

Total No. of Questions : 5]

[Total No. of Printed Pages : 2

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**EL/IC-505**

**B.E. V Semester**

Examination, December 2016

**Analytical and Industrial Instrumentation**

**Time : Three Hours**

**Maximum Marks : 70**

- Note:** i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.  
ii) All parts of each question are to be attempted at one place.  
iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.  
iv) Except numericals, Derivation, Design and Drawing etc.

**Unit - I**

1. a) What is Analytical Instruments?  
b) What is Thermal Conducting?  
c) Explain Zirconia Probe Oxygen Analyser.  
d) Explain gas chromatography as the basis of :  
i) Basic principle ii) Detector

OR

Explain the working of paramagnetic oxygen meter. Also write down the advantages.

**Unit - II**

2. a) What is detectors used in spectrophotometer?  
b) Explain laws of photometry.  
c) Explain Fourier transforms Infrared Spectroscopy.  
d) Explain ultraviolet spectrophotometer and also the components of spectrophotometer.

OR

Explain basic components and working of Infrared Spectrophotometer.

EL/IC-505

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543

**Unit - III**

3. a) What is Resolution in Mass Spectrometer?  
b) Explain the basic principle of mass spectrometer.  
c) Explain the block diagram of ESR spectrometer.  
d) Explain the working of X-ray spectrometer. Also explain the advantage and application.

OR

Explain the working of Time of Flight mass spectrometer with diagram.

**Unit - IV**

4. a) What is Viscosity?  
b) What is Turbidity?  
c) What is Conductivity? Also explain the working of conductivity meter.  
d) Explain the working of Digital pH meter. Also write down the advantage.

OR

Explain the techniques of measurement of density of Solid. Also write down the limitations.

**Unit - V**

5. a) What is Environmental pollution?  
b) What is the cause of Air pollution?  
c) Explain the Nitrogen oxides monitoring instruments.  
d) Explain the cause of water pollution. Also explain the water pollution monitoring instrument.

OR

Write short notes (Any two).

- i) Ozone pollution and monitoring instrument  
ii) Chemical air analysis  
iii) Water pollution

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