

[57/A-13]

SEAT No. _____

No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGR- 388120

T. Y. B. Sc. (Instrumentation Voc.) Examination
US06CINV04 – Spectroscopy & Biomedical Instrumentation
Monday, 1st April, 2019, Time:10: 00 A.M. to 1:00 P.M.

Total Marks: 70

Note: The figures to the right indicate maximum marks.

Q-1. Multiple Choice Questions- [10]

- (1) In equation, $E = hv$, v represents
(a) wavelength (b) velocity of light (c) energy (d) frequency
- (2) The wavelength range of visible light is
(a) below 400nm (b) from 400nm to 700nm (c) above 700nm (d) none of these
- (3) Mull technique in IR spectroscopy is used for..... sample handling.
(a) liquid (b) solid (c) gas (d) all
- (4) Silicon carbide is used in.....
(a) Globar Rod (b) Nernst Filament (c) Nichrome Strip (d) none of them
- (5) The measurement of Glavanic skin resistance is example of signal
(a) biochemical (b) bioimpedance (c) bio-optical (d) biomechanical
- (6) ECG is based on signals.
(a) bioacoustic (b) biochemical (c) bio-optical (d) bioelectric
- (7) If the thermocouple is made up of Copper-Constantan, 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) medium is immune to cross talk.
(a) copper cable (b) waveguides (c) strip line (d) optical fiber
- (10) Energy source for biomedical stimulation is
(a) plotter (b) ultrasound (c) printer (d) optical fiber

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

- (1) What type of Instrument related errors occur in Spectrometer?
- (2) Draw the neat labeled block diagram of Absorption instruments.
- (3) What is Littrow mounting infrared monochromator?
- (4) Write the principle of Pyroelectric detector.
- (5) List the materials used for prism construction.

(1)

(P.T.O.)

- (6) What are the limitations of Photomultiplier tube?
- (7) Enlist advantages of Optical fibers.
- (8) State empirical laws to accurately measure temperature by thermoelectric means.
- (9) Enlist advantages of Thermistor.
- (10) Draw neat labeled diagram of man machine interface.
- (11) What is the use of skin and needle electrodes?
- (12) What is the use of EEG machine?
- Q-3. (a) Explain the function of prisms and gratings in spectroscopy with neat diagram. [5]
 (b) Explain Photovoltaic cell. [5]
- OR
- Q-3. (a) Describe double beam filter photometer. [5]
 (b) Write a note on UV-VIS Radiation sources. [5]
- Q-4. (a) Draw optical arrangement diagram of IR spectrometer and explain. [5]
 (b) Describe Golay's Pneumatic Cell. [5]
- OR
- Q-4. (a) Write a note on IR Radiation sources. [5]
 (b) With block diagram explain Optical Null type double beam Infrared spectrophotometer. [5]
- Q-5. (a) Describe automatic optical method for cell counting. [5]
 (b) Discuss in brief types of Optical Fiber Sensors. [5]
- OR
- Q-5. (a) Explain principle of Coulter counter with neat diagram. [5]
 (b) Discuss errors in Electronic counters. [5]
- Q-6. (a) Draw neat block diagram and write a note on Electrocardiograph. [5]
 (b) Explain Blood Pressure measurement technique. [5]
- OR
- Q-6. Describe Bio-potential generation with sequential figures explaining PQRS graph. Also define the terms: Resting Potential and Action Potential. [10]

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 (2)