

**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**



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

**FIFTH SEMESTER – APRIL 2018**

**CH 5511– TRANS ELEM. & NUCLEAR CHEMISTRY**

Date: 30-04-2018  
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

**PART-A**

**Answer ALL questions**

**(10x2=20 marks)**

1. What are transition elements? Why are they called so?
2. What are variable oxidation states? Give an example.
3. Write any two ores of Vanadium.
4. What do you mean by mineral beneficiation?
5. What are the common oxidation states of lanthanides?
6. What is actinide series?
7. What are magic numbers?
8. Define the term half-life period.
9. What is spallation reaction?
10. What is carbon dating?

**PART-B**

**Answer any EIGHT questions**

**(8x5=40 marks)**

11. Explain the biological importance of any two transition elements.
12. What are metal borides? How are they prepared?
13. Explain how tungsten is extracted from its ore?
14. Write a note on Ellingham diagram.
15. Write a note on froth floatation process.
16. What is lanthanide contraction? Explain its causes and consequences.
17. Give a comparative account of lanthanides and actinides.
18. What is binding energy?

Calculate the nuclear binding energy per nucleon (in J) of the isotope,  ${}^7_3\text{Li}$  (7.0160amu)

19. How is radioactivity detected and measured using scintillation counter.
20. State and explain Geiger-Natal rule.
21. Distinguish between nuclear fission and nuclear fusion.
22. Write a note on isotopic labelling studies.

### **PART-C**

**Answer any FOUR questions**

**(4x10=40 marks)**

23. a) Explain the industrial applications of interstitial compounds of Ti and W. **(6)**
  - a) Write a note on the toxicity of Cd. **(4)**
24. a) Explain any five factors influencing the choice of extraction processes. **(5)**
  - b) Explain how Cr is extracted from its ore? **(5)**
25. a) What are transactinide elements? Explain their importance. **(5)**
  - b) How are lanthanides separated using ion-exchange method? **(5)**
26. Explain the applications of radioactive isotopes in the field of agriculture and medicine. **(10)**
27. a) Explain the various factors affecting the stability of a nucleus **(5)**
  - b) Write a note on the nuclear reactors in India. **(5)**
28. Explain the principle involved and applications of the following **(5+5)**
  - a) Fast breed reactors
  - b) Neutron activation analysis.

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