Name :	
Roll No. :	Andrew O'Canside Instant

Invigilator's Signature :

CS/B.Tech(BME)/SEM-5/BME-503/2011-12

2011

ANALYTICAL & DIAGNOSTIC EQUIPMENT

Time Allotted : 3 Hours

Full Marks: 70

The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.

GROUP – A (Multiple Choice Type Questions)

1. Choose the correct alternatives for the following :

 $10 \times 1 = 10$

- i) The test performed to measure the lung abnormalities is known as
 - a) Spirometry b) Audiometry
 - c) Angioplasty d) Ultrasonography.
- ii) Doppler shift phenomenon is observed in the
 - a) ultrasonic blood flow meter
 - b) spirometer
 - c) pacemaker
 - d) hemocytometer.

[Turn over

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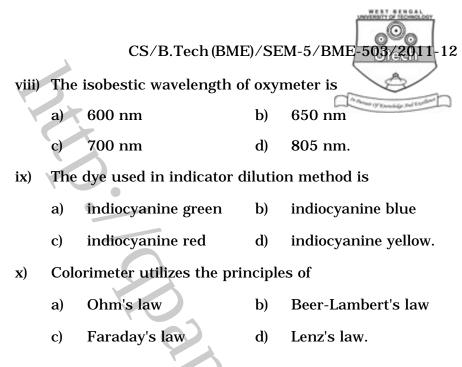
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- iii) The secondary electrons which provide topographical information are
 - a) auger electrons

b) backscattered electrons

- c) both (a) and (b)
- d) none of these.
- iv) Coulter counter method of blood cell counting may also be called
 - a) optical method b) microscopic method
 - c) conductivity method d) none of them.
- v) A combination electrode which measures blood pH and gases is called
 - a) Clark-Severinghaus electrode
 - b) Ag-AgCl electrode
 - c) Clark PO₂ electrode
 - d) Polarographic electrode.
- vi) The reference gas of flame photometer contains
 - a) calcium salt b) lithium salt
 - c) magnesium salt d) potassium salt.
- vii) Hollow cathode lamp is used in
 - a) colorimeter
 - b) flame photometer
 - c) spectrophotometer
 - d) atomic absorption photometer.



GROUP - B

(Short Answer Type Questions)

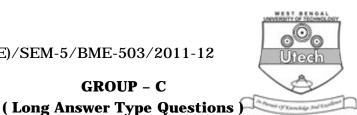
Answer any *three* of the following. $3 \times 5 = 15$

- 2. With the help of a suitable diagram, explain the functioning of the Scanning Electron Microscope. 5
- Derive the equation for Beer-Lamberts law and explain the principle of Spectrophotometry based on Beer-Lamberts law.
- 4. Describe the Clark method of pO $_2$ measurement. 5
- 5. Explain the clinical importance of direct blood pressure measurement. Describe the direct method of blood pressure measurement. 1 + 4
- 6. What is monochromator ? Mention the major components of autoanalyzer and its clinical applications. 2 + 3
- 7. What are the important volumes and capacities of lungs ?What is Spirometer ?4 + 1

3

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GROUP - C



 $3 \times 15 = 45$

Answer any three of the following.

- 8. What are the different types of Pneumotachometers used to measure lung function? With the help of flow-volume curve explain the inspiration-expiration phenomenon in human lungs. What do you understand PEF, by FEV₁, FEF 25 - 75% ? 5 + 5 + 5
- How do you measure cardiac output using the dye 9. a) dilution method?
 - What is a Flame photometer ? Explain with the help of b) a neatly labelled diagram.
 - How is fibre optics endoscope used in vivo diagnosis c) and treatment of different diseases ? 5 + 5 + 5
- 10. What is the significance of blood cell counting ? Describe the Automatic Optical method of blood cell counting with a 3 + 7 + 5neat diagram.
- 11. Explain the basic principle of oximetric measurement. Describe the pulse oximeter with a neat sketch. What is impedance Pneumometer? 5 + 8 + 2
- 12. What is plethysmographs? How can they be used for measurement of intrathoracic pressures ?____ Explain the methods for airway resistance measurement. 1 + 7 + 7
- 13. Explain the basic principle of electromagnetic blood flow meter. Describe the transit-time (ultrasonic) or Doppler 6 + 9shift blood flow meter with proper sketch.