INTERNAL ASSESMENT-2021-22

KANDI RAJ COLLEGE

DEPARTMENT OF PHYSICS

SEMESTER: 3rd STREAM: Honours (Core)

Paper:[Mathematical Physics-II + Thermal Physics +Digital Systems and Applications]

Time: 6 Hrs.

PAPER CODE: PHY-H-CC-T-05

Full marks: 10

Answer any five questions **5X2 =10**

1. What are Dirchlet's conditions in Fourier Series Transform?
2. Find the Fourier Series of $f(x) = x^2$ for $0 < x \leq 2$.
3. Find the Fourier Series of :

$$f(x) = x; \ 0 \leq x \leq \pi$$
$$= 2\pi - x; \ \pi \leq x \leq 2\pi$$

4. Express $f(x) = x$ as a Fourier Series in the interval $-\pi < x < \pi$.
5. Obtain the Half-Range sine series for e^x in $0 < x < 1$.
6. What is the basic difference between an ordinary point and singular point of the following Differential equation:

$$P_0(x)\frac{d^2y}{d^2x} + P_1(x)\frac{dy}{dx} + P_2(x)y = 0.$$

PAPER CODE: PHY-H-CC-T-06

Full Marks: 10

Answer any *Five* of the following questions: **[2 +2 +2+2+2]**

1. What is the significance of Zeroth law of thermodynamics.
2. If there is no wastage of energy in the Carnot's reversible engine, then why is the efficiency less than 100%.
3. Calculate the change in entropy when a body of mass 5 gm is heated from 100K to 300K. given specific heat of the body = 0.1 cal gm^{-1} deg^{-1}.
4. Write down the expression for Maxwell-Boltzmann's distribution law of velocities for gas molecules, explaining the individual terms.
5. What is Boyle temperature. How is it related to critical temperature ?
6. What are the essential differences between adiabatic expansion and Joul-Thomson effect.

PHY-H -CC-T-07
Full Marks: 10

. **(5x2=10)**

Answer any two questions.

1. Explain the working principle of a CRO along with a block diagram.
2. What are multiplexers and demultiplexers? Explain with suitable examples.
3. Draw the block diagram of 8085 microprocessor. Explain tristate configuration.
4. Describe the functions of ALE, S0 and S1 pins in 8085 microprocessor

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PHY-H-GE-T-01: MECHANICS
Full Marks: 10

Answer any *Five* questions of the following: **(5x2=10)**

1. Determine the moment of inertia of the earth, assuming earth to be a uniform sphere of radius 6400 km and mass 6 X 10^{24} kg.
2. What is perfectly inelastic collision ? Give an example.
3. Find the potential due to a point mass.
4. Does a particle moving along a circular path with uniform speed possess acceleration ? Explain.
5. Write down the differential equation of SHM explaining the every terms.
6. Write two differences between inertial and non-inertial frame of references.

Paper Code - PHY-H-SEC-T-01
Full Marks: 5

Answer any Five Questions: **5×1=5**

1. What is Ohm's law? Define Resistivity.

2. What is a voltmeter? How it works?

3. What is a parallel resonant circuit?

4. What are the advantages of AC generator over DC generator?

5. What is a circuit breaker and how it works?

6. What are the differences between Star and delta connection?

7. What is power factor in AC circuits?
