QP CODE: D1BPH2402

Name: .....
Reg.No.: .....

FIRST SEMESTER FYUGP EXAMINATION NOVEMBER 2024

MINOR

PHY1MN101 MECHANICS AND OPTICS

Time : 2 Hrs **Maximum Marks : 70**

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

Section A

Ceiling Marks : 24

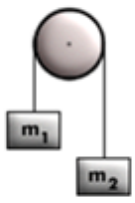
Answer all questions. Each carries 3 marks.

No.	Question	M	BL	CO
1.	Why do cars with more powerful engines accelerate faster?	3	2	CO1
2.	A student stands on a bathroom scale in a lift that is supported by a cable. If the scale reads zero should he worry? explain	3	4	CO1
3.	If force varies as $F=Kx^2$ in the x direction,derive the expression for work done.	3	3	CO2
4.	What is dispersion? What causes light to have dispersion?	3	4	CO5
5.	A beam of light goes from one material into another. On physical grounds, explain why the wavelength changes but the frequency and period do not.	3	5	CO5
6.	The focal length of a simple lens depends on the color (wave length) of light passing through it. Why? Is it possible for a lens to have a positive focal length for some colors and negative for others? Explain.	3	5	CO5
7.	State and explain the principle of superposition.	3	2	CO4
8.	Write the expression for the intensity variation of the interference pattern of Young's double slit experiment and deduce the conditions for minima and maxima.	3	3	CO4
9.	Distinguish between Fresnel diffraction and Faunhofer diffraction.	3	2	CO4
10.	What are principal maxima in a several slit experiment?	3	4	CO4

Section B

Ceiling Marks : 36

Answer all questions. Each question carries 6 marks.

No.	Question	M	BL	CO
11.	 In an Atwood machine, two masses m1=5Kg and m2=3kg are connected by a string over a frictionless pulley. (a) Calculate the acceleration of the system. (b) What is the tension in the string?	6	3	CO1

12.	Why pilots black out while making a tight turns? Explain with banking of flight.	6	2	CO1
13.	Derive the expression for maximum velocity that a vehicle can have while rounding a banked road.	6	4	CO1
14.	Derive the expression for gravitational force from gravitational potential energy.	6	3	CO3
15.	A spring of spring constant 900N/m is stretched to 10 cm from equilibrium. Find the potential energy. Suppose it is compressed to 5cm from equilibrium what will be the potential energy?	6	3	CO3
16.	Devise straightforward experiment to measure the speed of light in a given glass using Snell's law.	6	6	CO5
17.	In Young's double slit experiment, obtain the position of m^{th} dark fringe on a screen placed at a distance R from the sources having separated by a distance d.	6	3	CO4
18.	With the help of diagram, describe the difference between Fresnel diffraction and Faunhofer diffraction.	6	2	CO4

Section C

Answer any 1 question. Each carries 10 marks. (1x10=10 marks)

No.	Question	M	BL	CO
19.	How the concept of work is related to energy? State and derive work energy theorem for a variable force.	10	2	CO2
20.	Derive the paraxial object-image relation for a thin lens and obtain the lateral magnification. Also derive the lens makers formula.	10	3	CO4 CO5

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