



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIFTH SEMESTER – NOVEMBER 2017

CH 5511 - TRANS ELEM. & NUCLEAR CHEMISTRY

Date: 03-11-2017
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer ALL the questions.

(10x2=20)

1. Why do the transition metals form coloured compounds?
2. What are interstitial compounds? Give any two examples.
3. Differentiate ores and minerals.
4. What is self-reduction process?
5. What is actinide series?
6. Why is mercury considered as toxic element?
7. Define radioactivity.
8. What are pi-mesons and K-mesons?
9. What are moderators? Give an example.
10. Explain orbital electron capture with an example.

PART – B

Answer any EIGHT questions.

(8x5=40)

11. Explain the preparation and applications of tungsten bronzes.
12. Discuss the industrial applications of transition metals and their alloys.
13. Explain the thermodynamics of reduction processes using Ellingham diagram.
14. Discuss the various oxidation states of transition metals.
15. Why are Fe, Co, Ni treated as VIII element?
16. What is lanthanide contraction? How does it affect the properties of the lanthanides?
17. Explain the chemical properties of hydrides and oxides of uranium.
18. Calculate the half-life period of a nucleus if at the end of 4.2 days, $N = 0.798 N_0$.
19. Explain any two factors which affect the nuclear stability.
20. Describe the working of G.M.counter.
21. Describe the principle and applications of neutron activation analysis.
22. Discuss the atomic power projects in India.

PART – C

Answer any FOUR questions.

(4x10=40)

23. (a) Explain the preparation of (i) TiCl_3 (ii) $\text{K}_2\text{Cr}_2\text{O}_7$. (5)
(b) Explain the biological importance of any two transition elements. (5)
24. (a) How is vanadium extracted from its ores? (5)
(b) Explain any two mineral extraction processes. (5)
25. (a) Describe how lanthanides are separated by ion-exchange chromatography. (5)
(b) How is uranium extracted from its ores? (5)
26. Describe the various components of a nuclear power plant and the working principle in generating power.
27. (a) Describe the functioning of Scintillation counter. (5)
(b) Describe the principle involved in the determination of dating of objects. (5)
28. (a) What is critical mass? How does it explain the principle of atom bomb? (5)
(b) A piece of wood was found to have $^{14}\text{C}/^{12}\text{C}$ ratio 0.35 times that in the living plant. Calculate the period when the plant died. Given $t_{1/2}$ of $^{14}\text{C} = 5760$ years. (5)

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