SC

[494A-19] SEAT No._____ No. of Printed pages: 2

SARDAR PATEL UNIVERSITY

T. Y. B. Sc. Examination (CBCS) (VI SEM)
US06CINV04 – Spectroscopy & Biomedical Instrumentation
Monday, 2nd April, 2018, Time:10: 00 am to 1:00 pm

Total Marks: 70

Note: The figures to the right indicate maximum marks.

Q-1. ***Multiple Choice Questions-*** [10]

(1) High transmittance at desired wavelength and low transmittance at other wavelength is requirement for
(a) detector (b) sample (c) optical filter (d) none

(2) The wavelength of ultraviolet light is
(a) below 300nm (b) from 300nm to 500nm (c) above 600nm (d) none of these

(3) Tungsten lamp emits light in the ..... range.
(a) X-ray (b) Visible (c) Microwave (d) Cosmic

(4) Earth oxides are used in
(a) Globar Rod (b) Nernst Filament (c) Nichrome Strip (d) none of them

(5) Pellet type is sample handling technique for
(a) Liquid (b) Gas (c) Plasma (d) Solid

(6) The most commonly used window material in IR range is
(a) NaCl (b) CO_2 (c) BaF (d) SiGe

(7) If the thermocouple is made up of Chromel-Alumel, it is of ..... type.
(a) J (b) K (c) T (d) S

(8) Information regarding relative cell size is obtained by
(a) centrifuge (b) coulter counter (c) inhibitor (d) none

(9) Amplitude of P wave is about ...
(a) 1.60mV (b) 0.25mV (c) 70mV (d) -20mV

(10) Flow of blood in heart is example of ..... signal.
(a) bioacoustic (b) biochemical (c) bio-optical (d) bioelectric

Q-2. ***Short answer type (attempt any ten)*** [20]

(1) What is constructive and destructive interference?

(2) State Beers law and write the equation with all interpretations.

(3) What type of Instrument related errors occur in Spectrometer?

(4) What is Littrow mounting infrared monochromator?

(5) List the materials used for prism construction.

(6) What are the limitations of Photomultiplier tube?

(7) Write the principle of Bolometer.

(8) State empirical laws to accurately measure temperature by thermoelectric means.

(9) List the advantages of Thermistor.

(10) What do you understand by systolic and diastolic pressure?

(11) What are different types of electrodes and where they are used?

(12) What is the function of stimulators used in EMG machines?

Q-3. (a) Write a note on High Vacuum Photo emissive cell. [5]

(b) Explain the function of prism mono chromator with neat diagram. [5]

OR

Q-3. (a) Describe single beam filter photometer. [5]

(b) Explain Photomultiplier tube as detector. [5]

Q-4. (a) Discuss Golay's Pneumatic Cell [5]

(b) With block diagram explain Optical Null type double beam Infrared spectrophotometer. [5]

OR

Q-4. (a) Write a note on IR Radiation sources. [5]

(b) Draw optical arrangement diagram of IR spectrometer and explain. [5]

Q-5. (a) Draw block diagram of Man-Instrument System and explain its components with sources of Biomedical signals. [5]

(b) Describe Electrical Resistance Thermometer. [5]

OR

Q-5. (a) Explain principle of Coulter counter. [5]

(b) How does of Optical Fiber Sensors work? [5]

Q-6. (a) Explain indirect method of Blood Pressure Measurement. [5]

(b) Draw neat block diagram of Electro-Encephalograph machine and explain its preamplifier circuit. [5]

OR

Q-6. Discuss the basic principle of Bio-potential generation with sequential figures and PQRS complex graph. Also define the terms: Resting Potential and Action Potential. [10]

(2)