



Name :

Roll No. :

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 × 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.



- 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 - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

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 by PEF, FEV₁, FEF_{25-75%} ? $5 + 5 + 5$
9. a) How do you measure cardiac output using the dye dilution method ?
b) What is a Flame photometer ? Explain with the help of a neatly labelled diagram.
c) How is fibre optics endoscope used *in vivo* diagnosis 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 neat diagram. $3 + 7 + 5$
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 shift blood flow meter with proper sketch. $6 + 9$