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SVIS 303 A-15
B.Sc. VIth Semester Degree Examination
Physics
(Statistical physics solid state physics and material science)
Paper - 6.1

Time : 3 Hours

Maximum Marks : 80

Instructions to candidates:

Answer **All** the questions from Section "A" any **five** from section "B" and any four from Section "C"

Section - A

I. Answer the following questions. (15×1=15)

1. What are fermions?
2. Define weidmann-Franz law.
3. Define primitive cell
4. Define moseley's law
5. Give an example for donar impurity
6. What is photoconductivity?
7. What is thin film?
8. What is the volume of phase space?
9. Define ripple factor
10. State Debye's T^3 law.
11. What is meant by persistant current?
12. What is curie temperature?
13. What is energy gap?
14. Write an equation for thermal conductivity of metals.
15. Why hall coefficient is negative in metals.

Section - B

II. Answer any **five** of the following

(5×5=25)

16. Compare three statistics
17. Derive an expression for electrical conductivity of metals.
18. State and explain Bragg's law for diffraction of X-rays
19. Explain PNP transistor as amplifier.
20. Explain Pb-sn phase diagram
21. Write a note on Hall effect
22. Write a note on high temperature superconductor.

Section - C

III. Answer any **four** of the following.

23. Derive Maxwell-Boltzmann distribution equation. **(10)**
24. a) Derive an equation for fermi energy at 0°K .
b) Find fermi energy of a sodium metal, given that number of free electron per unit volume is 2.54×10^{28} , mass of an electron is 9.1×10^{-31} kg and $h=6.625 \times 10^{-34}\text{JS}^{-1}$ **(7+3)**
25. a) Describe construction and working of solar cell.
b) Explain NaCl crystal structure **(5+5)**
26. a) Explain chemical vapourisation method to prepare thin film.
b) Write the applications of thin film. **(5+5)**
27. a) State and explain curie-weiss law?
b) Explain physics of PN junction diode **(5+5)**
28. a) Explain BCS theory of superconductivity?
b) Write the applications of superconductor.. **(5+5)**