30/5/24

DOON UNIVERSITY, DEHRADUN

End Semester Examination, Even Semester, 2023-24 (2nd Sem)

Department of Physics, School of Physical Sciences

B.Sc. (Hons) With Research

Course PHC-152: Wave and Oscillations

Time Allowed: 2:00 Hours ***Maximum Marks: 30***

SECTION: A **(Marks: 1x5=5)**

1. In the interference pattern energy is:
   A. Created at the position of maxima's.
   B. Destroyed at the position of minima.
   C. Conserved but is redistributed.
   D. None of the Above.

2. Wavefront of a wave has direction with wave motion is:
   A. Parallel
   B. Perpendicular
   C. Opposite
   D. At an angle of θ

3. The similarity between the sound waves and light waves is:
   A. Both are electromagnetic waves
   B. Both are longitudinal waves
   C. Both have same speed in a medium
   D. They can produce interference

4. Which of the following phenomenon produces colour in soap bubble?
   A. Interference
   B. Diffraction
   C. Polarization
   D. Dispersion

5. Sound wave travel faster in which medium. (denser/rarer medium)

SECTION: B **(Marks: 3x5=15)**

6. State and explain the superposition principle with an example.

7. A particle is subjected to two simple harmonic oscillations

   $X_1=A_1 \text{Sin } wt$
   $X_2= A_2 \text{ Sin}(wt+\pi/3)$
   Determine (a) the displacement at t=0, (b) the maximum speed of the particle, (c) the maximum acceleration of the particle.

8. How to determine the refractive index of material by the use of Michelson interferometer?

9. Why are Newton's rings circular in shape and the fringes due air wedge straight?

10. What is wave front? Discuss three types of wave front with diagram.

SECTION: C **(Marks: 2x5=10)**

11. Explain the working of Michelson Interferometer. How the Interferometer produces straight and circular fringes (Explain with neat diagram).
12. Derive the expression for two mutually perpendicular harmonic oscillators. Obtain the resultant motion of the particle under the special cases.