

Khatra Adibasi Mahavidyalaya  
B.Sc. Internal Assessment 2020

Physics Honours **SHPHS/202/C-4:**  
Wave & Optics (T4)  
Full Marks: 20; Time 1 hr

June 2, 2020

**Group A**

Answer any *two* questions:  $5 \times 2 = 10$

1. A 5g marble is fired vertically upwards using a spring gun. If the spring is compressed 8cm, the marble reaches a target of 20m above the marble's position on the compressed spring. Find the spring constant of the spring.
2. Show that SHM can be resolved into two equal and opposite circular motions.
3. Derive the dependance of intensity and amplitude of (i) plane, (ii) cylindrical & (iii) spherical waves on distance from respective sources.(1+2+2)

**Group B**

Answer any *one* question:  $10 \times 1 = 10$

- 4(a). Establish the differential equation of linearly damped motion along x-axis of a particle under a linear restoring force. (3)  
(b) Find the complete steady-state solution of the above equation and hence find the energy of the system at resonance. (4+3)
- 5(a). Explain Rayleigh criterion of resolution (3)  
(b). Obtain the intensity distribution for Fraunhofer diffraction pattern for a double slit. Hence find the condition for maxima. (6+1)