15U230

Reg. No..... Name: .....

B.Sc DEGREE END SEMESTER EXAMINATION MARCH 2016

SEMESTER - 2: PHYSICS (COMPLEMENTARY COURSE FOR CHEMISTRY)

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

(Common for 2015 Admission & 2014 Admission - Supplementary)

Time: Three Hours Maximum Marks:60

PART - A

[Very short answer questions]

(Answer all questions. Each question carries 1 Mark)

1. What is an isothermal process?
2. What are the uses of indicator diagram?
3. Define Primitive cell and unit cell in crystal structure.
4. Is there any increase or decrease in entropy during an irreversible process.
5. What do you understand by Miller indices of a crystal ?
6. What do you mean by dielectric displacement vector ?
7. What is meant by polar dielectric ?
8. What are ferrites ? (1 x 8 = 8)

PART - B

[Short answer questions]

(Answer any six questions. Each question carries 2 Marks)

9. Explain polarisation mechanism in dielectrics.
10. Derive the work done during an adiabatic process
11. State and write down maxwells equation in their original form
12. Show that the packing factor for the bcc lattice is $\pi\sqrt{3}/8$.
13. DefineGauss's law in dielectrics
14. State and explainI law of thermodynamics.
15. What factors reduce the efficiency of heat engine from its ideal value ?
16. Distinguish between antiferromagnetism and ferromagnetism.

(2 x 6 = 12)

PART - C

[Problems/Derivations]

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

17. Find the maximum radius of the interstitial sphere that can just fit into the void at,

(½,1/2, 1/2) between the body centred atoms of bcc structure.

18. Calculate the packing fraction of a simple cubic lattice.

19. Deduce an expression for the entropy change in a reversible cycle?

20. A domestic refrigerator based on reversible engine working between the ice point and 17^0

C.Calculate the efficiency.

21. Air is compressed adiabatically to eight times itspressure. Calculate the rise in its temperature.

Assuming the initial temperature to be 300K .(γ for air =1.5)

22. Find relative permeability and susceptibility μ of metal if its permeability is 0.126 Wm/A?

(5 x 4 = 20)

PART - D

[Essay]

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

23. Explain with examples, the characteristics exhibited by bcc, fcc and hcp lattices.

24. What is an indicator diagram? Explain its importance. Derive an expression for the work done

by an adiabatic process.

25. Explain Carnots cycle. Derive an expression for the efficiency of a Carnots engine.

26. What is entropy? Show that for a reversible cycle, entropy is constant.

(10 x 2 = 20)

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