



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – CHEMISTRY

SECOND SEMESTER – APRIL 2017

CH 2820- MAIN GROUP ELEMENTS & NUCLEAR CHEMISTRY

Date: 06-05-2017
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

Part-A

Answer ALL questions.

(10 x 2= 20)

1. What are ionophores? Mention any one application.
2. How many electrons will be contributed if the following group is attached to any one vertex of the cluster?
(a) $\text{Mn}(\text{CO})_3$ (b) $\text{Ni}(\text{C}_5\text{H}_5)$
3. What are calixarenes? Cite an example.
4. Compute the number of three center-two electron bonds present in B_5H_9 .
5. How is trimethylborazine synthesised from BCl_3 ?
6. What are ultramarines? Mention anyone application.
7. What is hydrosilylation reaction? Give the mechanism.
8. Mention the types of polyhedral boranes based on their structures with one example each.
9. Define binding energy.
10. How do neutrons stabilise the nucleus?

Part-B

Answer any EIGHT questions.

(8 x 5= 40)

11. Write a brief note on the allotropes of carbon.
12. Derive the possible styx number of B_2H_7^- and discuss the types of bonding.
13. Discuss the preparation, properties, uses and structure of I_2O_5 .
14. Write a brief note on zeolite as molecular sieve.
15. Compare the bonding in borazine and benzene. Give any two reactions in which benzene and borazine differ.
16. Discuss the relationship between different types of boranes with suitable example.
17. Discuss the structure of the following compounds using VSEPR theory.
(i) XeO_2F_2 (ii) XeO_3
18. Write a brief note on the classification of fluorinating agents.
19. Describe the principle of scintillation counters.
20. What are mesons? How are they classified?
21. Compare any two processes of a nucleus, which is comparable with that of a liquid drop.
22. Write a note on the various oxidation states of xenon in forming oxo fluoride compounds.

Part-C

Answer any FOUR questions.

(4 x 10= 40)

23. Discuss the role of ionophore in the transmission of nerve impulse.
24. Write a brief note on PSEPT theory. Predict the structure of the following compounds.
(i) $C_2B_3H_5Fe(CO)_3$ (ii) $B_3C_3H_7$ (iii) NB_9H_{12}
25. Discuss the preparation, properties and structure of $C_2B_{10}H_{12}$.
26. Discuss the types of silicates with examples and the formula of the fundamental unit with its structure.
27. Discuss in detail any five factors influencing stability of a nucleus.
28. Explain the working of a conventional nuclear fission reactor.
