KARIMPUR PANNADEVÍ COLLEGE

Sub: Physics (General) **Paper:** PHY-G-CC-T-02 **F.M-**10

2ND SEMESTER INTERNAL EXAMINATION, 2020(BLENDED MODE)

Students are strongly advised to write answers in their own words.

Waves and Optics

Answer any five questions from the following: **2×05=10**

1) How does the fringe width of interference fringes change, when the whole apparatus of Young's experiment is kept in a liquid of refractive index 1.3?

2) State the reason, why two independent sources of light cannot be considered as coherent sources.

3) What type of wavefront will emerge from a

(i) Point source, and

(ii) Distant light source?

4) In a single-slit diffraction experiment, the width of the slit is made double the original width. How does this affect the size and intensity of the central diffraction band.

5) Write the distinguishing features between a diffraction pattern due to a single slit and the interference fringes produced in Young's double slit experiment?

6) Explain by drawing a suitable diagram that the interference pattern in a double slit is actually a superposition of single slit diffraction from each slit.

Mathematical Physics-II

Find the Fourier series to represent $f(x) = x^2$ in the interval $(0, 2\pi)$. **10**

Thermal Physics

Answer any five questions from the following: **2×05=10**

1. A mass **m** of a liquid at temperature $\mathbf{T_1}$ is mixed with an equal mass of the same liquid at a lower temperature $\mathbf{T_2}$.The system is thermally insulated. Show that when the system comes in equilibrium the entropy change of the universe will be **2ms**
$$\left[\frac{\frac{(T_1+T_2)}{2}}{(\sqrt{T_1}T_2)}\right]$$
2. Show that for a van der Waal's gas $R=\frac{8}{3}\frac{P_C V_C}{T_C}$ where P_c, V_c and T_c are critical pressure, volume, temperature respectively.
3. Each molecule of a polyatomic gas posses six degrees of freedom, calculate C_p, C_v and Υ for one mole of a gas .Given R=8.3J/K $mole^{-1}$.
4. Show that average kinetic energy per gm-mole of a substance is $\frac{3}{2}$RT.
5. Calculate the most probable speed of nitrogen at 27ºC.Given N=6 × 10^{23} molecules/mole; k=1.38×10^{-16} erg K^{-1}.
6. Show Maxwell-Boltzmann's law of distribution of molecular velocities graphically.

Digital Systems and Applications

Construct OR, AND, NOT Gate using NAND Gate.

Draw the circuit diagram for each of the Gate with truth table. **10**

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