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Reg. No.....

Name.....

M.Sc. DEGREE (C.S.S.) EXAMINATION, FEBRUARY 2021

Third Semester

Faculty of Science

Branch III : Pure Chemistry

CH 3C 09/AN 3C 09/PO 3C 09—STRUCTURAL INORGANIC CHEMISTRY

[Common to M.Sc. Analytical Chemistry, Pure Chemistry and Polymer Chemistry]

(2012—2018 Admissions)

Time : Three Hours Maximum Weight : 30

Section A

Answer any **ten** *questions.*
Each question carries a weight of 1.

1. What are F-centres (Farbenzecentre) ? How they are detected ?
2. Explain the 'Reconstructive' phase transitions in solids using a suitable example.
3. What is 'vitrification range' as used in the manufacture of refractory bodies ?
4. Give one example each for a) Line defects ; and b) Plane defects.
5. What are Kronig fine structures ? What is its use ?
6. What is Frolich diagram ? What is its use ?
7. Differentiate between metals, insulators and semiconductors taking band structure.
8. What are the differences between intrinsic and extrinsic semiconductors ?
9. Calculate the Styx numbers of a) B_4H_{10} ; and b) B_5H_{11}.
10. Give the nonnumeric structures of a) Silicon oils ; and b) Phosphazene.
11. What are 'Sialons' ? Explain
12. Give one example each a) Tacto (frame work) silicates ; and b) Phyllosilicates.
13. Classify the following Kaolinite, pyrophyllite, Feldspar, Quartz.

(10 × 1 = 10)

Turn over

Section B

Answer any **five** *questions.*
Each question carries a weight of 2.

14. Discuss briefly Perosvskite structure (ABX_3).

15. Explain Schottky defect.

16. What is Sintering ? How it is brought out in crystals ?

17. Explain the free electron theory of metals.

18. Write briefly on isopoly acids of Vanadium.

19. What are the requirements for refractory bricks that are to be used for lining iron and steel blast furnaces ? Explain why silica bricks are suitable unless highly reducing conditions are present in the kiln.

20. Why Borazine is called inorganic benzene by Weberg ?

21. Explain the sol-gel ceramic processing.

(5 × 2 = 10)

Section C

Answer any **two** *questions.*
Each question carries a weight of 5.

22. Discuss briefly on the metal clusters of Rhenium.

23. Write briefly on the homocyclic ring compounds of sulphur and selenium.

24. Write notes on a) Organic super conductors ; and b) Carbon nanotubes.

25. Expiain the thermal decomposition of soiids both Type-I and Type-II reactions.

(2 × 5 = 10)