TEVETA

Technical Education, Vocational and Entrepreneurship Training Authority

DIPLOMA IN BIOMEDICAL ENGINEERING TECHNOLOGY

LEVEL 6 YEAR II EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: JULY/AUGUST 2025

SUBJECT: MEDICAL GASES

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. Answer FIVE (5) questions.
4. Diagrams may be used where necessary to clarify your answer.
5. Cell phones and programmable calculators are not allowed in the examination room.

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

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QUESTION 1

a) Explain the application of the following gases in medicine:
   i) Oxygen. [3 marks]
   ii) Nitrous oxide. [3 marks]
   iii) Argon. [3 marks]
   iv) Nitrogen. [3 marks]

b) Describe **four (4)** properties of Nitrous Oxide. [8 marks]

[TOTAL MARKS 20]

QUESTION 2

a) Explain the procedure of disconnecting the pressure regulator from the cylinder. [8 marks]

b) Outline six (6) procedure for purging a pressure regulator using the cross purge assembly. [6 marks]

c) Describe the evaluation process of pressure regulators in ensuring proper function and performance. [6 marks]

[TOTAL MARKS 20]

QUESTION 3

a) Explain the function of the pressure relief valve. [4 marks]

b) Describe the **three (3)** types of pressure relief valves. [9 marks]

c) Draw a well labeled diagram of a pressure relief valve. [7 marks]

[TOTAL MARKS 20]

QUESTION 4

a) Compare the colour codes for medical gas pipelines in hospital in the United States and the ISO 32:1977 standard for the following gases:
   i) Oxygen. [2 marks]
   ii) Nitrogen. [2 marks]
   iii) Carbon dioxide. [2 marks]
   iv) Nitrous oxide. [2 marks]

b) Indicate accessories of the medical gas cylinders. [6 marks]

c) Explain the safety considerations when using medical gas cylinders. [6 marks]

[TOTAL MARKS 20]

QUESTION 5

a) Describe **five (5)** identification labels found on the medical gas cylinders. [10 marks]

b) Explain hydrostatic testing of gas cylinders. [5 marks]

c) Identify sizes of gas cylinders approved for medical purposes. [5 marks]

[TOTAL MARKS 20]

QUESTION 6

a) Explain the function of the pressure regulator. [5 marks]
b) Describe the working principle of the pressure regulator. [5 marks]
c) Outline the procedure for connecting a pressure regulator to a medical gas cylinder. [10 marks]

[TOTAL MARKS 20]

QUESTION 7

a) Explain the causes of low or inadequate pressure in the gas lines. [14 marks]
b) Describe the functions of the following in a gas supply line:
   i) Pressure alarms. [3 marks]
   ii) Gauge. [3 marks]

[TOTAL MARKS 20]

QUESTION 8

a) Explain the safety considerations when using the following gases.
   i) Oxygen. [4 marks]
   ii) Nitrogen. [3 marks]
   iii) Nitrous oxide. [3 marks]
b) Describe the safety considerations when using the manifold system. [10 marks]

[TOTAL MARKS 20]