LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **NOVEMBER 2023**

UCH 5504 – TRANSITION ELEMENTS AND NUCLEAR CHEMISTRY

Date: 10-11-2023 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

PART-A

Answer **ALL** Questions. **(10 x 2 = 20 Marks)**

1. "First row transition elements exhibit high tendency to form complexes"- Why?
2. Define the term corrosion.
3. Mention the difference between calcination and roasting.
4. How will you differentiate ores from minerals?
5. Mention any two methods of extraction of lanthanides
6. Write any two differences between lanthanides and actinides.
7. State Geiger –Nuttall rule.
8. Calculate the number of α and β particles emitted in the conversion of U-235 in to Pb-207.
9. Define nuclear isotopic labelling
10. What is the principle involved in pulse radiolysis?

PART- B

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

11. a) Give the chemical formula of sodium nitroprusside and mention the oxidation state of Sulphur in it.
    b) Discuss the variable oxidation state of d-block elements.
12. Write short notes on silvering of mirrors.
13. How will you extract titanium from its ore?
14. Give a detailed account on the role of silver in photography.
15. How is sulfide ore concentrated by froth floatation method?
16. Write the significance of Ellingham's diagram in metallurgy.
17. Distinguish between nuclear fusion and nuclear fission reactions with examples.
18. Discuss the oxidation states of actinides citing appropriate examples of the compounds of actinides.
19. Discuss the position of lanthanides in the periodic table.
20. Explain liquid drop model of nucleus.
21. Write a notes on Soddy- Fajans and Russel Group displacement law.
22. Explain the theory of nuclear chain reaction.

PART- C

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

23. Highlight the differences in the physical and chemical properties among the 3d row and other rows of d block elements.

24. (a) Describe Electroplating of metals.
    (b) Explain any three methods of concentration of ores. **(5+5)**

25. (a) Discuss in detail about the manufacture of steel.
    (b) What are the ores of iron? How will you extract iron from its ore? **(5+5)**

26. (a) How is uranium extracted from its ore? Explain.
    (b) Write the causes and consequences of lanthanide contraction. **(5+5)**

27. Describe nuclear reactor with a neat diagram.

28. (a) How will you measure radioactivity using ionization chamber and Geiger counters? Explain.

    (b)Derive the relation between decay constant and half –life time**.** **(5+5)**

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