24518(New)

**B.Sc. V - Semester Degree Examination, Nov./Dec. - 2018**

**PHYSICS**

**Statistical Mechanics, Quantum Mechanics And Electronics - I**

**Paper - VI (5.2)**

**(New)**

Time : 3 Hours                                                    Maximum Marks : 80

*Instructions to Candidates:*

1.  Answer **All** questions from Section A, any **Five** from Section - B and any **Four** from Section - C.

2.  Write answer to Section - A Questions in first two pages only.

**Section - A**

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

1.   Give an example for Boson particles.

2.   Which particle obey Pauli's exclusion principle.

3.   What is compton effect.

4.   Write the expression for de-Broglie's wavelength.

5.   What is wave function.

6.   Write eigen value of energy equation for a particle in one - dimensional box.

7.   Define extrinsic semiconductor.

8.   What is energy band gap in semiconductor.

9.   Write one application of Hall effect in semiconductor.

10.  Define threshold voltage of PN junction diode.

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11. Write the relation between $\alpha$ and $\beta$.

12. What is solar cell.

13. Which material emits blue colour in LED.

14. What is meant by thermal run away.

15. What is MOSFET.

### Section - B

II. Answer any **Five** of the following :     (5×5=25)

16. Write a note on Gibb's Paradox.

17. Illustrate the Heisenberg's uncertainty principle by Gamma ray microscope.

18. Describe time - independent Schrodinger wave equation.

19. Explain the concept of valance band, conduction band and energy gap in semiconductor.

20. State and explain Hall effect in metals.    https://www.vskub.com

21. Explain transistor as an amplifier in CE-mode.

22. Describe AC load line of a transistor.

### Section - C

III. Answer any **Four** of the following :     (4×10=40)

23. a) Describe Bose - Einstein distribution function.

    b) Explain the comparision between Maxwell - Boltzman and Fermi - Dirac distribution function.

24. a) Derive an expression for compton shift.

    b) Monochromatic X-rays of wavelength 0.15A° undergoes compton effect from a carbon block. Calculate the wavelength scattered through

      1) 45°

      2) 135°

      3) 180°

                         (7+3)

25. a) Obtain an expression for energy of a particle in a one dimensional box with eigen values and function.

b) An electron is constrained in a one dimensional box of side 1nm. Obtain the first three eigen values in ev.  (7+3)

26. a) Describe Zener diode as voltage regulator.

b) Explain action of NPN transistor.  (5+5)

27. a) Explain the working principle of solar cell.

b) Explain the comparision between LED and LCD.  (5+5)

28. a) With diagram explain the working of JFET.

b) Write a note on stability factor.  (6+4)

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