initiate protein synthesis.
- 1.13 Ingression is the
- (a) moving of separated cells of a layer to an embryonic space to form a new layer.
 - (b) spreading of a cell sheet over a substratum.
 - (c) sinking of a layer of cells.
 - (d) moving of a cell layer beneath another layer.
- 1.14 The coelom of frog is
- (a) a blastocoel.
 - (b) an enterocoel.
 - (c) a schizocoel.
 - (d) a neurocoel.

- 1.15 Amnion is made out of extra-embryonic
(a) ectoderm and mesoderm.
(b) ectoderm and splanchnic mesoderm.
(c) ectoderm and somatic mesoderm.
(d) endoderm and splanchnic mesoderm.
- 1.16 Apical ectodermal ridge is formed at the
(a) edge of the neural plate.
(b) middle of the optic cup.
(c) tip of the limb bud.
(d) posterior edge of the limb bud.
- 1.17 What is the region of the brain that evaginates to form the optic lobes?
(a) Telencephalon
(b) Diencephalon
(c) Mesencephalon
(d) Metencephalon
- 1.18 What is the protein produced by epithelial cells during their differentiation?
(a) Actin
(b) Keratin
(c) Crystalline
(d) Fibrin
- 1.19 Which of the following receives blood from the vitelline veins in chick embryo?
(a) right ventricle
(b) sinus venosus
(c) conus arteriosus
(d) right atrium
- 1.20 Which of the following hormones delays metamorphosis of insects?
(a) Prolactin
(b) Ecdysone
(c) Juvenile hormone
(d) Thyroxine

Part B

Q. 2. A part of a cross section of a mammalian seminiferous tubule is given in Figure 1. Question 2 is based on this figure.

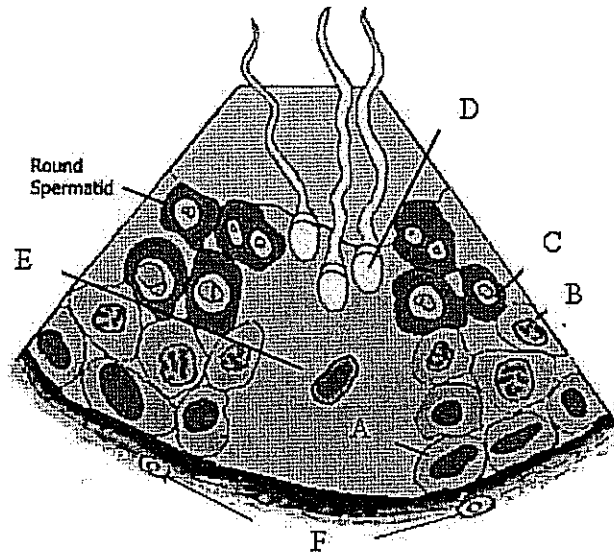


Figure 1

2.1 Name A, B, C and D cells shown in Figure 1.

A - C -
 B - D -

2.2 Of the cell types given in 2.1, which is the stem cell population that provides new cells for differentiation?

2.3 What is the type of cell division occurs in stem cells mentioned in 2.2, to produce new cells?

2.4 Name two haploid cell types, mentioned under 2.1.

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2.5 What is the name given to the process, which changes spermatids to D?

.....

2.6 Give 3 changes that occur in spermatids during the process mentioned in 2.5.

1.
2.
3.

2.7 Name the cell E given in Figure 1 and mention two of its functions.

E -

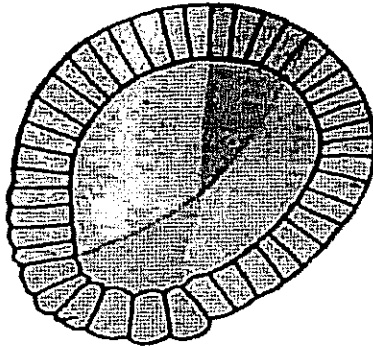
- Functions –
1.
 2.

2.8 Name the cell F given in Figure 1 and mention its function.

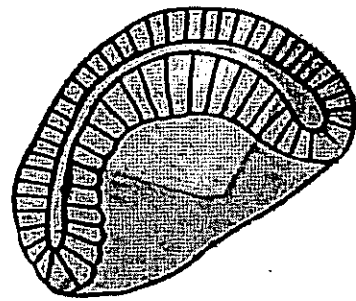
F -

Function –

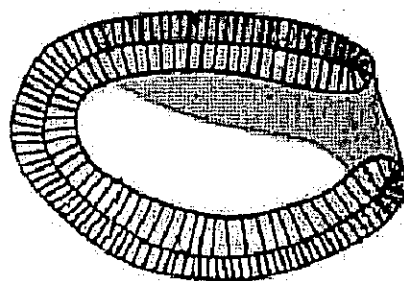
Q. 3 This question is based on three stages of the developing embryo of *Amphioxus* given in Figure 2.



Stage 1



Stage 2



Stage 3

Figure 2

3.1 Name/briefly describe the three stages given in Figure 2.

Stage 1 -

Stage 2 -

Stage 3 -

3.2 Mark the different presumptive (future) areas that you can identify in Stage 1, Stage 2 and Stage 3, on Figure 2 using different marks or colours, and label them.

3.3 Briefly explain how are these areas experimentally found out?

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3.4 Mark the dorsal, lateral and ventral lips of blastopore on the Stage 2 of Figure 2.

3.5 Mention the different presumptive areas present on the three lips of blastopore at the Stage 2.

Dorsal lip -

Lateral lips -

Ventral lips -

3.6 How does the Stage 2 transform into Stage 3? Explain.

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