



# TECHNICAL UNIVERSITY OF MOMBASA

*Faculty of Engineering and Technology*

## DEPARTMENT OF MEDICAL ENGINEERING

### DIPLOMA IN MEDICAL ENGINEERING

DME/SEPT 2013/S-FT

ECL 2304

HOSPITAL LABORATORY 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) State any THREE factors which affects the sensitivity of a glass electrode of a pH-meter  
(3 marks)
- (b) i) With reference to deionisers, explain the cause of;  
i. Blocked resin bed  
ii. Exhausted resin bed  
ii) State a remedy for each of the following causes in b(i) startingng how each can be prevented  
(10 marks)
- (c) Describe the construction features of a water bath as used in the clinical laboratories  
(7 marks)
- (d) Describe with the aid of a block diagram the principle of operation of a flame photometer.  
(10 marks)

### Question2

- (a) i) Describe any one type of filter cartridge used in bacterial removal during water preparation  
ii) With the aid of a diagram, describe how the speed of a centrifuge may be controlled.  
(12 marks)
- (b) Differentiate between swing out head and angle heads of a centrifuge  
(8 marks)

### Question3

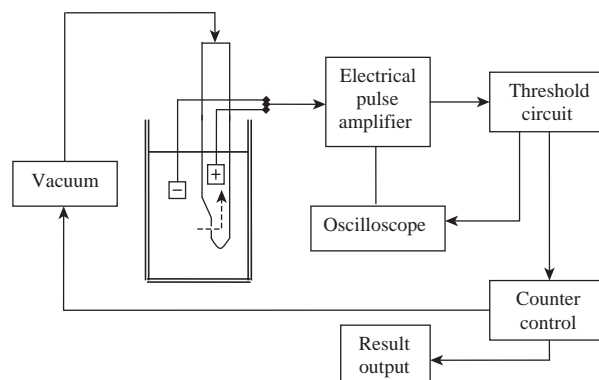
- (a) i) Differentiate between the following electrodes as used in pH meters  
i. References  
ii. Glass  
ii) Draw a labelled block diagram of a calorimeter and explain the fuction of each block  
(8 marks)
- (b) i) Outline any FOUR common causes of malfunction of spectrophotometers  
ii) With the aid of a diagram, explain the principle of diffraction granting in spectrophotometers

(12 marks)

#### Question4

- (a) State any TWO possible causes of a photometer with a drift in water-blank reading.

(2 marks)



- (b) i) Describe the principle of operation of equipment in figure 1  
ii) Explain how the equipment in b(i) differentiates cell types from each other in blood

(12 marks)

- (c) i) State any **two** essential parts of a centrifuge  
ii) Explain the principle of *Centrifuge Force*

(6 marks)

#### Question5

- (a) For each of the following symptoms in a PH meter, outline any **one** possible fault and one corrective measure to be taken to rectify the fault;

- i) erratic readings
- ii) no response to buffer solution
- iii) sluggish response

- (b) Outline any **three** maintenance procedures performed every six months for water baths

(12 marks)

- (c) With the aid of a diagram explain the principle operation of microhaematocrit centrifugation

(8 marks)