



# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc. DEGREE EXAMINATION – CHEMISTRY**

**FIFTH SEMESTER – NOVEMBER 2016**

**CH 5511 – TRANS ELEM. & NUCLEAR CHEMISTRY**

Date: 03-11-2016

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

## PART – A

Answer ALL questions.

(10 x 2 = 20 marks)

1. Explain why most of the transition metals form coloured compound.
2. What are interstitial compounds? Give any two examples.
3. Differentiate ores from minerals.
4. What is self-reduction process?
5. What is actinide series?
6. What is co-ordination number? Give an example.
7. Define induced radioactivity.
8. What are pi-mesons and K-mesons?
9. What are moderators? Give an example.
10. What is spallation reaction? Cite an example.

## PART – B

Answer any EIGHT questions.

(8 x 5 = 40 marks)

11. Explain the preparation and applications of tungsten bronzes.
12. How is titanium extracted from its ores?
13. Discuss the Ellingham diagram.
14. Discuss the stable oxidation states of transition metals.
15. How is vanadium extracted from its ores?
16. Explain the electronic spectra of lanthanide compounds.
17. Explain the chemical properties of hydrides and oxides of uranium.
18.  $U^{235}$  gives 4770 disintegrations  $\text{min}^{-1}\text{mg}^{-1}$ . Calculate the decay constant ( $\lambda$ ) and half-life of  $U^{235}$  (1 year =  $3.15 \times 10^7$  s).
19. Discuss the shell model of nucleus on the basis of magic number.
20. Describe the working of G.M.counter.
21. Explain the principle of a nuclear reactor.
22. Discuss the atomic power projects in India.

## PART – C

Answer any FOUR questions.

(4 x 10 = 40 marks)

23. (a) Explain M-M bonding and cluster compounds.  
(b) Discuss the toxic effects of lead and mercury.
24. (a) Describe how lanthanides are separated by ion-exchange chromatography.  
(b) How is uranium extracted from its ores?

25. What is lanthanide contraction? How does it affect the properties of the lanthanides and other elements in the periodic table?
26. (a) Explain radioactive displacement law.  
(b) Explain binding energy.
27. (a) Describe the functioning of Scintillation counter.  
(b) Describe the principle involved in the determination of dating of objects.
28. (a) Describe the principle and applications of neutron activation analysis.  
(b) Explain the working and applications of a nuclear reactor.

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