



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF MEDICAL ENGINEERING

DIPLOMA IN MEDICAL ENGINEERING

DME/SEPT 2013/S-PT

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) i) State any TWO principles used in Blood Cell Analysers
ii) Outline any FOUR maintenance procedure performed on flame photometer
(10 marks)
- (b) i) Explain the principle of diffraction grating in spectrophotometers
ii) Outline any THREE common photosensitive detectors system used in photometers
(12 marks)
- (c) Describe the following balances in medical laboratory:
i) Rough balances (mechanical balances)
ii) Analytical balances
(8 marks)

Question2

- (a) With the aid of a labelled diagram, describe the construction of calomel reference electrode.
(10 marks)
- (b) Explain the procedure of ascertaining that the reference electrode is at fault when pH-meter gives inaccuracy or sluggish response, unstable readings or off-scale readings
(10 marks)

Question3

- (a) The following symptoms were encountered in a low temperature incubator,
i) The temperature readings are erratic. (It is higher or lower than selected)
ii) The temperature in the incubation chamber is uniform, but higher than selected
iii) The compressor does not function although the cooling LED is on
Outline any ONE cause and remedial measures.
(6 marks)
- (b) i) State the beer-Lambert's law
ii) Write the maintenance of the following parts of the semi-automated Blood Cell Counters:
i. Sensing Zone
ii. Manometer
iii. Vacuum System

- iii) Outline FOUR sources of errors in a Semi-automated Blood Cell Counters:
(14 marks)

Question4

- (a) i) State any TWO possible causes of a photometer with a drift in water-blank reading.
ii) State four daily routine maintenance procedure performed in mechanical balances in a laboratory
(6 marks)
- (b) i) Outline any four maintenance procedure performed every six months for water bath
ii) Explain how "salt error" occurs in the application of pH- meters and state its significance in pH measurement
(14 marks)

Question5

- (a) i) Explain the principle of *Centrifuge Force*
ii) With the aid of a diagram, explain the difference between swing out head and angle heads of a centrifuge
(14 marks)
- (b) In regular maintenance practice the following faults were noted on a photometer;
i) drift in water-blank reading
ii) water blank reading fluctuates and cannot be set to zero
iii) reagent blank reads less than water blank
State any TWO possible causes.
(6 marks)