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Reg. No. : .....

Name : .....

First Semester B.Sc. Degree Examination, February 2018
First Degree Programme Under CBCSS
Complementary Course for Physics and Geology
CH 1131.1/CH 1131.2 : PRINCIPLES OF CHEMISTRY
(2013 – 2016 Admissions)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions. **Each** question carries **1** mark.

1. What is an orbital ?
2. How many electrons can enter into 3d orbitals ?
3. State Pauli's exclusion principle.
4. What is the geometrical shape of PCl_5 molecule ?
5. Explain the term 'closed system' in chemical thermodynamics.
6. Explain the term enthalpy.
7. What is meant by hybridization of atomic orbitals ?
8. Explain the term heat of vaporization.
9. Which is more polar HCl or HF and why ?
10. State the first law of thermodynamics.

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SECTION – B

Answer **any eight** questions. **Each** question carries **2** marks.

11. What are degenerate orbitals ?

12. What is bond energy ?

13. Explain the reason for the polarity of bonds.

14. Define the term internal energy.

15. Hydrogen sulphide is a gas at room temperature but water is a liquid, why ?

16. Define bond order.

17. What are sigma and pi bonds ? Distinguish between them.

18. Distinguish between isothermal and adiabatic processes.

19. What is Lattice energy ?

20. Define dipole moment.

21. Write the hybrid state carbon atoms in acetylene.

22. What is a nodal plane ?

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SECTION – C

Answer **any 6** questions. **Each** question carries **4** marks.

23. Explain the bond angle in ammonia on the basis of VSEPR theory.

24. Write a note on Schrodinger wave equation.

25. Explain Born Haber Cycle.

26. State and explain Hund's rule of maximum multiplicity.

27. Write a note on hydrogen bonding.

28. Differentiate between bonding and antibonding molecular orbitals.

29. Define Cp and Cv. State their relation.

30. What is meant by entropy ? Explain its physical significance.

31. Discuss briefly the Bohr model of the atom. What are its limitations ?

SECTION – D

Answer **any two** questions. **Each** question carries **15** marks.

32. What are quantum numbers ? Explain the significance of various types of quantum numbers.

33. Sketch the molecular orbital diagram of O_2 molecule. Calculate the bond order and explain the magnetic behaviour.

34. a) State and explain Hess's law of heat summation.

    b) What is the difference between heat of formation and heat of reaction ?

35. a) Discuss briefly the Kirchhoff equation.

    b) Derive the expression $\Delta G = \Delta H - T\Delta S$ and discuss the significance of the terms involved.

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