

Roll No. _____

[Total No. of Pages : 3

SIIS-N 59 A-15
B.Sc. IInd Semester Degree Examination
Physics
(Thermodynamics, Waves and oscillations electrical measurements and
circuits, Theory of Relativity)
Paper - II
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to candidates:

Answer **all** the questions from **section -I**, Any five questions from **section -II** and any **four** from **Section - III**

Section - I

Answer the following questions.

(15×1=15)

1. Write zeroth law of thermodynamics
2. Define Isothermal process
3. What is Boyle's Temperature
4. What is melting point of solids
5. Define wave velocity
6. Write the expression for the one-dimensional wave.
7. What is minkowski space?
8. Define amplitude of a wave
9. Write the condition for resonance in LCR series circuit
10. Define band width

11. Define wattless current.
12. Write the postulates of special theory of relativity
13. Write the principle of Maxwell Bridge.
14. In a Carnot's engine $T_1=37^\circ\text{C}$ & $T_2=7^\circ\text{C}$ calculate the efficiency
15. What is magnetic deflection sensitivity?

Section - II

Write short note on any **five** of the following

(5×5=25)

16. Derive expression for work done in an adiabatic process.
17. Explain the principle of entropy in reversible process.
18. Obtain expression for stationary Longitudinal vibrations in rod.
19. Using j-notation analyze the AC circuit containing R & L in series.
20. Draw the diagrams of cathode ray oscilloscope and label the parts
21. Derive expression for length contraction
22. Write a note on Minkowski's space

Section - III

Write explanatory note on any **four** of the following.

(4×10=40)

23. Derive Lorentz transformation equations. **(10)**
24. a) Explain the measurement of voltage and frequency using CRO. **(5)**
b) Obtain the expression for harmonics in fixed-fixed rod. **(5)**
25. Obtain an expression for charging and discharging of voltage in capacitor **(10)**

26. a) Write a note about principle of regenerative cooling (6)
- b) A Carnot's engine sink with a temperature 10°C has an efficiency of 40%. It is desired to double its efficiency. By how many degrees should the temperature of source be increased. (4)
27. a) Derive expression for Einstein's mass-energy relation (7)
- b) Reduce Einstein Mass-Energy equation to Kinetic energy equation at very low velocities. (3)
28. a) Derive Clausius-Clapeyron equation for latent heat of vaporization (7)
- b) Write a note on applications of Clausius - Clapeyron equation on melting point and boiling point. (3)
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