CHUKA **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF EDUCATION SCIENCE AND BACHELOR OF SCIENCE IN BIOLOGY

ZOOL 430: COMPARATIVE ANIMAL PHYSIOLOGY

STREAMS: B.ED SCI/BSC BIO Y4S1 **TIME: 2 HOURS**

DAY/DATE: FRIDAY 20/12/2024 **11.30 A.M – 1.30 P.M.**

INSTRUCTIONS:

- **Answer ALL questions in Section A and any TWO from Section B.**

SECTION A (30 MARKS)

Q1. a) Differentiate between nervous and intrinsic regulation of a heartbeat (2 marks)

b) Explain how cardiac output vary in response to oxygen demand (3 marks)

Q2. a) Draw and label a diagram of the circulatory system of cephalopod mollusk (3 marks)

b) Give the function of the following structures (2 marks)

i. Sinus venosus
ii. Foramen of panizza

Q3. a) If a mammal has a minute volume of 5200ml/min, a breathing frequency of 13 breaths per minute, a vital capacity of 4600ml and expiratory reserve volume of 1200ml. Obtain the

i. Tidal volume (2 marks)
ii. Inspiratory reserve volume (2 marks)

b) Give two disadvantages of external gills (1 mark)

Q4. a) Explain how the respiratory system can regulate blood pH in vertebrates (2 marks)

b) Elaborate on forms of embryonic and foetal development in vertebrates (3 marks)

Q5. a) Describe three adaptations of endotherms to survive extreme cold environments (3 marks)

b) Give the significance of estivation in thermoregulation (1 mark)

c) Mention two advantages of ectothermy (1 mark)

Q6. a) Differentiate between protandry and protogyny (2 marks)

b) Describe three types of asexual reproduction in vertebrates (3 marks)

SECTION B (40 MARKS)

Q7. Discuss osmoregulatory mechanisms in marine animals (20 marks)

Q8. Describe

a) Excretory mechanisms found in vertebrates (10 marks)
b) Blood circulation in a mammalian foetus (10 marks)

Q9 a) Describe the gaseous exchange in avian lungs (10 marks)

b) Discuss factors that affect oxygen-haemoglobin dissociation (10 marks)
