



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## University Examinations 2022/2023

THIRD YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR  
OF EDUCATION SCIENCE (BIOLOGY/CHEMISTRY), (BIOLOGY/MATHS)  
(BIOLOGY/AGRICULTURE)

### SZA 3305: DEVELOPMENTAL BIOLOGY

DATE: APRIL 2023

TIME: 2 HOURS

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INSTRUCTIONS: Answer question *one* and any other *two* questions

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#### QUESTION ONE (30 MARKS)

- a) Outline and briefly explain the metabolic events that occur during cleavage (2 marks)
- b) List four types of cleavage and the organism involved (3 marks)
- c) Sketch a simple fate map of amphioxus at early gastrula (5 marks)
- d) Name the structures on the spermatozoon formed from following organelles and state one major function of each
  - (i) Golgi complex (2 marks)
  - (ii) Nucleus (2 marks)
  - (iii) Centriole (2 marks)
- e) Explain the structural specialization of the egg for fertilization (4 marks)
- f) Explain briefly forces in formation of blastocoels during blastula formation (4 marks)
- g) Explain briefly the structural specialization of egg for fertilization (4 marks)

h) Differentiate between embryogenesis and blastogenesis (2 marks)

**QUESTION TWO (20 MARKS)**

Discuss cell surface interactions between egg and sperm during fertilization (20 marks)

**QUESTION THREE (20 MARKS)**

Discuss the sequence of events and mechanism of gastrulation in sea urchin (20 marks)

**QUESTION FOUR (20 MARKS)**

a) Describe the process of spermiogenesis starting with spermatid (10 marks)

b) Discuss the process of gastrulation in bird embryo (10 marks)