

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIFTH SEMESTER – NOVEMBER 2019

CH 5511 – TRANS ELEM. & NUCLEAR CHEMISTRY

Date: 04-11-2019

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

Part-A

Answer ALL questions.

(10 x 2= 20)

1. Why do transition metals form coloured complexes?
2. What are interstitial compounds?
3. Differentiate ores and minerals.
4. What is calcination?
5. What is actinide series?
6. Define co-ordination number.
7. Define radioactivity.
8. What are pi-mesons and K-mesons?
9. Mention any two uses of moderators.
10. What is spallation reaction? Cite an example.

Part-B

Answer any EIGHT questions.

(8 x 5= 40)

11. Discuss in detail the preparation and applications of tungsten bronzes.
12. How is titanium extracted from its ores?
13. Explain the industrial applications of transition metals and their alloys.
14. Discuss the various oxidation states of transition metals.
15. How is vanadium extracted from its ores?
16. Explain the thermodynamics of reduction processes using Ellingham diagram.
17. Briefly discuss the chemical properties of hydrides and oxides of uranium.
18. What is lanthanide contraction? How does it affect the properties of lanthanides?
19. Give in detail any two factors that affect the nuclear stability.
20. Explain the principle and applications of neutron activation analysis.
21. Write a note on fast breeder reactors.
22. Explain the following terms.
a) critical mass b) nuclear cross section.

Part-C

Answer any FOUR questions.

(4 x 10= 40)

23. a) Explain the industrial applications of interstitial compounds of V and Cr. (5)
b) Write any four applications of transition metals. (5)
24. a) Give the biological importance of transition metals. (5)
b) Explain any two mineral extraction processes. (5)
25. a) How are lanthanides 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 its working principle in generating power.
27. a) Discuss the functioning of Scintillation counter. (5)
b) Describe the principle involved in the determination of dating of objects. (5)
28. a) Discuss the structure of nucleus based on liquid drop model. (5)
b). Distinguish between nuclear fission and nuclear fusion. (5)
