UNIVERSITI KUALA LUMPUR
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

FINAL EXAMINATION

OCTOBER 2025 SEMESTER

COURSE CODE	:	HDB40303
COURSE TITLE	:	DEVELOPMENTAL BIOLOGY
PROGRAMME NAME	:	BACHELOR OF BIOMEDICAL SCIENCE (HONOURS)
DATE	:	23 JANUARY 2026
TIME	:	3:00PM - 6:00PM
DURATION	:	3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Answer ALL questions for Section A.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet. ☐ *Tick if applicable*
9. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

Question 1

(a) Draw a simple flowchart to illustrate the process of spermatogenesis.

(5 marks)

(b) Describe the mechanisms used by the oocytes to prevent polyspermy during fertilization.

(5 marks)

Question 2

(a) Define gastrulation.

(2 marks)

(b) Name **3 (THREE)** tissue/organs in adult humans that are originated from the mesoderm.

(3 marks)

(c) Explain the molecular mechanism that regulates the formation of the bilaminar disc.

(5 marks)

Question 3

(a) Explain the molecular mechanism in somitogenesis.

(5 marks)

(b) Describe how signaling molecules regulate the formation of somite compartments.

(5 marks)

Question 4

(a) List **5 (FIVE)** transcription factors that are involved in developmental biology.

(5 marks)

(b) Draw a simple diagram, with brief descriptions, to illustrate the Wnt signaling pathway.

(5 marks)

SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

Summarize the process of development from blastula to the neural tube formation.

(20 marks)

Question 2

Discuss the significance of the antagonistic signaling action in the developmental process.

(20 marks)

Question 3

Explain the molecular control for the dorsoventral pattern formation of the developing neural tube.

(20 marks)

Question 4

The apical ectodermal ridge, the zone of polarizing activity and the dorsal/ventral ectoderm are the major signaling centers in the limb development.

Discuss the role of these signaling centers in controlling the axial organization of developing limb.

(20 marks)

END OF EXAMINATION PAPER