Reg. No…….. Name…… **18U233**

B. Sc DEGREE END SEMESTER EXAMINATION - MARCH/APRIL 2018

SEMESTER **- 2: COMPLEMENTARY COURSE FOR B. Sc. CHEMISTRY**

COURSE: **15U2CPPHY4: ELECTRIC AND MAGNETIC PHENOMENA, THERMODYNAMICS AND ELEMENTARY SOLID STATE PHYSICS**

(Common for Regular 2017 / Supplementary - Improvement 2016 / 2015 / 2014 Admission)

Time Three Hours Total: 60 Marks

PART A (Very short answer questions)

(Answer ***all*** questions. Each question carries 1 Mark)

1. Explain a thermodynamic system.
2. Define Curie temperature.
3. What are ferroelectric materials?
4. State Zeroth law of thermodynamics.
5. Write an example for (i) a paramagnetic (ii) diamagnetic substances.
6. Define packing fraction.
7. Define dielectric constant of a material.
8. What are lattice parameters? (1 x 8 = 8)

PART - B (Short answer questions)

(Answer ***Six*** *questions*. Each question carries 2 Marks)

9. Explain domain theory of Ferro magnetism.
10. State and explain second law of thermodynamics.
11. Explain principle of increase of entropy.
12. Explain hysteresis curve of a ferromagnetic material.
13. Derive an expression for the work done in an isothermal process.
14. What is magnetization? How it is related to pole strength.
15. Briefly explain seven crystal system.
16. Explain Gauss' theorem in electrostatics for a dielectric material. (2 x 6 = 12)

PART - C (Problem/Derivations)

(Answer any ***four*** questions. Each question carries 5 Marks)

17. Derive packing fraction for simple cubic and body centered cubic structure.
18. Lead is a face centered cubic with an atomic radius of 1.746 A^0. Find the spacing of (i) (200) planes and (ii) (220) planes.
19. 1 kg of water is heated with an electric heating coil from 20^0 C to 80^0 c. Compute the change in entropy of (a) water (b) the universe. (Specific heat capacity of water 4.18 x 10^3 J/Kg K)

20. The efficiency of the carnot engine is 20%. When the temperature of the source is increased by 25 % , then its efficiency is found to increase by 20%. Calculate the temperature of source and sink.
21. State and explain the relation connecting the displacement vector, polarization vector and the electric field in a dielectric.
22. A gas is compressed isothermally to half of its volume. Find the work done.

(5 x 4 = 20)

PARTD (Essay)

(Answer ***two*** questions. Each question carries 10 Marks)

23. Explain the working of a Carnot engine. Derive the expression for efficiency.
24. Explain paramagnetism, diamagnetism and ferromagnetism on the basis of domain theory.
25. Derive Bragg's law of diffraction for crystal planes.
26. Write a note on (i) Polar and non polar materials (ii) dielectric displacement vector (iii) susceptibility. (10 x 2 = 20)

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