

BSc4PhyC401x
B.Sc. Semester - 4 (CBCS) Examination
March/April-2024 [NEW COURSE]
Physics-Ph401(Core)

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

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

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- Que.1(A) Answer the following questions. (any two out of three) (10)
1. Explain straight line currents.
 2. Derive the divergence and curl of magnetic field (B).
 3. Discuss in detail cycloid motion.
- Que.1(B) Answer the following questions. (any one out of two) (04)
1. Give comparison of electrostatics and magnetostatics.
 2. Explain Lorentz force law.
- Que.2(A) Answer the following questions. (any two out of three) (10)
1. Explain Joule-Thomson Expansion.
 2. Discuss in detail second law of thermodynamics.
 3. Give the statement of Carnot's theorem and give its proof.
- Que.2(B) Answer the following questions. (any one out of two) (04)
1. Give definitions of any four thermodynamic processes.
 2. Describe thermal equilibrium and zeroth law of thermodynamics.
- Que.3(A) Answer the following questions. (any two out of three) (10)
1. Write a note on blackbody and blackbody radiation.
 2. State and prove the principle of increase of entropy.
 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. Discuss third law of thermodynamics.
 2. Explain quantum theory of radiation by Planck's law.
- Que.4(A) Answer the following questions. (any two out of three) (10)
1. What is the symbol of Uni Junction Transistor (UJT)? Also discuss the workings of UJT.
 2. Describe the output characteristics of JFET and discuss its important points.
 3. Write a detailed note on varactor diode.
- Que.4(B) Answer the following questions. (any one out of two) (04)
1. Explain the principle of photo diode and also discuss its characteristics.
 2. Write a note on Multicolor LEDs.
- Que.5(A) Answer the following questions. (any two out of three) (10)
1. Give definition, symbol, truth table and Boolean expression of NAND and NOR gate.
 2. Discuss AND laws and OR laws of single variable Boolean theorem.
 3. Write a note on various number systems.
- Que.5(B) Answer the following questions. (any one out of two) (04)
1. Discuss NOT gate in detail.
 2. Discuss analog and digital signal.
