



MACHAKOS UNIVERSITY

University Examinations 2019/2020 Academic year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF DEPARTMENT OF BIOLOGICAL SCIENCES

AUGUST SESSION EXAMINATION FOR

BACHELOR OF EDUCATION

SZL 409: ENVIRONMENTAL PHYSIOLOGY

DATE: SCHOOL BASED

TIME:

INSTRUCTIONS TO CANDIDATES

Answer Question one (COMPULSORY) and any other two questions

Clearly illustrate your answer with well labelled diagrams as appropriate

QUESTION ONE (30 MARKS)

- a) Differentiate between the following pairs of terms:
 - i. endothermy and exothermy (2 marks)
 - ii. hibernation and aestivation (2 marks)
 - iii. dormancy and diapause (2 marks)
- b) Explain how the ruminant stomach is adapted to herbivory (3 marks)
- c) Explain how air intake occurs in aquatic organisms (3 marks)
- d) Briefly discuss migration in birds (2 marks)
- e) Briefly explain water conservation in the desert camel (3 marks)
- f) Justify reducing the metabolic rate to the barest minimum in animals (3 marks)
- g) Identify the sources of cellular energy during starvation (3 marks)
- h) Explain the role of biological clocks in animals (2 marks)
- i) Explain the adaptations of the mia crab to changing environments (3 marks)
- j) Explain the role of panting in birds (2 marks)

QUESTION TWO (20 MARKS)

- a) Explain the responses of mammals to heat stress (12 marks)
- b) Discuss the physiological adaptations of mammals to endothermy Outline the life cycle of *Aurelia* (8 marks)

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QUESTION THREE (20 MARKS)

Discuss the rhythmicity of the menstrual cycle in man

QUESTION FOUR (20 MARKS)

a) Relate the structure of mammalian skin to its function (10 marks)

b) Discuss the formation of urine in man (10 marks)

QUESTION FIVE (20 MARKS)

Discuss the mechanisms of movement of material in and out of an animal cell



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AUGUST SESSION EXAMINATION FOR

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SZL 100: GENERAL ZOOLOGY

DATE: SCHOOL BASED

TIME:

INSTRUCTIONS TO CANDIDATES

Answer Question 1 (COMPULSORY) and any other two questions

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QUESTION ONE (30 MARKS)

- a) Outline the effects of activation of proteins of the complement system (3 marks)
- b) List the functions of the cell membrane (3 marks)
- c) Describe a theory that explains the origin of the universe (3 marks)
- d) Explain the principles of homeostasis (3 marks)
- e) Illustrate the structure of a named haemoflagellate (3 marks)
- f) Explain the role of the various proteins present in cell membranes (3 marks)
- g) With examples, outline any three economic importance of Protista (3 marks)
- h) Outline the composition and functions of the skeletal system in man (3 marks)
- i) Identify the basic chemicals from which life is supposed to have originated (3 marks)
- j) Describe the components of the circulatory system in man

QUESTION TWO (20 MARKS)

Discuss the role of blood in immunology of man

QUESTION THREE (20 MARKS)

Discuss the classification animal - like Protists

QUESTION FOUR (20 MARKS)

Discuss the methods of normal body defense against infectious diseases.

QUESTION FIVE (20 MARKS)

Describe the homeostatic thermoregulation regulation in mammals



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AUGUST SESSION EXAMINATION FOR BACHELOR OF EDUCATION

SBT 401: GENERAL GENETICS

DATE: SCHOOL BASED

TIME:

INSTRUCTIONS TO CANDIDATES

Answer Question 1 (COMPULSORY) and any other two questions

Clearly illustrate your answer with well labelled diagrams as appropriate

QUESTION ONE (30 MARKS)

- a) Define the following terms (3 marks)
- Monohybrid cross
 - Test cross
 - Multiple alleles
- b) Highlight three human disorders associated with polygenes (3 marks)
- c) Distinguish between the following terms (3 marks)
- Dominant and Recessive
 - Homozygous and heterozygous
 - Continuous and discontinuous
- d) Explain the following types of inheritance. Give appropriate examples in each case (3 marks)
- Incomplete dominance
 - Co-dominance
- e) Outline six assumptions of Hardy Weinberg (3 marks)
- f) Using examples explain disruptive type of natural selection (3 marks)
- g) State Mendel's first law of inheritance (3 marks)
- h) Explain three reasons why Mendel succeeded in his work (3 marks)
- i) i Differentiate between dominant lethal genes and recessive lethal genes (1 mark)

- ii Highlight four examples of conditions in human beings which are as a result of lethal genes (3 marks)
- j) Describe the structure of DNA (Deoxyribonucleic acid) molecule (3 marks)

QUESTION TWO (20 MARKS)

- a) In a cross between a black and white guinea pig all members of the F1 generation are black. The F2 generation is made up of approximately $\frac{3}{4}$ black and $\frac{1}{4}$ white guinea pigs.
 - i. Diagram this cross, showing the genotypes and phenotypes (3 marks)
 - ii. What will the offspring be like if the two F2 white guinea pigs are mated? (3 marks)
 - iii. Two different matings were made between black members of F2 generations with the results shown below. Diagram each of the crosses (4 marks)

Cross	Offspring
Cross 1	All black
Cross 2	$\frac{3}{4}$ black, $\frac{1}{4}$ white

- b) Mendel crossed peas having round seeds with green cotyledons was crossed with peas having wrinkled seeds, with yellow cotyledons. The F1 generation had round seeds and green cotyledons. Show the crosses of F1 and F2 generation (8 marks)

QUESTION THREE (20 MARKS)

- a) With regard to ABO blood types in humans;
 - i. Outline the possible genotypes for the A, B, AB and O Phenotypes (2 marks)
 - ii. Determine the genotype of the male parent and female parent below:
 - Male parent: Blood type B; Mother type O (2 marks)
 - Female parent: Blood type A; Father type B (2 marks)
- b) Predict the blood types of the offspring that this couple may have and the expected proportion of each (4 marks)
- c) What patterns of inheritance are shown by the genotypes above? (2 marks)
- d) Discuss the causes of genetic variations in organisms (8 marks)

QUESTION FOUR (20 MARKS)

Discuss, epistasis and pleiotropy exceptions to Mendelian law of inheritance. Give appropriate examples in each case.

QUESTION FIVE (20 MARKS)

Discuss the departures of Hardy Weinberg equilibrium other than natural selection



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AUGUST SESSION EXAMINATION FOR

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SBT 408: FOREST ECOLOGY

DATE: SCHOOL BASED

TIME:

INSTRUCTIONS TO CANDIDATES

Answer Question 1 (COMPULSORY) and any other two questions

Clearly illustrate your answer with well labelled diagrams as appropriate

QUESTION ONE (30 MARKS)

- a) Using diagrams describe vertical and horizontal forest structure (3 marks)
- b) Describe forest snag and forest edge (3 marks)
- c) Outline three living components of a forest ecosystem (3 marks)
- d) Explain the factors that determine the distribution of forests (3 marks)
- e) Describe three characteristics of forest ecosystems (3 marks)
- f) Distinguish between the following terms (1 mark each)
 - i. Species richness and species abundance
 - ii. Anemochory and Autochory
 - iii. Zonation and succession
- g) Discuss the three classes of crown (3 marks)
- h) Outline the characteristics of Tropical Rain Forest (3 marks)
- i) Discuss the advantages of a complex ecosystem over a simple ecosystem (3 marks)
- j) State the steps involved in Environmental Impact Assessment (EIA) (3 marks)

QUESTION TWO (20 MARKS)

- a) Describe energy flow in a forest ecosystem (10 marks)
- b) Discuss *insitu* and *exsitu* conservation of forests (10 marks)

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QUESTION THREE (20 MARKS)

Discuss the role of abiotic factors in forest ecosystem

QUESTION FOUR (20 MARKS)

- a) Describe how sustainable forest management (SFM) can be used in forest conservation (10 marks)
- b) Describe the effects of natural disturbance on forest (10 marks)

QUESTION FIVE (20 MARKS)

- a) Using illustrations,, explain the process of succession in a forest ecosystem (10 marks)
- b) Discuss the importance of forests (10 marks)