NEWTON'S INN COACHING CENTRE

XI Physics Preparation Paper 2023

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SECTION "B"
SHORT-ANSWER QUESTION

NOTE: Attempt any **Nine** part questions from this section. All questions carry equal marks. The use of scientific calculator is allowed. All notations are used in their usual meanings. Draw diagram where necessary.

Q2: Short Answer Questions.

i. State and prove the law of Conservation of Linear Momentum.

OR

Prove that the rate of change of linear momentum is equal to force

ii. Give Newton's formula for speed of sound. What corrections made by Laplace in it.

iii. How is the magnifying power of the Astronomical telescope and Compound microscope affected by increasing the focal length of their objectives?

iv. Why it is not possible to obtained the diffraction of X-rays by Young's double slit experiment?

v. Determine a unit vector perpendicular to the plane containing $\vec{A} = 3\hat{i} + 6\hat{j} - 2\hat{k}$ and $\vec{B} = 4\hat{i} - \hat{j} + 3\hat{k}$.

OR

Find the area of parallelogram given that the given vectors forms the adjacent sides of triangle $\vec{A} = -4\hat{i} + \hat{k}$ and $\vec{B} = 3\hat{i} + \hat{j} + 2\hat{k}$.

vi. Drive an expression for the Variation of "g" with depth.

vii. Derive work energy equation?

viii. Two coherent sources are placed 1.8cm apart. Interference fringes are obtained on screen 80cm away. The fourth bright fringe is at a distance of 1.08 cm from the central fringe. Calculate the wavelength of the light used.

ix. A particle of mass 0.5kg moves along xy-plane. At that instant, the coordinates are (2, 4) m and its velocity is $(3\hat{i} + 4\hat{j})$ m/s .Determine the angular momentum relative to the origin at that time.

x. Find the speed of sound in air at 50 ^{o}C and 70 ^{o}C (take speed of sound 332 m/s).

xi. A truck starts from rest at the top of a slope which is 1 m high and 49 m long. Find its acceleration and speed at the bottom of the slope assuming that friction is negligible.

xii. A car is waiting at the traffic signal when it turns green the car starts ahead with a constant acceleration of 3m/s^2, at the same time a bus moving with constant speed of 20m/s passes the car. Find the distance at which car will overtake the bus and also find the velocities of car and bus.

xiii. Find the acceleration due to gravity on the surface of moon whose radius is 27% that of earth and mass equals to 12% that of earth

xiv. Two convex lenses of focal length 30 cm and 40 cm are kept together, find the focal length and power of the combination.

SECTION "C"
DETAILED ANSWER QUESTIONS

NOTE: Attempt any **Two** question from this section. Draw diagrams, where necessary.

Q3: a. Describe the addition of vectors by rectangular components method.

b. With the help of ray diagram. Derive relation for magnifying power of compound microscope.

OR

Derive the formula for the position of bright fringe by using Young's double slit experiment

Q4: a. What is Projectile motion? Derive the relation for.

i) Maximum Height ii) Range of projectile

b. Define SHM and prove that motion of simple pendulum for small amplitude is SHM

OR

Discuss Doppler effect when the listener is at rest and the source is moving, first toward then away

Q5: a. What is an inclined plane? A block of mas 'm' is placed on an inclined surface; derive the relation for its acceleration when the block is sliding down in presence of friction.

OR

Derive the relation for the acceleration and tension of bodies hanging vertically by means of a pulley.

b. What is diffraction grating? How can it be used to measure Wavelength of light?

OR

Discuss in detail about Astronomical telescope and derive the formula for the magnification

Important Numerical Problems

Chapter # 02
Problem # 15, 16, 22

Chapter # 03
Problem #2, 3, 9, 10, 12, 13, 15
Example # 3.2

Chapter # 04
Problem # 7, 8, 9, 12

Chapter # 05
Problem # 10

Chapter # 06
Problem # 2, 4, 5, 6

Chapter # 07
Problem # 1, 5, 6

Chapter # 08
Problem # 4, 8, 9, 10 & Pendulum

Chapter # 09
Problem # 1, 3, 4, 5, 8

Chapter # 10
Problem # 3, 7, 9, 10, 13

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