



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

THIRD YEAR FIRST SEMESTER EXAMINATION FOR
BACHELOR OF SCIENCE (ANALYTICAL CHEMISTRY)

SZL 306: HUMAN BIOLOGY

DATE: 11/8/2021

TIME: 2:00 – 4:00 PM

INSTRUCTIONS

Answer Question One and Any Other Two Questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Explain the role of calcium in human physiological mechanisms (3 marks)
- b) Explain three complications that may arise as a result of severe insulin deficiency (3 marks)
- c) Explain the effects of a sympathetic stimulation of the heart (3 marks)
- d) Explain why endometriosis may increase a woman's risk of infertility (3 marks)
- e) Describe three factors that facilitate the exchange of gases between venous blood and the respiratory structures in the lungs (3 marks)
- f) Explain the kind of disorder you would expect from a vegetarian woman who experiences heavy menstrual flow (3 marks)
- g) Describe how hormones regulate kidney function (3 marks)
- h) Explain the significance of the delay of impulse at the AV node (3 marks)
- i) The following values were obtained in an experiment
 - Vital capacity – 3 litres
 - Inspiratory reserve volume – 2 litres
 - Expiratory reserve volume – 0.5 litres
 - Residual volume – 1 litre
 - Hourly respiratory movements – 960
 - Heart rate – 1 beat per second
 - End diastolic volume – 80 ml
 - End systolic volume – 20 ml

From the data above, calculate the following: (3 marks)

- i. Tidal volume
- ii. Total Lung capacity
- iii. Cardiac output

- j) Describe three factors that facilitate ultra-filtration in mammalian urine production (3 marks)

SECTION B: ANSWER ANY OTHER TWO QUESTIONS

QUESTION TWO (20 MARKS)

Explain how the mammalian lung is adapted to facilitate oxygen filtration from air to blood.

QUESTION THREE (20 MARKS)

Discuss the role of accessory organs in digestion.

QUESTION FOUR (20 MARKS)

Discuss:

- i) Homeostatic role of the kidney (10 marks)
- ii) how the human body rids itself of metabolic wastes (10 marks)

QUESTION FIVE (20 MARKS)

Discuss the significance of hormones in human reproduction.