



GS-305

II Semester B.Sc. Examination, May/June - 2019

CHEMISTRY

Chemistry - II

(CBCS) (F+R) (2014-15 & Onwards)

Time : 3 Hours

Max. Marks : 70

Instructions : (i) The question paper has been **two** parts. Answer **both** the parts.
(ii) Write equations, draw diagrams wherever necessary.

PART - A

I. Answer **any eight** of the following questions. **8x2=16**

1. State Heisenberg's uncertainty principle. Write its mathematical form.
2. Calculate the wavelength of a moving ball of mass 0.6 kg travelling with a velocity 60 m/s, $h = 6.63 \times 10^{-34} \text{ JS}$.
3. Write two limitations of classical mechanics.
4. Mention the type of hybridisation in (i) PCl_5 (ii) SF_6
5. Among H_2O and CO_2 , which is polar? Give reason.
6. Define bonding molecular orbital.
7. Write the structure of Basic unit present in pyrosilicates.
8. Mention any two consequences of Lanthanide contraction.
9. Cupric chloride is blue, while cuprous chloride is colourless. Give reason.
10. Give an example of Diel's-Alder reaction.
11. State Huckel's rule of Aromaticity.
12. Among alkyl halide and vinyl halide which is more reactive and why?

PART - B

II. Answer **any nine** of the following questions. **9x6=54**

13. (a) Derive an expression for the energy of the 1st Bohr orbit in hydrogen atom. **4+2**
(b) Write Schrodinger wave equation. Explain the terms.

P.T.O.



14. (a) Write any four postulates of quantum mechanics. 4+2
(b) What is the difference between orbit and orbital ?
15. (a) Explain the significance of quantum numbers. 4+2
(b) Write the shapes of the orbitals when $l=0$ and $l=1$.
16. (a) Based on VSEPR theory, explain the shape of Ammonia molecule. 4+2
(b) What is bond order ? Give its significance.
17. (a) Explain sp^2 hybridisation with an example. 4+2
(b) Write Born-Lande equation of lattice energy. Explain the terms involved.
18. (a) Write the molecular orbital diagram of Be_2 molecule and calculate 4+2
the bond order.
(b) Explain intramolecular H-bonding with an example.
19. (a) Write the structure of the basic unit present in cyclic silicate ? 4+2
Write the name and formula of a mineral having this structure.
(b) HF has higher boiling point than HCl why ?
-
20. (a) How is Helium isolated from Natural gas ? 4+2
(b) Give one method of preparation of Xenon trioxide.
-
21. (a) Give any four differences between *d* and *f*-block elements. 4+2
(b) Calculate the magnetic moment of Fe^{3+} ion. [At. no. of Iron = 26]
22. (a) Describe the separation of Lanthanides by Ion-exchange method. 4+2
(b) Why chromium in +6 oxidation state is diamagnetic ?
23. (a) Explain the orienting influence of $-CH_3$ group in tolerance towards 4+2
electrophilic substitution.
(b) Explain Ullmann reaction with an example.
24. (a) Write the mechanism of Nitration of Benzene. 4+2
(b) How Anthracene converted to Anthraquinone.
25. (a) Explain the mechanism of SN^1 reaction with an example. 4+2
(b) State Saytzeff rule with an example.