B.Sc. IV Semester Degree Examination, Sept./Oct. - 2024
PHYSICS
DSC 4-IV : Thermal Physics and Electronics
(NEP)

Time : 2 Hours   Maximum Marks : 60

Note :   (i)   *Answer **all** sections.*

         (ii)   *Non-programmed Scientific calculators are allowed.*

SECTION - A

1.   Answer the following sub-questions, each sub-question carries **one** mark.   **10x1=10**

   (a)   State First Law of Thermodynamics.

   (b)   What is reversible process ?

   (c)   What is absolute zero of temperature ?

   (d)   Define degree of freedom.

   (e)   State the law of equipartion of energy.

   (f)   State Steafan's Boltzmann Law.

   (g)   What is Forward bias of p-n junction diode ?

   (h)   What is emitter in a transistor ?

   (i)   Write the truth table of NOR gate.

   (j)   Convert 111 in a decimal number.

SECTION - B

Answer **any four** of the following, each carries **five** marks.   **4x5=20**

2.   Explain Second Law of Thermodynamics in terms of Entropy.

3.   What is Joule Thomson effect ? Find the value of Joule Thomson Co-efficient for a perfect gas.

4.   State and prove Wein's displacement law.

5.   Distinguish between Intrinsic and Extrinsic semiconductor.

6.   Explain the working of a Half-Wave rectifier.

7.   Derive an expression for voltage gain of an OP-Amp in Non-inverting mode.

SECTION - C

Answer **any three** of the following, each carries **ten** marks.   **3x10=30**

8. (a) Explain the construction and working of a Carnot engine.   **6+4**

(b) Distinguish between isothermal and adiabatic process.

9. Derive an expression for Vander Walls gas equation.   **10**

10. Explain Maxwell-Boltzmann law of distribution of velocities in an ideal gas and **10** hence obtain expression for RMS velocity.

11. (a) Explain how Zener diode act as a voltage regulator.   **5+5**

(b) Explain the working of a transistor as an amplifier.

12. (a) State and prove De Morgan's Theorem.   **5+5**

(b) With the help of NAND gate, explain AND and OR gates.

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