COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)
SHIVAJI NAGAR, PUNE - 411 005

END Semester Examination

(MT-09003)   Modern Chemical Analysis of Materials

Course: B.Tech   Branch: Metallurgical Engineering

Semester: Sem V

Year: 2014-2015   Max.Marks:30

Duration: 1.5 Hrs   Time:- 2.00 pm - 3.30 pm   **Date:27/11/2014**
Hours

Instructions: MIS No.

1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of anything like stationery, calculator is not allowed.
5. Assume suitable data if necessary.
6. Write your MIS Number on Question Paper

Q.1 (a) What are different criteria for selection of particular analysis method? [4]

(b) Explain working principle of following with help of diagram :
   i)   Hollow cathode lamp [6]
   ii) X-ray tube

Q.2 (a) Why are spectral interferences less severe in AAS than in emission spectroscopy [2]

(b) Identify transitions responsible for each of the following : [2]
   i) K_α ii) K_β iii) L_α iv) L_β

(c) Suggest best suitable analysis method for following. Give proper justification for your answer. [6]
(any 3)
   i)   Lead in petrol
   ii) Polymer characterization
   iii) Corrosion product
   iv) Purity of Copper

Q.3 (a) Which X-ray procedure would be most suitable for following examples: [6]
   i)   The detection of a default in a steel beam
   ii) The study of the crystallite structure of a compound, and
   iii) The quantitative determination of a trace amount of zinc in tissue
Explain their working principles in detail.

(b) i)   What is mass absorption coefficient? What is the relation between mass absorption [4]
        coefficient, at. number and at. weight at same wavelength?
    ii) State Bragg's equation and discuss its applications in X-ray Spectroscopy

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