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SRINIVASAN COLLEGE OF ARTS AND SCIENCE

(Affiliated to Bharathidasan University, Trichy)

(Recognized by UGC, Section 2(f) & 12 (b) of the UGC Act 1956)

PERAMBALUR – 621 212



M. Sc. DEGREE EXAMINATION, NOVEMBER 2022

MODEL EXAMINATION

PHYSICAL CHEMISTRY – I

TIME: 03:00 Hrs

Maximum marks: 75

Class: I M.Sc., CHEMISTRY

DATE: .

PART A

10×1=10

ANSWER ALL QUESTIONS

1. The schrodinger equation is a ____ differential equation
a) homogenous b) heterogeneous c) integration
2. Hamiltonian operator is presents by ____
a) $H^{\wedge}$ b) E c) H
3. $CF_2=CF_2$ belongs to which point group
a) D_{3d} b) D_{2h} c) D_{1h}
4. The first law of thermodynamics is conervation of
a) momentum b) energy c) both momentum and energy
5. The potential energy of the molecule of an ideal gas is
a) equal to kinetic energy b) equal to internal energy c) zero
6. H_2O molecule belong to the ____ group
7. The entropy of a photon gas is proportional to ____
8. Specific heat of a gas at constant volume and constant temperature are related as ____
9. T-S diagram for a Carnot cycle is ____
10. The relationship between Boyle temperature and critical temperature is ____

(ii) Answer all the Question:

5×2=10

11. Write short note on operators?
12. Define pulse technique.
13. Define Slater treatment

4. Define shock tube method.

5. Define life time method?

PART B

5×5=25

1 a) Explain conjugate elements and classes?

OR

b) Write short notes on symmetry of hybrid orbitals?

2 a) Derive Bohr theory of hydrogen atom. ✓

OR

b) What is meant by linear operator and hermitian operator and algebra operator. ✓

3 a) Derive ARRT.

OR

b) Explain KRRT. ✓

4. a) Derive the Maxwell Boltzmann distribution law. ✓

OR

b) Explain Einstein theory and Debye theory. ✓

5. a) Explain about Jablonski diagram. ✓

OR

b) Write short notes on laser and their applications. ✓

3×10=30

PART

6. Derive three dimensional box. ✓ ✓

7. Derive Bose Einstein and Fermi Dirac equations.

8. Write short notes on

a. Negative Kelvin temperature

b. Molecular beam method

c. kinetic isotopic effect

9. Explain reducible and irreducible representation and LET. ✓

10. a) Explain Black body radiation. ✓

b) Wave particle dualism ✓

c) Uncertainty principle. ✓