

D1BPH2503

Name:

Reg. No.:

FIRST SEMESTER FYUGP EXAMINATION NOVEMBER 2025**(Regular/Improvement/Supplementary)****MINOR****PHY1MN101: MECHANICS AND OPTICS****Time: 2 Hrs.****Maximum Marks: 70**

M – Mark

BL - Bloom's Taxonomy Level (1 to 6)

CO - Course Outcome

Section A: Answer all questions. Each carries 3 marks.**Ceiling: 24 Marks**

No.	Question	M	BL	CO
1.	Define mass and weight of a body. Give its units.	3	1	CO1
2.	A ball of mass 200gm is moving with a speed of 30m/s. When it strikes to a wall it returns back to the same speed. If the contact time between ball and wall is 0.2 second, what is the force exerted by the ball on the wall?	3	3	CO1
3.	What is meant by banking of road?	3	2	CO1
4.	Show that the work done is a path function for non-conservative forces.	3	4	CO3
5.	Explain Snell's law with the help of figure.	3	3	CO4 CO5
6.	How does the violet color appear in the lower side and red color appear in the upper side of primary rainbow?	3	5	CO5
7.	What happens when two waves combine or interfere in space?	3	2	CO4
8.	Explain how the interference pattern is formed by the interference of two coherent light waves.	3	3	CO4
9.	With the help of Huygens' Principle explain the phenomenon of diffraction.	3	2	CO4
10.	Obtain the width of the central maxima of single slit diffraction pattern.	3	3	CO4

Section B: Answer all questions. Each carries 6 marks.**Ceiling: 36 Marks**

No.	Question	M	BL	CO
11.	Explain with example how Newton's first law is applicable to objects in motion?	6	3	CO1
12.	Explain positive, negative and zero work with example.	6	2	CO2

(PTO)

13.	If a pendulum of weight w and length l is given a horizontal force F just to make pendulum move slowly and remain very nearly in equilibrium throughout the process. It makes an angle of θ with the vertical. Derive the expression for work done by force F .	6	3	CO2
14.	A liquid lies on top of the horizontal surface of a block of glass. A ray of light traveling in the glass has speed 1.85×10^8 m/s, wavelength 365 nm, and frequency 5.07×10^{14} Hz. The ray is incident on the surface of the glass at an angle of 38.0° with respect to the normal to the surface. The ray that refracts into the liquid makes an angle of 44.7° with the normal to the interface between the two materials. What are the speed, wavelength, and frequency of the light when it is traveling in the liquid?	6	4	CO5
15.	A concave spherical mirror has radius of curvature 37.0 cm. Find the image distance and lateral magnification for each of the following object distances. In each case state whether the image is real or virtual, whether it is erect or inverted, and whether it is larger or smaller than the object. (a) 11.0 cm; (b) 31.0 cm; (c) 55.0 cm.	6	5	CO5
16.	You are designing a lens to be made of glass with index of refraction 1.70. The first surface (the surface toward the object) is to be convex with radius of curvature 28.0 cm, and the focal length of the lens is to be 14.0 cm. (a) What must be the radius of curvature of the second surface (the surface away from the object)? (b) Will the second surface be concave or convex?	6	5	CO5
17.	Using phasor representation, obtain the intensity variation of the interference pattern of Young's double slit experiment.	6	4	CO4
18.	Obtain the width of the central maxima of single slit diffraction pattern.	6	3	CO4

Section C: Answer any one question. Each carries 10 marks. (1 x 10 = 10 Marks)

No.	Question	M	BL	CO
19.	Derive the expression for maximum velocity that a vehicle can have while rounding a flat road and banked road.	10	3	CO1
20.	Discuss the relationship between conservative force and potential energy using examples.	10	2	CO3