[98]

SEAT No._____

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SARDAR PATEL UNIVERSITY

M.Sc. (ELECTRONICS) FIRST SEMESTER EXAMINATION

SUBJECT: ANALYTICA AND BIOMEDICAL INSTRUMENTS

PAPER: PS01EELE21

DATE: Monday, 29th October, 2018

TIME: 10:00 A.M. to 1:00 P.M.

TOTAL MARKS: 70

Q-1 Multiple choice questions. 8x1=8 [08]

1 Glass materials for prism construction which are found most suitable in the infrared region is

(a) 300 mμ to 2μ (b) 800 mμ to 3μ

(c) 600 mμ to 6μ (d) 200 mμ to 9μ

2 In photo emissive tube, potassium-silver oxide cells are sensitive to

(a) Visible range (b) Ultraviolet range

(c) Far IR range (d) Near IR range

3 Which of these effects results from slow injection of a small sample volume?

(a) Increase resolution (b) Decrease resolution

(c) Non-linear detector response (d) Between (b) and (c)

4 Which type of column has the greater efficiency and resolution

(a) Packed column (b) Open packed column

(c) Closed packed column (d) Capillary column

5 Kidney works with

(a) Neurons (b) Medula

(c) Nephrons (d) None of the above.

6 Material for negative temperature coefficient of thermistor like

(a) Thorium oxide (b) Rare earth oxide

(c) Indium antimonide (d) Sintere metal oxide

7 The Nernst filament composed of fused rare earth oxides of

(a) Zirconium (b) Yttrium

(c) Platinum (d) both (a) and (b)

8 In sonography machine, the range of Ultrasound is

(a) 10 MHz (b) 15 MHz

(c) 20 MHz (d) 25 MHz

[P.T.O.]

Q-2 Short question. (Answer any 7) [14]
7x2=14

1 What is the significant of stable reference electrode in pH measurement?

2 Define the term Polarization, Depolarization and Re-polarization of the muscle cell.

3 Draw and label the Einthoven Triangle in Cardiac.

4 In NMR spectroscope, The splitting of energy level when nuclei is placed in magnetic field. why?

5 State the factor that depends on the retardation time of gas chromatography

6 What are the important considerations for selecting the carrier gas in gas chromatography?

7 State the factor which governs the design of the electrode in pH meter.

8 Enlist the advantages and disadvantages of HPLC.

9 Why the Atomic Absorption Spectrophotometer gives line spectra?

Q-3 [a] State the different types of thermal detector used in Infrared spectrophotometer and explain any one of them. [06]

Q-3 [b] Enlist the different types of ultraviolet source and detector and explain any one of them in each. [06]

OR

Q-3 [b] Explain the principle of pH measurement. Draw the functional block diagram of Null detector type pH meter using an electrometer tube and explain how its works. [06]

Q-4 [a] What is chromatograph? Describe the constructional details of gas chromatograph and roll of column in gas chromatograph. Enlist the advantages and disadvantages of its. [06]

Q-4 [b] Sketch the schematic diagram of liquid chromatography and explain the function of mobile/stationary phase, cherecteristic and mechanism for elemental separation carried out in liquid chromatograph. [06]

OR

Q-4 [b] What Nuclear Magnetic Resonance? Describe the constructional details of NMR spectrophotometer. [06]

Q-5 [a] Discuss in detail the requirements of Biopotential Amplifier in ECG machine. [06]

Q-5 [b] Describe the requirements for ECG leads and equipment for calibration of the ECG machine. [06]

OR

Q-5 [b] Explain the working principle of sphygmomanometer for blood pressure measurement. [06]

Q-6 [a] Explain the different types of modes for transmission of ultrasound in sonography machine. [06]

Q-6 [b] Explain how kidney removes the waste product along with nephron structure. [06]

OR

Q-6 [b] Enlist the applications of sonography and explain any one of them. [06]

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