

B.Sc. Semester - 4 (CBCS) Examination
March/April-2023 [OLD COURSE]
PHYSICS(CORE)

Time: 2:30 Hours

Marks: 70

Instructions:

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

Q.1(A) Answer the following questions. (Any One) (07)

1. Explain Specific heats of gas.
2. State and prove Carnot's theorem.

Q.1(B) Answer the following question. (Any One) (04)

1. Explain Zeroth law of thermodynamics.
2. Explain Heat engine.

Q.1(C) Answer the following question. (Any Three) (03)

1. In Isothermal process _____ remains constant throughout the process.
2. The first law of thermodynamics $dQ =$ _____.
3. Heat capacity per unit mass is known as _____.
4. Write the Mayer's formula.
5. In Isochoric process _____ remains constant throughout the process.

Q.2(A) Answer the following questions. (Any One) (07)

1. Explain change of entropy in Reversible and Irreversible Process.
2. Explain Ferry's and Wien's black body.

Q.2(B) Answer the following question. (Any One) (04)

1. Write a note on T-S diagram.
2. Write a note on Wien's displacement law.

Q.2(C) Answer the following question. (Any Three) (03)

1. The entropy is _____ during an adiabatic reversible process.
2. In all irreversible processes the entropy of the system is _____.
3. As the entropy decreases, the disorder of the system is _____.
4. As per Stefan-Boltzmann law $E \propto$ _____.
5. Wien's displacement law $\lambda_m \cdot T =$ _____.

Q.3(A) Answer the following questions. (Any One) (07)

1. Explain thermodynamic functions: (i) Internal energy U and (ii) Helmholtz free energy F.
2. Derive an equation for Maxwell's thermodynamic relations.

Q.3(B) Answer the following question. (Any One) (04)

1. Derive Specific heat equation $C_p - C_v = R$.
2. Derive Joule-Thomson coefficient formula

Q.3(C) Answer the following question. (Any Three) (03)

1. For an isochoric adiabatic process $dU =$ _____.
2. Helmholtz free energy $F =$ _____.
3. Enthalpy $H =$ _____.
4. For an isothermal isochoric process $dG =$ _____.
5. Gibb's function $G =$ _____.

Q.4(A) Answer the following questions. (Any One) (07)

1. Explain principle, construction and working of LED.
2. Explain construction, working and advantages of JFET.

Q.4(B) Answer the following question. (Any One) (04)

1. Write a note on thermistor.
2. Write a note on NAND gate as a Universal gate.

Q.4(C) Answer the following question. (Any Three) (03)

1. LED is always operates in _____ bias.
2. Photodiode is operates in _____ bias.
3. JFET is a _____ controlled device.
4. UJT is also called _____.
5. Not gate is known as _____.

Q.5(A) Answer the following questions. (Any One) (07)

1. Explain electrical resonance in parallel LCR circuit.
2. Explain principle, working and construction of Phase-shift Oscillator.

Q.5(B) Answer the following question. (Any One) (04)

1. Write a note on Maxwell's LC Bridge.
2. Write a note on Colpitts Oscillator.

Q.5(C) Answer the following question. (Any Three) (03)

1. In series LR circuit, voltage leads current. Is it true?
2. In series CR circuit, current leads voltage. Is it true?
3. De-Sauty Bridge is use for measurement of _____.
4. Wien Bridge Oscillator gives constant output. Is it true?
5. Owens Bridge is use for measurement of _____.
