

[A-57]

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**SARDAR PATEL UNIVERSITY**  
**T.Y.B.Sc. Examination, SIXTH Semester**  
**Saturday, 9<sup>TH</sup> April 2016**  
**Time : 02.30 pm To 05.30 pm**  
**Instrumentation Course Code : USO6CINS06**  
**Course Title : Analytical and Biomedical Instrumentation**

**Total Marks : 70**

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

- (1) In the interference filter, the transparent film is made up by \_\_\_\_.  
(a) gold (b) copper (c) silver (d) nickel
- (2) \_\_\_\_ Hz is the frequency range of alpha( $\alpha$ ) state.  
(a) 0.5 - 4 (b) 4 - 8 (c) 8 - 13 (d) 13 - 22
- (3) In absorption instruments, as a detecting system, \_\_\_\_ is used.  
(a) phototube (b) Hg tube (c) photomultiplier (d) Ag tube
- (4) In the Beer-Lambert's law, the absorbance (A) in the solution is given as  
(a)  $A = \epsilon bc / K$  (b)  $A = \epsilon cb$  (c)  $A = \epsilon cb / T$  (d)  $A = K \epsilon c / b$
- (5) In the sample handling techniques, \_\_\_\_ window material is commonly used.  
(a) NaCl (b) KCl (c) AgCl<sub>2</sub> (d) CaCl<sub>2</sub>
- (6) The source of radiation in IR spectrometer is ideally a \_\_\_\_ radiator.  
(a) black body (b) white body (c) silver body (d) golden body
- (7) Gas cell contains path length of \_\_\_\_ cm.  
(a) 5 (b) 10 (c) 15 (d) 20
- (8) The full form of ECG is  
(a) electro cardio gram (b) electric carbon graphy  
(c) electro calibration gram (d) electro cardio graph
- (9) The Nernst filament is a small rod composed of fused rare oxides of Yttrium and \_\_\_\_.  
(a) Zn (b) Zr (c) Pt (d) Au
- (10) The sample holder of NMR spectrometer is generally having a diameter of \_\_\_\_.  
(a) 0.5 cm (b) 0.5 mm (c) 0.05 mm (d) 5 mm

**Q-2 Answer the following questions in brief. (Answer any Ten Questions) [20]**

- (1) Enlist the types of detectors for IR spectroscopy.
- (2) Enlist the parts of optical null method detectors.
- (3) Write a short note on optical filter.
- (4) Enlist the biomedical instruments.
- (5) Draw only the block diagram of EMG machine.
- (6) Define systolic & diastolic pressure.
- (7) Enlist the basic components of IR spectrophotometer.
- (8) Enlist the types of recording system in IR spectroscopy.
- (9) Enlist the basic components of NMR spectroscopy.
- (10) Enlist the various circulatory systems of our body.
- (11) Write a short note on chemical shift
- (12) What is the recording principle of ECG?

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- Q-3 (a) Explain photomultiplier tube. [5]  
(b) Write a note on interference filter. [5]

**OR**

- Q-3 Explain in detail the Beer-Lambert's law. Also explain how it deviates. [10]

- Q-4 (a) Write a note on pneumatic detector. [5]  
(b) Explain in brief the liquid cells. [5]

**OR**

- Q-4 (a) Write a note on pyroelectric detector. [5]  
(b) Write a short note on radiation sources. [5]

- Q-5 What is mass spectrometer? Explain in brief the types of mass spectrometers. Discuss the applications of it. [10]

**OR**

- Q-5 With necessary diagrams explain principle and construction of NMR. [10]

- Q-6 (a) Write a short note on direct methods of monitoring blood pressure. [5]  
(b) Write a note on bioelectric signals. [5]

**OR**

- Q-6 (a) Write a short note on EEG. [5]  
(b) Write a note on damping adjustment of the fluid. [5]

