Q.P. Code – 42635

Sixth Semester B.Sc. Degree Examination, April/May 2019

(CBCS Scheme)

Chemistry

Paper VII – INORGANIC CHEMISTRY

Time : 3 Hours] *[Max. Marks : 90*

Instructions to Candidates :

1. *The questions paper has 2 parts A & B. Both the parts should be answered.*
2. *Write equations/diagrams wherever necessary.*

PART – A

Answer any **TEN** of the following questions. **(10 × 2 = 20)**

1. What is glass transition temperature? Name a factor affecting the glass transition temperature.
2. Calculate the EAN of Mn in $Mn_2(CO)_{10}$.
3. Write the structure of Zeise's salt.
4. Write the approximate composition of borosilicate glass.
5. Give reason. Glass articles are annealed after fabrication.
6. What are mixed fertilizers? Give an example.
7. Write the chemical equations involved in the preparation of CAN.
8. What is anodizing? Give an example.
9. Give any two differences between roasting and calcination.
10. ΔG^0 for the formation of CO is more negative than for the formation of Al_2O_3 at high temperature, but carbon cannot be used to reduce Cr_2O_3. Give reasons.
11. What is 24 carat gold? What is the percentage of gold in 22 carat gold for jewellery?
12. What are hybrid propellents? Give an example.

PART – B

Answer any **SEVEN** of the following questions. **(7 × 10 = 70)**

13. (a) What are silicones? Give a method of preparation of cross-linked silicone. Mention one application of it.

(b) Give the method of preparation of boron nitride from NH_3. Write the planar structure of $(BN)_n$.

(c) Mention one application for each of the following :

(i) Sulphur nitride

(ii) Phosphonitrilic chloride

(iii) Boron nitride. **(4 + 3 + 3)**

14. (a) Define organometallic compounds. How are they classified? Give an example for each.

(b) Discuss σ and π-bonding between metal-carbon bond in metal carbonyls with orbital overlapping diagram.

(c) Write the structures of $Fe_2(CO)_9$ and ferrocene. **(4 + 3 + 3)**

15. (a) Discuss the structure, bonding and hybridization in $CO_2(CO)_8$.

(b) (i) Describe a method of preparation of the following metal carbonyls. Give chemical equation

(1) $Fe(CO)_5$

(2) $Cr(CO)_6$.

(ii) Explain how IR spectral data provide evidence in support of metal-carbon back bonding in metal carbonyls.

(c) What is an explosive? Give any two requirements of an explosive. **(4 + 3 + 3)**

16. (a) Describe the manufacture of cement by dry process. Write the chemical reactions taking place during the process.

(b) Mention the raw materials and their functions in the manufacture of ceramics.

(c) Write a note on carbon nanotubes. **(4 + 3 + 3)**

17. (a) Describe the manufacture of glass. Write the chemical reactions taking place during the process.

    (b) Write a note on the following :

        (i) Tough glass or tempered glass.

        (ii) Quick setting of cement.

    (c) How is RDX prepared? Give chemical equation. **(4 + 3 + 3)**

18. (a) Describe the manufacture of urea. Give chemical equations.

    (b) What are fertilizers? How are they classified?

    (c) Discuss the manufacture of calcium super phosphate. Write the chemical equations. **(4 + 3 + 3)**

19. (a) Explain the following terms with examples :

        (i) Pigments

        (ii) Enamels.

    (b) Give main objectives of coating surfaces.

    (c) Mention the main constituents of oil paints. **(4 + 3 + 3)**

20. (a) What is Ellingham's diagram? Discuss the reduction of haematite by CO using Ellingham's diagram.

    (b) Describe the zone refining process of obtaining ultrapure metal.

    (c) What is pyrometallurgy? Explain smelting process with an example. **(4 + 3 + 3)**

21. (a) Describe electrolytic refining of metals with a neat labelled diagram.

    (b) Discuss the following metallurgical processes :

        (i) Parting process

        (ii) Van Arkel-de Boer process.

    (c) What are propellants? Mention any two requisites of a good propellant. **(4 + 3 + 3)**

22. (a) Describe the manufacture of steel.

(b) Write the composition of the following alloys and give one use of each :

(i) Invar steel

(ii) Brass

(c) Write a note on case hardening. **(4 + 3 + 3)**
