TEVETA

Technical Education, Vocational and Entrepreneurship Training Authority

DIPLOMA IN BIOMEDICAL ENGINEERING

LEVEL 6 YEAR III EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: NOVEMBER/DECEMBER 2025

SUBJECT: MEDICAL INSTRUMENTATION II

TIME: THREE (3) HOURS **TOTAL MARKS: 100**

PASS MARK: 50

INSTRUCTIONS TO CANDIDATE

1. Write your Examination number and National Registration Card (NRC) number on the answer booklet provided. Ensure you append your signature in the space provided on the answer booklet.
2. Write the ANSWER SCRIPT SERIAL NUMBER on the examination register and on the entry slip.
3. There are EIGHT (8) questions in this paper. Question one (1) is compulsory; answer FOUR (4) questions from the remaining SEVEN (7) questions.
4. Diagrams may be used where necessary to clarify your answer.
5. Cell phone and programmable calculators are not allowed in the examination room

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

QUESTION 1 (COMPULSORY)

a) State **five (5)** components of an ultrasound machine [5 marks]

b) Explain **four (4)** advantages of an ultrasound machine when compared to other imaging machines. [8 marks]

c) Draw a weekly preventive maintenance schedule for the ultrasound machine. [7 marks]

[TOTAL MARKS 20]

QUESTION 2

a) State **five (5)** uses of an infant incubator [5 marks]

b) Describe the solutions to the following faults in an infant incubator:

i) Burnt heating element [4 marks]

ii) Defective thermostat [4 marks]

iii) Fan making noise [4 marks]

iv) Torn sleeves [3 marks]

[TOTAL MARKS 20]

QUESTION 3

a) Differentiate between a compound microscope and a stereo microscope. [6 marks]

b) Describe the function of the following components of a microscope:

i) Objective lens [2 marks]

ii) Condenser lens [3 marks]

iii) Stage of a microscope [3 marks]

c) Troubleshoot the following problems in a laboratory microscope by stating **three (3)** possible causes:

i) Blurry image [3 marks]

ii) Microscope not coming on [3 marks]

[TOTAL MARKS 20]

QUESTION 4

a) State **five (5)** components of a radiant warmer [5 marks]

b) Explain **three (3)** functions of a radiant warmer [6 marks]

c) Describe **three (3)** modes of operation of a radiant warmer [9 marks]

[TOTAL MARKS 20]

QUESTION 5

a) State **six (6)** components of a dialysis system [6 marks]

b) Explain **three (3)** functions of a kidney [6 marks]

c) Describe the following filter processes of a dialysis system:

i) Diffusion of solutes [4 marks]

ii) Ultrafiltration [4 marks]

[TOTAL MARKS 20]

QUESTION 6

a) Explain **five (5)** vital parameters measured by a patient monitor [10 marks]

b) Describe **five (5)** common faults associated with patient monitors [10 marks]

[TOTAL MARKS 20]

QUESTION 7

a) Define centrifugation [2 marks]

b) Explain the use of the following in the medical laboratory:

i) Centrifuge. [2 marks]

ii) Tachometer [2 marks]

c) Describe the function of the following centrifuge machine components:

i) Motor [3 marks]

ii) Rotor [3 marks]

iii) Control panel [3 marks]

iv) Latch [3 marks]

v) Lid [2 marks]

[TOTAL MARKS 20]

QUESTION 8

a) Define an insufflator [2 marks]

b) State **two (2)** medical gases used during insufflation [2 marks]

c) Explain **eight (8)** common user errors associated with the use of foetal heart rate monitors. [16 marks]

[TOTAL MARKS 20]