



**NATIONAL OPEN UNIVERSITY OF NIGERIA**  
**PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA**  
**FACULTY OF SCIENCE**  
**Biological Sciences**  
**2025\_1 EXAMINATION**

**BIO413: Developmental Biology**

**Time: 2 Hours**

**Credit Unit: 2**

**Instruction: Attempt THREE (3) questions only. QUESTION 1 is compulsory.**

**Q1.**

- a. How does the zygote develop from the moment of fertilization to the process of cleavage? **(6 Marks)**
- b. Identify four key events that occur during the process of conception in living organisms **(6 Marks)**
- c. Provide a comprehensive explanation of the final stage in the maturation of sperm cells **(6 Marks)**
- d. Describe the process of germ cell determination in *Drosophila melanogaster* **(6 Marks)**
- e. Explain somitogenesis **(6 Marks)**

**Q2**

- a. Analyze the organized arrangement of differentiated cells into complex tissues and organs **(4 marks)**
- b. Discuss the factors contributing to the decline in a woman's fertility as she ages **(4 marks)**
- c. Explain the distinctive and noteworthy characteristics of spermatogenesis **(6 marks)**
- d. List and explain the differences between cleavage and mitosis **(6 marks)**

**Q3.**

- a. Illustrate the process of egg development using an annotated diagram. **(10 marks)**
- b. Provide a concise overview of the different types of eggs categorized by yolk content. **(10 marks)**

**Q4a.** Explain the last step of sperm cell maturation **(8 marks)**

- b.** Give an account of the leptotene and zygotene stages of meiosis **(12 marks)**

**Q5.a.** State the changes that occur on the Zona pellucida as a result of Egg cortical reaction **(9 Marks)**

Discuss fertilization in terms of functions and outline the four (4) common events that occur during fertilization **(11 Marks)**