



Date: 30-10-2018
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer ALL the questions.

(10x2=20)

1. Explain why most of the transition metals form coloured compound.
2. What are interstitial compounds? Give an example.
3. Differentiate ores and minerals.
4. What is electrostatic precipitation?
5. What are actinides? Why are they so called?
6. Give any two chemical properties of uranium halides.
7. Define the term binding energy.
8. What are pi-mesons and K-mesons?
9. What are radiopharmaceuticals? Give an example.
10. Define the term carbon dating.

PART – B

Answer any EIGHT questions.

(8x5=40)

11. Discuss the toxic effects of cadmium and mercury.
12. Explain the preparation and applications of tungsten bronzes.
13. Explain the thermodynamics of reduction processes using Ellingham diagram.
14. Explain the mineral beneficiation process.
15. How is chromium extracted from its ore?
16. What is meant by lanthanide contraction? Explain the consequences of lanthanide contraction on the properties of other group elements.
17. Explain the isolation of uranium.
18. A freshly cut piece of wood gives 16100 counts of β -ray emission per minute per kg and an old wooden bowl gives 13200 counts per minute per kg. Calculate the age of the wooden bowl. The half-life period of ^{14}C is 5568 years.
19. What is critical mass? How does it explain the principle of atom bomb?
20. Define the following with examples. (i) isotopes (ii) isotones (iii) isobars (iv) nuclear isomers.
21. Explain neutron activation analysis.
22. Discuss the atomic power projects in India.

PART – C

Answer any **FOUR** questions.

(4x10=40)

23. (a) Explain the industrial applications of interstitial compounds of titanium and vanadium. (5)
- (b) Explain the magnetic and catalytic property of transition elements. (5)
24. (a) Describe how lanthanides are separated by ion-exchange chromatography. (5)
- (b) How is vanadium extracted from its ores? (5)
25. (a) What are transactinide elements? How they are significant? (5)
- (b) Explain van Arkel de Boer process. (5)
26. (a) Describe the functioning of Scintillation counter. (5)
- (b) Explain n/p ratio. (5)
27. (a) Explain natural and induced radioactivity. (5)
- (b) Write about the theory of nuclear fission. (5)
28. (a) The activity of the hair of an Egyptian mammy is $7.0 \text{ min}^{-1}\text{g}^{-1}$ of carbon. (5)
- Find the age of the mummy ($t_{0.5}$ of $^{14}\text{C} = 5770$ years and disintegration rate of freshsample of $^{14}\text{C} = 14 \text{ min}^{-1}\text{g}^{-1}$). (5)
- (b) Explain the working and applications of a nuclear reactor. (5)
