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(FOR THE CANDIDATES ADMITTED **19UPS614**

DURING THE ACADEMIC YEAR 2019-20 ONLY) **REG.NO.**

N.G.M.COLLEGE (AUTONOMOUS): POLLACHI

END-OF-SEMESTER EXAMINATIONS: JULY- 2022

B.Sc. PHYSICS **MAXIMUM MARKS: 75**

SEMESTER: VI **TIME: 3 HOURS**

PART - III

CONDENSED MATTER PHYSICS AND STATISTICAL MECHANICS

SECTION - A **(10 X 1 = 10 MARKS)**

ANSWER THE FOLLOWING QUESTIONS.
MULTIPLE CHOICE QUESTIONS. **(K1)**

1. The number of atoms present in the unit cell of sodium chloride is _____.
   (a) 5 (b) 2 (c) 4 (d) none of the
2. Which of the following material does not have permanent magnetic dipoles?
   (a) paramagnetic (b) diamagnetic
   (c) ferrimagnetic (d) anti – ferro magentic
3. The transition temperature of mercury is _____.
   (a) 1 K (b) 1.14 K (c) 4.12 K (d) 9.22K
4. Phase space is a _____ dimensional space
   (a) 3 (b) 2 (c) 6 (d) 7
5. In which statistics the numbers of particles are limited?
   (a) Fermi dirac (b) Bose Einstein (c) a& b (d) none of the above

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES **(K2)**

6. What is a covalent bond?
7. What is hall effect?
8. What are the practical uses of superconductors?
9. Define phase space.
10. Give the conditions for Bose Einstein statistics.

SECTION – B **(5 X 5 = 25 MARKS)**

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.
(Qn. No. 11 to 15)10 questions (a & b) – 2 questions from each unit. **(K3)**

11. a) What is known as Ionic bonding ? Discuss with appropriate examples.

(OR)

b) Discuss lattice points and space lattice.

12. a) Explain the drawbacks of classical free electron theory.

(OR)

b) Briefly explain the Weiss theory of paramagnetism.

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13. a) Explain Meissner effect.

(OR)

b) Explain type I and Type II superconductors.

14. a) Explain the Density of quantum states of energy of a particle

(OR)

b) What is known as Doppler broadening? Discuss the Doppler broadening of spectral lines.

15. a) Deduce the expression for the Planck's radiations..

(OR)

b) Derive an expression for the Fermi Energy for electrons in metal.

SECTION - C (4 X 10 = 40 MARKS)

ANSWER ANY FOUR OUT OF SIX QUESTIONS
(16th QUESTION IS COMPULSORY AND ANSWER ANY THREE QUESTIONS (FROM Qn. No : 17 to 21) (K4 (Or) K5)

16. Describe an experimental set up for the measurement of hall coefficient.

17. Describe briefly the seven systems of crystals.

18. Explain Langevin's theory of paramagnetism.

19. Explain the phenomenon of superconductivity using BCS theory.

20. Discuss Maxwell -Boltzmann statistics and arrive an expression for the M-B distribution law.

21. Compare the Maxwell-Boltzman, Bale-Einestein and Fermi-Dirac statistics.

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