



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIFTH SEMESTER – NOVEMBER 2013

CH 5506 – TRANSITION ELEMENTS & NUCLEAR CHEMISTRY

Date : 07/11/2013
Time : 9:00 - 12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer ALL questions:

(10 x 2 = 20 marks)

1. Explain why most of the transition metals form coloured compound.
2. What are cluster compounds?
3. What are actinides? Why are they called so?
4. f-f Transitions are used for fingerprinting of Ln(III) ions. Account for this.
5. What is EAN?
6. What are ligands? Explain with an example.
7. Define the term binding energy.
8. What are pi-mesons and K-mesons?
9. What are radiopharmaceuticals? Give an example.
10. What are moderators? Give an example.

PART – B

Answer any EIGHT questions:

(8 x 5 = 40 marks)

11. Discuss the toxic effects of cadmium and mercury.
12. How is tungsten extracted from its ores?
13. Explain the electronic spectra of lanthanide compounds.
14. Explain the isolation of uranium.
15. What is spectrochemical series? Mention its significance.
16. Explain Sidgwick's theory.
17. Discuss geometrical and optical isomerism of coordination compounds.
18. A freshly cut piece of wood gives 16100 counts of β -ray emission per minute per kg and an old wooden bowl gives 13200 counts per minute per kg. Calculate the age of the wooden bowl.
The half-life period of ^{14}C is 5568 years.
19. Discuss the forces in the nucleus and stability of it.
20. Write a note on shell model of the nucleus.
21. Explain neutron activation analysis.
22. Give an account of the atomic power projects in India.

PART – C

Answer any FOUR questions:

(4 x 10 = 40 marks)

23. (a) Discuss the toxic effects of Lead.
(b) Explain the preparation of $K_2Cr_2O_7$.
(c) Explain the biological importance of any two transition elements. (3+3+4)
24. (a) Describe how lanthanide are separated by ion-exchange chromatography.
(b) How is neptunium synthesized? Give its uses. (5+5)
25. (a) Explain the crystal field splitting of transition metal ions in an octahedral field.
(b) Define crystal field stabilization energy.
(c) Calculate IODq value for the following systems:
(i) d^5 low-spin octahedral (ii) d^3 octahedral. (3+3+4)
26. (a) What are the basic postulates of valence bond theory of coordination compounds?
(b) What are its limitations? (5+5)
27. (a) Write a note on liquid drop model of the nucleus.
(b) Explain the radioactive decay. (5+5)
28. (a) Explain the applications of radioisotopes.
(b) Discuss the working of a nuclear reactor. (5+5)

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