LOYOLA COLLEGE (AUTONOMOUS), CHENNAI–600034

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

FIFTH SEMESTER–**NOVEMBER 2014**

CH-5511: TRANSITION ELEMENTS & NUCLEAR CHEMISTRY

Date : 01/11/2014 Dept. No. Max. : 100 Marks
Time : 09:00-12:00

PART – A

Answer ALL questions: **(10 x 2 = 20 marks)**

1. What are variable oxidation states?
2. What are interstitial compounds? Give any two examples.
3. Differentiae ores and minerals.
4. Name any two minerals of lanthanides.
5. What is actinide series?
6. What is coordination number? Give an example of a complex.
7. Define induced radioactivity.
8. What are pi-mesons and K-mesons?
9. What is the principle of scintillation counter?
10. What is spallation?

PART – B

Answer any EIGHT questions: **(8 x 5 = 40 marks)**

11. Explain the biological importance of any two transition elements.
12. Explain the reactivity of vanadates and chromates.
13. Discuss the Ellingham diagram.
14. Discuss the stable oxidation states of transition metals.
15. Explain the metallurgy of chromium.
16. Explain the electronic spectra of lanthanide compounds.
17. Explain the chemical properties of hydrides and oxides of uranium.
18. Calculate the mass defect, binding energy per nucleon, and packing fraction for $^{12}_{6}C$ whose isotopic mass is 12,00380 amu. The masses of neutron and proton may be taken as 1.008665 and 1.007276 amu, respectively.
19. Discuss the shell model of nucleus on the basis of closed shells of magic number.
20. Describe the working of G.M.counter.
21. Explain the theory of nuclear fission.
22. Discuss the atomic power projects in India.

PART – C

Answer any FOUR questions: **(4 x 10 = 40 marks)**

23. (a) How is titanium extracted from its ores?
    (b) Discuss the toxic effects of lead and mercury.

24. (a) Describe how lanthanides are separated by ion-exchange chromatography.
    (b) How is vanadium extracted from its ores?

25. (a) Explain the postulates of VB theory of coordination compounds.
    (b) What are transactinide elements? Give their importance.

26. (a) Explain radioactive displacement law.
    (b) Describe the functioning of scintillation counter.

27. (a) Discuss any three evidences to support crystal field theory.
    (b) Describe the principle involved in the dating of objects.

28. (a) Explain the working principle and applications of a nuclear reactor.
    (b) Give the applications of nuclear medicine.

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