

OBJECTIVE

NOTE:



You have four choices for each objective type question as A , B , C and D . The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question.

QUESTION NO. 1

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- 1 The minimum velocity necessary to put a satellite into orbit is :
(A) 7.1 Kms⁻¹ (B) 7.9 Kms⁻¹ (C) 7.4 Kms⁻¹ (D) 8.7 Kms⁻¹
- 2 Stoke's law holds for bodies having :
(A) Oblong shape (B) Rectangular shape (C) Spherical shape (D) All shapes
- 3 Product of time period and frequency is :
(A) Zero (B) π (C) 1 (D) 2
- 4 The value of 'r' for monoatomic gas is :
(A) 1.67 (B) 1.40 (C) 1.29 (D) 1.45
- 5 Laplace's formula for speed of sound is :
(A) $\sqrt{\gamma P/\rho}$ (B) $\sqrt{E/\rho}$ (C) $\sqrt{P/\rho}$ (D) $\gamma P/\rho$
- 6 The blue colour of sky is due to :
(A) Reflection (B) Diffraction (C) Scattering (D) Polarization
- 7 Magnifying power of astronomical Telescope is :
(A) f_e/f_o (B) f_o/f_e (C) $f_e f_o$ (D) $\frac{1}{f_e f_o}$
- 8 Heat is form of :
(A) Power (B) Momentum (C) Torque (D) Energy
- 9 Pascal is the unit of :
(A) Force (B) Pressure (C) Tension (D) Weight
- 10 SI unit of intensity of light is :
(A) Watt (B) Joule (C) Mole (D) Candela
- 11 1 giga is equal to :
(A) 10^3 (B) 10^{12} (C) 10^9 (D) 10^{18}
- 12 The magnitude of $\hat{i} \cdot (\hat{j} \times \hat{k})$ is :
(A) -1 (B) 0 (C) 1 (D) \hat{j}
- 13 If A_x and A_y are both negative, the resultant vector will lie in ----- quadrant.
(A) First (B) Second (C) Third (D) Fourth
- 14 A body having uniform acceleration of 10 ms^{-2} has a velocity of 100 ms^{-1} . In what time its velocity will be doubled ?
(A) 7 S (B) 14 S (C) 10 S (D) 16 S
- 15 The mass of an object is quantitative measure of its :
(A) Momentum (B) Inertia (C) Energy (D) Velocity
- 16 Work is negative when angle between \vec{F} and \vec{d} is :
(A) 0° (B) 90° (C) 180° (D) 45°
- 17 One revolution is equal to :
(A) $\frac{\pi}{2}$ rad (B) π rad (C) 2π rad (D) $\frac{\pi}{4}$ rad

SECTION-I

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QUESTION NO. 2 Write short answers to any Eight (8) of the following

- Does a dimensional analysis give any information on constant of proportionality that may appear in an algebraic expression? Explain.
- Give the drawbacks to use the period of a pendulum as a time standard.
- Find the uncertainty in the average value of these measurements 1.20, 1.22, 1.23, 1.19
- Find the distance between Moon and Earth where the travel time of light from Moon to Earth is 1 min 20 sec.
- If one of the rectangular components of a vector is not zero. Can its magnitude be zero? Explain.
- Can a body rotate about its center of gravity under the action of its weight?
- If $F_1 = 3 \text{ cm}$ and $F_2 = 6 \text{ cm}$. Let \vec{F}_1 is at angle 30° while \vec{F}_2 is lying at an angle of 120° w.r to X-axis respectively, then find their dot Product.
- What is the difference between uniform and variable velocity. Give S.I unit of acceleration.
- Why does a cricket player retrace his hands backward while catching?
- At what point or points in its path does a projectile have its minimum speed, its maximum speed?
- When a rocket re-enters the atmosphere, its nose cone becomes very hot. Where does this heat energy come from?
- Calculate the work done in Kilo joules in lifting a mass of 10 Kg through a vertical height of 10 m.

QUESTION NO. 3 Write short answers to any Eight (8) of the following

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- What are natural satellites and artificial satellites?
- Define angular displacement and write its unit.
- A disc and a hoop start moving down from the top of an inclined plane at the same time. Which one will be moving faster on reaching the bottom?
- Show that $S = r\theta$
- Explain the difference between laminar flow and turbulent flow.
- Explain what do you understand by the term viscosity?
- Can we realize an ideal simple pendulum?
- What is meant by phase angle? Does it define angle between maximum displacement and the driving force?
- What is the total distance travelled by an object moving SHM in a time equal to its period, if its amplitude is A?
- Explain the terms node and anti-node.
- Why does sound travel faster in solid than in gases?
- What are stationary waves? Explain.

QUESTION NO. 4 Write short answers to any Six (6) of the following

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- How would you distinguish between un-polarized and plane-polarized lights?
- Can visible light produce interference fringes? Explain.
- Explain for which colour of light, the fringe spacing in double slit experiment will be maximum.
- Why would it be advantageous to use blue light with a compound microscope?
- How the power is lost in optical fibre through dispersion? Explain.
- In a compound microscope magnification of objective and eyepiece are 5 and 50 respectively. What is the total magnification of microscope?
- Why does the pressure of a gas in a car tyre increase when it is driven through some distance?
- What happens to the temperature of the room, when an air conditioner is left running on a table in the middle of the room?
- How process of Human metabolism can be explained, by the first law of thermodynamics.

SECTION-II

8 x 3 = 24

Note: Attempt any Three questions from this section

Q.5.(A)	What is vector product of two vectors? Why it is called cross product? Give its examples and write down its characteristics.	5
(B)	A truck weighing 2500 Kg and moving with velocity of 21 ms^{-1} collides with a stationary car weighing 1000 Kg. The truck and the car move together after the impact. Calculate their common velocity.	3
Q.6.(A)	What is gravitational field? Show that gravitational field is a conservative field.	5
(B)	An organ Pipe has a length of 50 cm. Find the frequency of its fundamental note and the next harmonic when it is open at both ends. (Speed of sound = 350 ms^{-1})	3
Q.7.(A)	What is moment of inertia. Discuss the moment of inertia of a rigid body.	5
(B)	A car of mass 1300 Kg is constructed using a frame supported by four springs. Each spring has a spring constant $20,000 \text{ Nm}^{-1}$. If two people riding in the car have a combined mass of 160 Kg. Find the frequency of vibration of the car, when it is driven over a pot hole in the road. Assume the weight is evenly distributed.	3
Q.8.(A)	State and explain Bernoulli's equation.	5
(B)	A mechanical engineer develops an engine. Working between 327°C and 27°C and claims to have an efficiency of 52%. Does he claim correctly? Explain.	3
Q.9.(A)	How does the magnification of an object is determined by using compound microscope?	5
(B)	Sodium light $\lambda = 589 \text{ nm}$ is incident normally on grating having 3000 lines per centimeter. What is the highest order of the spectrum obtained with this grating?	3

