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SVS-N 313 B-16
B.Sc.Vth Semester Degree Examination
Physics
(Quantum Mechanics Statistical Mechanics & Material Physics)
Paper : 5.2
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

1. Answer *all* the questions from *Section - A*
2. Answer any *five* questions from *Section - B* and *four* questions from *Section - C*

SECTION - A

Answer the following questions

(15×1=15)

1. What is a wave function
2. State Heisenberg's Uncertainty principle
3. What is a phase space
4. What are ferrites?
5. What is Meissner effect?
6. What are nano materials?
7. What is a boson?
8. What are paramagnetic materials
9. What is transition temp?
10. What are solgel
11. Write the Schrodinger's time independent wave equation
12. Name the two particles involved in compton scattering
13. Define magnetic susceptibility
14. Write the equation for de - Broglie wavelength
15. What is super conductivity?

SECTION - B

Answer any **Five** questions of the following

(5×5=25)

16. Write a note on physical significance of wave function
17. Write a note on Maxwell - Boltzmann statistics
18. Write a note on Chemical vapour Deposition (CVD)
19. Write a note on Meissner effect of the flux exclusion
20. Write the properties of diamagnetic materials
21. Describe Davisson and Germer's Experiment
22. Explain physical preparation of nanomaterials in case of photolithograph

SECTION - C

Answer any **Four** questions of the following

(4×10=40)

23. a) Derive the time - independent Schrodinger wave equation and write the solution (7)
b) Calculate the compton wavelength for an electron?
Given : $h = 6.62 \times 10^{-34} \text{ JS}$ $C = 3 \times 10^8 \text{ m/s}$
Mass of electron : $m = 9.11 \times 10^{-31} \text{ kg}$ (3)
24. Compare three statistics - i.e., Maxwell Boltzmann, Bose Einstein and Fermi - Dirac statistics (10)
25. What is compton effect? Give the theory of compton scattering (10)
26. a) Discuss the BCS theory of super conductivity (6)
b) Write the uses of super conductors (4)
27. What is magnetic susceptibility? Explain its variation with temp and hence arrive at Curie - Weiss law (10)
28. a) Write a note on photolithography (7)
b) Write three applications of nanomaterials. (3)