



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## University Examinations 2023/2024

THIRD YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR  
OF SCIENCE IN EDUCATION

### SZA 3305/3302: DEVELOPMENTAL BIOLOGY

DATE: APRIL 2024

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) Explain briefly forces applied in formation of blastocoels during fertilization (3 marks)
- b) Give two differences between oogenesis and spermatogenesis (2 marks)
- c) List four types of cleavage and the organism involved (4 marks)
- d) Outline properties of embryonic field (4 marks)
- e) State the functional roles of the following processes associated with fertilization
  - i. Cortical reaction (2 marks)
  - ii. Acrosomal reaction (2 marks)
- f) Sketch a simple fate map of amphibian at early gastrula (5 marks)
- g) Outline three steps that ensure species specificity in fertilization (3 marks)
- h) Name extraembryonic membranes of the chick and state one major function (3 marks)
- i) Explain briefly the developmental significance of meiosis in gametogenesis (2 marks)

**QUESTION TWO (20 MARKS)**

Discuss the sequence of events and mechanism of gastrulation in sea urchin

**QUESTION THREE (20 MARKS)**

- a) Describe the process of spermiogenesis starting with spermatid (10 marks)
- b) Discuss the process of gastrulation in bird embryo (10 marks)

**QUESTION FOUR (20 MARKS)**

Discuss cell surface interactions between egg and sperm during fertilization