647510 **BSc4PhyC401x** **Seat No :_____**

B.Sc. Semester - 4 (*CBCS*) Examination
March/April-2026 [NEW COURSE]
Physics-Ph401(Core)

Time: 2:30 Hours **Marks: 70**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que.1(A) Answer the following questions (any two out of three) (10)

(1) Derive the Bio Savart's law.

(2) Derive the divergence and curl of magnetic field (B).

(3) Discuss the Ampere's law and any one application of it.

Que.1(B) Answer the following questions (any one out of two) (04)

(1) Give comparison of electrostatics and magnetostatics.

(2) Explain the steady current.

Que.2(A) Answer the following questions (any two out of three) (10)

(1) Explain Joule-Thomson Expansion.

(2) Derive the Mayer's formula.

(3) Discuss Carnot's cycle.

Que.2(B) Answer the following questions (any one out of two) (04)

(1) Give definitions of any four thermodynamic processes.

(2) Discuss the zeroth law of thermodynamics.

Que.3(A) Answer the following questions (any two out of three) (10)

(1) Discuss the T-S diagram.

(2) Derive the entropy change in reversible processes.

(3) Give thermodynamic proof of $E = \sigma T^4$, Stefan's law.

Que.3(B) Answer the following questions (any one out of two) (04)

(1) Explain quantum theory of radiation by Planck's law.

(2) Explain the distribution of energy in blackbody spectrum.

Que.4(A) Answer the following questions (any two out of three) (10)

(1) Discuss the construction, working and applications of photodiode.

(2) Explain the construction and working of UJT.

(3) Write a detailed note on thermistor.

Que.4(B) Answer the following questions (any one out of two) (04)

(1) Explain the working of JFET.

(2) Write a note on Multicolor LEDs.

Que.5(A) Answer the following questions (any two out of three) (10)

(1) Discuss the De'Morgan's the theorem in details with appropriate importance.

(2) What is universal gate? Discuss the NAND gate as universal gate.

(3) Write a note on various number systems.

Que.5(B) Answer the following questions (any one out of two) (04)

(1) Discuss NOR gate in detail.

(2) Discuss analog and digital signal.

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