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53 (IE 505) ANIN

2017

ANALYTICAL INSTRUMENTATION

Paper : IE 505

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer **any five** questions out of **seven**.

1. (a) Explain the construction and working of a photomultiplier tube. 6
- (b) With a neat diagram, explain an absorption instrument. 6
- (c) With a neat diagram, explain flame photometer. 8
2. (a) Explain flame photometric and photo-ionization detectors in gas chromatography. 14

Contd.

- (b) With a neat block diagram, explain gas chromatography. 6
3. (a) Explain paramagnetic oxygen analyzer. 6
- (b) With a neat diagram, explain the following : $2 \times 7 = 14$
- (i) Thermal conductivity gas analyzer
- (ii) Nitrogen gas analyzer.
4. (a) Explain ion selective electrodes. 8
- (b) With a neat diagram, explain UV fluorescence method for measuring sulphur dioxide in air. 6
- (c) Explain gas analyzer based in gas density. 6
5. (a) Explain the principle of operation of mass spectrometer. 6
- (b) With a neat diagram, explain magnetic deflection and quadrupole mass spectrometers. 14

6. (a) Explain sample injectors used in gas chromatography. 6
- (b) Explain *two* types of reference electrodes. 6
- (c) Explain *any four* principles of operation in chromatography. 8
7. Write short notes on : 4×5=20
- (a) Double beam photometer
- (b) Liquid Chromatography
- (c) Flame ionization hydrocarbon detector
- (d) Halogen detector. 4×5=20
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