B. Tech.
(SEM. VIII) EXAMINATION, 2006-07
ANALYTICAL INSTRUMENTATION

Time : 3 Hours] [Total Marks : 100

Note : Attempt all questions.

1. Attempt any four parts of the following : 5x4=20
   (a) What is a real time parallel analyser ? Discuss in brief.
   (b) State and explain "Beer Lambert's law.
   (c) How does the IR spectrophotometer work ? Describe in brief.
   (d) Discuss electromagnetic radiation, its properties and its interaction with matter in brief.
   (e) Enumerate some of the major / key applications of UV and IR photometry in brief.

2. Attempt any four parts of the following : 5x4 = 20
   (a) How do the IR (Infrared) spectrometers analyse various substances ? Discuss.
   (b) How is a grating created ? What are its specific features and where is this used ?
   (c) What is an emission spectrograph ?

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(d) What are various applications of mass spectroscopy? Discuss in brief?
(e) Introduce the concept of "Flame and flame temperatures". How is it used in spectroscopy?

3 Attempt any two of the following: \[10 \times 2 = 20\]
(a) What are energy dispersive instruments? Discuss its principle of working in brief.
(b) Introduce the ion sources in brief.
(c) Write a short note on non-dispersive instruments.

4 Attempt any two of the following: \[10 \times 2 = 20\]
(a) What are counters? What for and why are these used in nuclear radiation measurements?
(b) What are ionization chambers? How do these help in measuring radiation particles?
(c) Describe the properties of \(\alpha\)-particles, \(\beta\)-particles and \(\gamma\)-particles? in brief?

5 Write short notes on: (any two) \[10 \times 2 = 20\]
(a) Radiation detectors
(b) Air pollution monitoring instruments
(c) Mass spectrometry.

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