

Name :

Roll No. :

Invigilator's Signature :

CS/B.TECH/BME(N)/SEM-5/BME-502/2012-13

2012

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 any *ten* of the following :

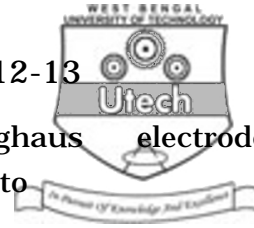
10 × 1 = 10

i) The ratio of aperture length to diameter of the aperture of coulter counter is recommended as

- | | |
|-------------|-------------|
| a) 0.25 : 1 | b) 0.50 : 1 |
| c) 0.75 : 1 | d) 1 : 1. |

ii) The glass bulb thickness of blood pH meter is

- | | |
|------------|-----------|
| a) 0.01 mm | b) 0.1 mm |
| c) 1 mm | d) 10 mm. |



iii) Teflon membrane of Severinghaus electrode (pCO₂ electrode) is only permeable to

- a) H⁺
- b) dissolved CO₂
- c) dissolved O₂
- d) HCO₃⁻.

iv) The isobestic wavelength of oxymeter is

- a) 600 nm
- b) 650 nm
- c) 700 nm
- d) 805 nm.

v) The dye used in indicator dilution method is

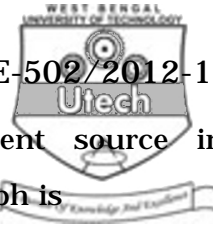
- a) Indiocyanine green
- b) Indiocyanine blue
- c) Indiocyanine red
- d) Indiocyanine yellow.

vi) In fibre optic based blood gas analyzer, Perylene dibutyrate dye is used for the measurement of

- a) pH
- b) pCO₂
- c) pO₂
- d) both pH, pCO₂ and pO₂.

vii) Endoscopy which involves examination of gullet, stomach, upper small intestine is called

- a) cystoscopy
- b) arthroscopy
- c) colonoscopy
- d) gastrosopy.



- viii) The value of the constant AC current source in plethysmograph/impedance pneumograph is
- a) 0.1 mA, 100 Hz b) 1 mA, 100 kHz
c) 10 mA, 400 kHz d) 100 mA, 400 kHz.
- ix) The logic processor of automatic recognition and cell counting system recognize the each picture element by
- a) 'ON' status
b) 'OFF' status
c) 'ON' and 'OFF' status
d) 'SIZE' and 'SHAPE' status.
- x) Hollow cathode lamp is used in
- a) atomic absorption photometer
b) colorimeter
c) flamephotometer
d) spectrophotometer.
- xi) The light source of endoscopic equipment is
- a) hydrogen or deuterium discharge lamp
b) Nernst filaments or tungsten lamp
c) xenon arc or halogen-filled tungsten filament lamp
d) mercury vapour lamp.
- xii) The reference gas of flame photometer contains
- a) Calcium salt b) Lithium salt
c) Magnesium salt d) Potassium salt.



GROUP - B

(Short Answer Type Questions)

Answer the following.

3 × 5 = 15

2. What is monochromator ? Mention the major components of auto analyzer and its clinical applications. 2 + 3
3. What are the important volumes and capacities of lungs ? What is Spirometer ? 4 + 1
4. Describe the illumination of endoscope. Briefly mention the various endoscopic applications. 2 + 3

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following.

3 × 15 = 45

5. Describe the pH measurement procedure using glass electrode with a neat sketch. Describe the Severinghaus method of pCO₂ measurement. 8 + 7
6. Explain the basic principle of oximetric measurement. Describe the pulse oximeter with a neat sketch. What is Pneumotachometer ? 5 + 8 + 2
7. Describe the cardiac output measurement by impedance technique. Describe the coulter counter with a neat sketch. 7 + 8
8. Describe the measurement procedure of ultrasonic blood flowmeter. Explain the working of atomic absorption spectrophotometer and mention its clinical applications. 7 + 8
9. Describe the measurement procedure of specific direct method of blood pressure monitor. Explain the working procedure of fibre optic based blood gas sensors. 7 + 8

