



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF MEDICAL ENGINEERING

BACHELOR OF TECHNOLOGY IN MEDICAL ENGINEERING

BTMD/SEPT 2016/S-JT

TMD 4202
DIAGNOSTIC & THERAUPEUTIC EQUIPMENT

2 hrs

INSTRUCTIONS TO CANDIDATES:

- This paper consists of **FIVE** questions
- Answer question **ONE COMPULSORY** and Attempt any Other **TWO**
- This paper consists of 3 printed pages

Question1

(COMPULSARY)

- (a) i) Differentiate between spirometry and Inductance plethysmography as a technique measurement of change in volume of the lung.
ii) Describe the function of the following medical devices
I) Diagnostic laparoscopy
II) Spirometry
(10 marks)
- (b) i) Draw a labelled diagram of membrane oxygenator in a cardiopulmonary bypass(CBP)
ii) Explain the principle of membrane oxygenator as applied in the diagram a(i)
(12 marks)
- (c) With the aid of a diagram, describe the interference technique therapy treatment
(8 marks)

Question2

- (a) i) Differentiate between bubble oxygenator and the membrane oxygenator in a cardiopulmonary bypass(CBP) .
ii) Describe the following systems of a heart lung machine.
I) Cardiotomy reservoir
II) Cardioplegia
III) Oxygenators
IV) Heat Exchanger
(12 marks)
- (b) Explain the principle of operation for ultrasound imaging machine.
(8 marks)

Question3

- (a) i) Illustrate with a labelled diagram the relationship between lung volumes and capacities
ii) Explain what is meant by air way pressure release ventilation (APRV)
(12 marks)
- (b) For each of the following symptoms in a ventilator machine, Outline any two possible causes and remedies:
i) the ventilator does not function when switched on

- ii) sounds as if it is running but it is not ventilating or giving inadequate ventilation

(8 marks)

Question4

- (a) Explain the principle of operation of a pulsed oximeter

(8 marks)

- (b)
 - i) State TWO advantages of flexible endoscope
 - ii) With the aid of structural diagram, describe the construction features of flexible endoscope

(12 marks)

Question5

- (a)
 - i) Describe the construction features of roller pump in an extracorporeal circulation.
 - ii) Outline five essential characteristics for a pump to be used in heart lung machine

(12 marks)

- (b)
 - i) Differentiate between continuous wave and pulsed wave Doppler units
 - ii) Write down a procedure to perform leak check of the breathing system of anaesthetic machine

(8 marks)