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SEAT No. \_\_\_\_\_

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SARDAR PATEL UNIVERSITY  
Semester VI, T.Y.B.Sc. Examination  
Thursday, April-4<sup>th</sup>, 2019  
Time: 10.00 am To 01.00 pm  
Instrumentation Course Code: USO6CINS06  
Course title: Analytical and Bio - Medical Instrumentation

Maximum Marks: 70

Q-1 Write answers to the following multiple choice questions in your answer book by selecting the [10]  
proper option.

- (1) To obtain a mass spectrum, the electric field is kept between  
(a) 50 - 70 V (b) 60 - 70 V (c) 50 - 60 V (d) 30 - 50 V
- (2) In NMR angular momentum associated with the spin is \_\_\_\_.  
(a)  $nh/2\pi$  (b)  $2\pi/nh$  (c)  $n\pi/2h$  (d)  $2h/n\pi$
- (3) What is the equation of an alternative plotting calibration curve?  
(a)  $C = K + A$  (b)  $C = K \cdot A$  (c)  $C = K - A$  (d)  $C = K/A$
- (4) Gas-filled photo-emissive cell consists of small quantities of inert gas like \_\_\_\_.  
(a) Neon (b) Argon (c) Krypton (d) Xenon
- (5) The diagnostically useful frequency range of Electrocardiograph is usually \_\_\_\_.  
(a) 0.01 to 140 Hz (b) 0.10 to 150 Hz (c) 0.05 to 150 Hz (d) 0.25 to 70 Hz
- (6) In the absorption instruments, as a detecting system, \_\_\_\_ is used.  
(a) photo emissive tube (b) photovoltaic tube  
(c) photomultiplier tube (d) phototransistor
- (7) The full form of ECG is  
(a) Electromyogram (b) Electrooculogram  
(c) Electrohysterogram (d) Electrocardiogram
- (8) The sample handling techniques, \_\_\_\_ window material is commonly used.  
(a) KCl (b)  $AgCl_2$  (c)  $CaCl_2$  (d) NaCl
- (9) In liquid cells, the rate of transmittance lies between \_\_\_\_.  
(a) 5 to 10 % (b) 15 to 70 % (c) 70 to 95 % (d) 10 to 15 %
- (10) The full form of EMG is  
(a) Electromyogram (b) Electric memography  
(c) Electromagnetic graph (d) Electro memogram

Q-2 Answer the following questions in brief. (Answer any ten questions)

[20]

- (1) Draw the figure of photovoltaic cell.
- (2) Enlist the types of monochromators.
- (3) Enlist the types of optical filters.
- (4) Enlist the factors on which principle of NMR is based.
- (5) Enlist the types of detectors.
- (6) Draw the figure of NMR instrument.
- (7) Draw the block diagram of ECG machine.
- (8) Define systolic and diastolic pressure.
- (9) Draw the block diagram of EEG machine.
- (10) Define resting potential.
- (11) Write a note on optical filter.
- (12) Write a brief note on gas cell.

P.T.O.

(1)

- Q-3 What is Beer Lambert's law? Explain in detail. Why the deviation in Beer Lambert's law occurs? [10]  
OR
- Q-3 (a) Explain photomultiplier tube. [5]  
(b) Explain the photovoltaic cell with necessary figure. [5]
- Q-4 (a) Write a note on pneumatic detector. [5]  
(b) Explain in detail Gas Cell. [5]  
OR
- Q-4 (a) Explain pre-amplifier for use with photoconductive infrared detector. [5]  
(b) Explain in detail Quantum type detector. [5]
- Q-5 What is mass spectrometer? Explain the working and principle of magnetic deflection mass spectrometer. [10]  
OR
- Q-5 With necessary diagram explain the working and principle of NMR. [10]
- Q-6 (a) Write a note on frequency response and damping adjustment of the fluid filled Catheters. [5]  
(b) Write a note on ECG. [5]  
OR
- Q-6 (a) Write a note on Electroencephalography (EEG). [5]  
(b) Discuss the origin of Bio-electric signals. [5]

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