

PHYSICS THEORY CLASS XI

TOTAL: 85 MARKS

TOTAL TIME: 2 HOURS

SECTION A (42 MARKS)

THIS SECTION CONSISTS OF 42 MULTIPLE CHOICE QUESTIONS. EACH QUESTION CARRY ONE MARK.

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01. Choose the correct answer from the given options:

| i) | The dimension of angular a) $M L^2 T^{-1}$ | momentum: b) M L ² T | | c) M L T - 1 | d) M L T -2 |
|---|---|--|--------|----------------------------|---------------|
| ii) | The number of significant a) 2 | figure in 2.500 x 10 ³ is b) 3 | 3: | c) 4 | d) 7 |
| iii) | \hat{k} . ($\hat{i} \ x \ \hat{j}$) is equal to | | | 23 | |
| | a) Zero | b) o | | c) j | d) – k |
| iv) | The vector in space has: a) One component | b) Three compone | nts | c) Two components | d) None |
| 2 | $ \int_{a}^{b} \int_{$ | | | | |
| v _j II $A = 5i + j$ and $B = 2k$ then $A - B$ III equal to: | | | | | |
| | a) $5i + j + 2k$ | b) $5i - j - 2k$ | | c) $5i + j - 2k$ | d) 5i – j -4k |
| | | | | | |
| vi) | When a bullet is fired the | gun move back | | | |
| | a) To maintain the force | b |) To (| enhance the velocity of bu | ıllet |
| | c) To keep the momentu | m conserves d |) Nor | ne of these | |
| vii) | A force which resists the | motion of a body is ca | llod. | | |
| vii) | a) Friction | notion of a body is ca | h) | State friction | |
| | c) Kinetic friction | | d) | | |
| | | | u) | | |



viii) An object is falling through a viscous fluid with terminal velocity. Its velocity: a) is decreasing b) Is increasing c) remains constant d) becomes zero ix) If a light object collides elastically with a massive body which is at rest, light object will: a) Rebound with the same velocity be stopped b) c) Rebound with twice the velocity d) cause the massive body to move x) In projectile motion the object is purely under the influence of: b) Force of gravity a) Centripetal force c) Restoring force d) None xi) For the maximum range of the projectile the angle of elevation must be: a) 0° b) 45° c) 90° d) 30° **xii)** One radian is equal to: a) 0.017° b) 57.3° c) 35.7° d) 0.117° xiii) A car traveling at 65 km hr⁻¹ north turns west without a change in speed. The car is moving with: a) Uniform velocity b) Acceleration c) Average velocity d) None of these xiv) A force of 8N is applyd to the spanner perpendicularly at a distance of 0.15m from the center of the nut, the moment of the force acting on the nut is: a) 1.2 N.m b) 1.5 N.m c) 2.1 N.m d) 3 N.m xv) 15) At what height above the earth surface is the value of g same as that 20km below the earth surface? a) 5Km b) 10Km c)15Km d)20Km xvi) The value of G was determined by: a) Cavendish b)Newton c) Einstein d) Young xvii) The frequency of a simple pendulum is given by (a) $\upsilon = 2\pi \sqrt{\frac{g}{L}}$ (b) $\upsilon = 2\pi \sqrt{\frac{L}{g}}$ (d) $\upsilon = 1/2\pi \sqrt{g/L}$ (c) $\upsilon = 1/2\pi_{1}/L/a$ xviii) An object is executing simple harmonic motion. Its kinetic energy is maximum at its: (a) Mean position (b) Extreme position (c) Extreme position. (d) At any point xix) As a source of sound moves away from a stationary listener, there is an apparent: (a) Increase in pitch (b) Decrease in wavelength (c) Decrease in phase (d)Decrease in pitch **xx)** The speed of sound is the highest in:

| (a) Solid (| (b) Liquid | (c) Gas | (d) Vacuum |
|-------------|------------|---------|------------|
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| xxi) Interferometers | s measures: | | | |

- (a) Wavelength of light
 (b) Thickness of thin objects
 (c) Illuminating power of light
 (d) Velocity of light in gases
- **xxii)** To replace a bright fringe by the next bright fringe in a Michelson interferometer, the movable mirror is moved through a distance equal to:
 - (a) λ (b) $\lambda/2$ (c) $\lambda/4$ (d) 2λ
- xxiii) In Young's double slit arrangement, the bright fringes obtained are of: (a) Uniform intensity (b) Non uniform width (c) Colored (d) Circular xxiv) In Young's double slit experiment, the fringe spacing is: (a) $\frac{d\lambda}{L}$ $\frac{\lambda L}{d}$ (c) $\frac{d}{\lambda L}$ (d) L λ (b) Two convex lenses, of the same focal length f, are kept touching each other. The focal length of the XXV) combination will be: b) f/2 a) f c) 2 f d) 2f + 2xxvi) If the focal length of the lens is 10cm then its power in Diopter is b) 5 a) 9 c) 10 d) 12 xxvii) In compound microscope the objective will form a image which is a) Virtual and magnified b) Real and diminished d) virtual and diminished c) Real and magnified xxviii) An astronomical telescope has the magnifying power 100 and focal length of eye piece is 4cm, then the focal length of the objective is b) 400 cm c)25 cm a) 40 cm d) 14cm xxix) An astronomical telescope is focused at infinity. The focal length of its objective is 0.2m and that of the eyepiece is 5cm. the length of the telescope is : a) 2.5cm b) 4cm c) 5.2cm d) 25cm
- xxx) If the mass of the earth becomes four times to its initial value then the value of 'g' will be:

a) Equal to its initial value b) Four times to its initial value

c) One fourth of its initial value

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| wwwi) If we go up from the s | surface of the earth to a | distance equal to the radius | of the earth, the value of 'a' will |
| he. | | | of the earth, the value of g will |
| a) $\frac{1}{2}$ g | b) $\frac{1}{2}$ | _ g c) 2 | g d) 4 g |
| xxxii) The physical quantity | which produce angular | acceleration is called: | |
| a) Torque | b) Wc | ork c) F | ower d) Energy |
| xxxiii) A body may be in ec | uilibrium when: | | |
| a) It is in motion | b) It is movi | ng with a uniform acceleration | on. |
| c) It is the rest | d) It is movir | ng with a variable velocity. | |
| xxxiv) When the net torque | acting on a system is z | ero, which of the following w | ill be constant? |
| a) Force b) Ang | jular momentum c) | Linear momentum d) accele | ration |
| | | | |
| xxxv) At maximum height, th | e vertical component of | the velocity of projectile is: | |
| a) Minimum | b) Zero | c) Maximum | d) 9.8 m/s |
| xxxvi) If a projectile has sor | me horizontal range at a | n angel of elevation of 15º th | nen its range will be the same |
| when the angle of eleva | tion is equal to; | | |
| a) 30° | b) 45º | c) 75º | d) 90° |
| xxxvii) The centripetal acce | leration of a body movin | g along a circle is: | |
| a) $4 T^2 r / \pi^2$ | b) $4 \pi^2 r / T^2$ | c) $4 r^2 T^2 / \pi^2$ | d) $4 \pi^2 / T^2 r$ |
| xxxviii) When two balls col | ide and as a result temp | perature 'changes. Which on | e of the following law is conserved? |
| a)Velocity | | b) Kinetic energy | |
| c) Momentum | | d) Inertia | |
| xxxix) Stokes' Law for flui | d friction is given as: | | |
| a) $F = 6 \pi \eta r^2 v$ | N. R. | b) $F = 6 \pi \eta r v$ | |
| c) $F = 4 \pi \eta r$ | | d $F = \pi \eta r v$ | |
| xl) The magnitude of unit v | ector will always be: | c) none of th | ase d) All of them |
| u) i | 0) 0 (2010) | c) hone of the | |
| xli) A vector which can be d a) Null | splaced parallel to itself b) Unit | and is applied at any point i c) Position | s known as vector. d) Free |
| xlii) The dimensions of torqu a) M L ² T | e are: b) M L ² T ² | c) ML ² T ⁻² | d) MLT ² |



SECTION B (SHORT ANSWER QUESTIONS) (24 MARKS)

Attempt any three questions from this section. Each question carries two parts and each part carries four marks

| 02. | a) Establish work energy equation. |
|-----|---|
| | b) Calculate centripetal acceleration and centripetal force on a man whose mass is 80 kg who is resting on the ground at the Equator, given that the radius of earth is 6.4 x10 ⁶ m |
| 03. | a) Define Position vector, Free vector, equal vector, negative vector and null vector |
| | <i>b</i>) A 100 grams bullet is fired from a 10 kg gun with a speed of 1000 m/s. What is the speed of recoil of the gun? |
| 04. | a)Define equilibrium give condition of equilibrium |
| | b)The planet Jupiter of mass 2 x 10^{27} kg revolves round the sun of mass 2x 10^{30} kg in a circular orbit of radius 7.8 x 10^{11} m; calculate the gravitational force between them and the orbit speed of Jupiter |
| 05. | a) Briefly describe the defect of lenses? |
| | b) A note of frequency 500 Hz is being emitted by an ambulance moving towards a listener at rest. If the listener detects a frequency of 526Hz, calculate the speed of the ambulance. Take the speed of sound at room temperature to be 340m/s. |
| 06. | a) Explain the interconversion of K.E and P.E? |
| | b)Two parallel slits are illuminated the light of two wavelengths one of which is 6×10^{-7} m. On a screen the fourth dark line of the known wavelength coincides with the fifth bright line of the unknown wavelength. Calculate the unknown wavelength. |
| | OR |

An astronomical telescope has a length of 105cm, and in magnification is 6. Determine the power of objective and eye piece.



SECTION C (DESCRIPTIVE - ANSWER QUESTIONS) (19 MARKS)

Attempt any 1 questions from this section. Each question carries 19 marks

07-a) Prove that motion of a simple pendulum is simple harmonic motion. When the angle of its swing is very small

07-b) What is Diffraction of light? Define Diffraction grating and grating element. How can it be used to determine the wave length of monochromatic light? Derive the mathematical expression.

07-c) Obtain the thin lens formula for the convex lens?

08-a) Derive the relation for variation in g with depth

08-b) Derive an expression for tension in the string and the acceleration of the system when two bodies move vertically?

08-c) Define scalar and vector product. Give example and property of each.