647510 **BSc4PhyC0401** **Seat No :_____**

B.Sc. Semester - 4 (*CBCS*) Examination
March/April-2024 [OLD COURSE]
PHYSICS (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 in detail. (Any one) (07)

1. Define specific heat of gas and derive Mayer's formula.
2. Write a note on thermodynamic system.

Que.1(B) Answer the following questions in brief. (Any one) (04)

1. Derive formula of work done during an adiabatic process.
2. Discuss porous-plug experiment.

Que.1(C) Answer the following questions in short. (Any three) (03)

1. The first law of thermodynamics is the law of conservation of ……
2. The unit of specific heat in CGS system is ……
3. $C_p - C_v = R$ is known as …… formula.
4. What is isobaric process?
5. Thermos flask is an example of isolated system in the thermodynamics. [True / False]

Que.2(A) Answer the following questions in detail. (Any one) (07)

1. Explain change in entropy in reversible and irreversible process.
2. Discuss distribution of energy in black body spectrum and discuss its results.

Que.2(B) Answer the following questions in brief. (Any one) (04)

1. State and explain Stefan-Boltzmann's law.
2. Write a note on temperature-entropy diagram.

Que.2(C) Answer the following questions in short. (Any three) (03)

1. During an adiabatic process, the change of entropy is ……
2. In a cycle of reversible process, the total change in entropy is always zero. [True / False]
3. The entropy of the universe always ……
4. Stefan's law state the $E = \sigma T^4$ [True / False].
5. Reyleigh-Jeans law holds good for …….. wavelengths.

Que.3(A) Answer the following questions in detail. (Any one) (07)

1. Define thermodynamic potentials. Discuss Enthalpy and Gibbs function.
2. Derive general expression of Maxwell's thermodynamic relation and derive four fundamental thermodynamic relations from it.

Que.3(B) Answer the following questions in brief. (Any one) (04)

1. Derive Clausius - Clapeyron's latent heat equation.
2. Explain Helmholtz free energy.

Que.3(C) Answer the following questions in short. (Any three) (03)

1. Enthalpy H = U+PV+R? [True / False]
2. Helmholtz free energy F = ……
3. First law of thermodynamics is dQ = dU + PdV [True / False]
4. Internal energy of the system remains constant in an isochoric adiabatic process. [True / False]
5. Enthalpy remains constant in reversible isobaric adiabatic process. [True / False]

Que.4(A) Answer the following questions in detail. (Any one) (07)

1. What do you mean by logic gate? Explain Basic three logic gates.
2. Draw equivalent circuit of UJT and discuss its working.

Que.4(B) Answer the following questions in brief. (Any one) (04)

1. Write a note on multicolor LED.
2. Explain NAND gate as a universal gate.

Que.4(C) Answer the following questions in short. (Any three) (03)

1. Write the full form of JFET?
2. The binary system has a base of …….
3. UJT is a bipolar device. [True / False]
4. NOT gate has only one input and one output and it is known as inverter. [True / False]
5. FET is a …… controlled device.

Que.5(A) Answer the following questions in detail. (Any one) (07)

1. Explain principle and action of Phase shift oscillator and write its advantages and disadvantages.
2. Write a note on L-C-R series ac circuit.

Que.5(B) Answer the following questions in brief. (Any one) (04)

1. Explain action of Colpitt oscillator.
2. Derive a.c. bridge balance condition.

Que.5(C) Answer the following questions in short. (Any three) (03)

1. Write unit of frequency.
2. The condition $X_L = X_C$ is known as ……..
3. The value of unknown inductance can be measured using Maxwell's Bridge. [True / False]
4. Owen's bridge is used to determine the unknown inductance in terms of resistance and capacitance. [True / False]
5. The specific conductivity of electrolyte is determined using which bridge?

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