LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **APRIL 2018**

CH 5506– TRANSITION ELEMENTS AND NUCLEAR CHEMISTRY

Date: 30-04-2018 Dept. No. Max. : 100 Marks

Time: 09:00-12:00

PART- A

Answer ALL questions **(10X2 = 20)**

1. What do you mean by passivation?
2. Mention any two toxic effects of cadmium.
3. State lanthanide contraction.
4. Mention the oxidation states exhibited by actinides.
5. State EAN rule.
6. Define co-ordination number.
7. What is binding energy?
8. State Geiger- Nuttal rule.
9. What is critical mass?
10. State nuclear fusion reaction.

PART- B

Answer any EIGHT questions **(8x5 = 40)**

11. (i). What are interstitial compounds?

    (ii). Mention the industrial applications of carbides of chromium and tungsten. **(2+3)**

12. What are the ores of titanium? How will you extract titanium from its ore?
13. What are cluster compounds? Explain with an example.
14. Discuss the chemical properties of the oxides of uranium.
15. Explain the complex formation in actinides with any two examples.
16. i) Write the IUPAC name of the following complexes.

    (a) $K_4[Fe(CN)_6]$ (b) $[Co(NH_3)_3Cl_2\ H_2O]Cl$

    ii) What is chelate effect? Explain with an example.

17. Describe the geometrical isomerism found in co-ordination complexes with examples.

18. Write notes on the postulates of valence bond theory of co-ordination compound with an examples.

19. Explain liquid drop model of nucleus.

20. State and explain Group displacement law.

21. Write notes on breeder reactor.

22. Explain the moderators and coolants used in nuclear reactor.

PART- C

Answer any FOUR questions **(4x10 = 40)**

23. Give a brief account on the importance of transition metals.

24. Describe the separation of lanthanides by solvent extraction and ion exchange processes.

25. Discuss the crystal field splitting d-orbital of metal in octahedral complexes.

26. (i). Using VB theory explain geometry and magnetism of $[Cu(NH_3)_2]^{2+}$ and $[Cr(CN)_6]^{3-}$

(ii). Write the factors affecting CFSP**.** **(6+4)**

27. Explain the measurement of radioactivity using**(5+ 5)**

(i). Ionization chamber (ii). Scintillation counter

28. (a) Enumerate the applications of radio isotopes in nuclear medicines.

(b) Write a brief note on neutron activation analysis. **(5+5)**

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