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**53 (IE 505) ANIN**

**2018**

**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. With a neat diagram, explain the following :  
20

- (i) Photomultiplier Tube
- (ii) Single beam photometer
- (iii) Atomic absorption spectrophotometer.

Contd.

2. With a neat diagram, explain the following detectors used in gas chromatography :

20

(i) Thermal conductivity

(ii) Flame photometric

(iii) Photo ionization.

3. With a neat diagram, explain the following gas analyzers :

20

(i) Paramagnetic

(ii) Thermal conductivity

(iii) Based on gas density.

4. (a) With a neat diagram, explain the following techniques for measuring  $\text{SO}_2$  in air :

14

(i) Flame photometric

(ii) UV fluorescence.

(b) Explain flame ionization technique for measuring hydrocarbons in air.

6

5. (a) Explain any two types of mass spectrometer. 14
- (b) Explain proportional counter. 6
6. (a) Explain fluorescence and mass detectors in liquid chromatography. 14
- (b) With a neat diagram, explain gas chromatography. 6
7. Write short notes on : 4×5=20
- (i) Glass electrode
- (ii) Absorption Instrument
- (iii) GC sample injectors
- (iv) Reference electrode.
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2. (a) Explain the two types of mass spectrometry.

(b) Explain the internal counter.

3. (a) Explain fluorescence and mass detectors in liquid chromatography.

(b) With a neat diagram explain gas chromatography.

4. Write short notes on:

- (i) Glass electrode
- (ii) Absorption instrument
- (iii) GC sample solvents
- (iv) Retention standards