

Reg. No.

S.NO: 149

BATCH: 2016 - 2018

END OF SEMESTER EXAMINATIONS, APRIL / MAY - 2019  
PHYSICAL CHEMISTRY - I  
SUBJECT CODE: 15P3CH03

MAJOR : M.Sc. (CHEMISTRY)

TIME : 3 HOURS

SEMESTER : I  
MAX. MARKS : 70

**SECTION - A (10 x 1 = 10)**

Answer ALL the questions:

1. What are the different types of operators?
2. What is eigen value?
3. What is Variation method?
4. What is meant by LCAO?
5. What is symmetry operation?
6. What is similarity transformation?
7. What is Gibb's free energy?
8. State Planck's statement.
9. Define chemical potential.
10. What is fugacity?

**SECTION - B (5 X 4 = 20)**

Answer ALL the questions:

11. a) Explain the time dependent schrodinger wave equation.  
(OR)  
b) Discuss the failure of classical mechanics.
12. a) Apply HMO treatment to ethylene system.  
(OR)  
b) Explain Born - Oppenheimer approximations.
13. a) What is reducible representations?  
(OR)  
b) Explain Matrix representation of a point group.
14. a) Discuss the significance of thermodynamic probability.  
(OR)  
b) Describe entropy change accompanying phase transformation.
15. a) Derive Duhem - Margules equation.  
(OR)  
b) How partial molar property is determined?

**SECTION - C (5 X 8 = 40)**

Answer ALL the questions:

16. a) Deduce the solution of schrodinger wave equation for a particle in three dimensional box.  
(OR)  
b) Discuss the hermite polynomials and recursion formula.
17. a) Apply Huckel theory to Benzene system.  
(OR)  
b) How ground state energy of the atom is determined by perturbation method.
18. a) Discuss on the electronic spectra of formaldehyde using group theory.  
(OR)  
b) Construct the group multiplication table of  $C_{3v}$  point group.
19. a) Discuss on Nernst heat theorem.  
(OR)  
b) Derive Gibb's Helm holtz equation.
20. a) Determine the activity and activity co-efficient by emf method.  
(OR)  
b) How does fugacity varies with temperature and pressure.

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