

MODEL PAPER ‘PHYSICS’
Intermediate Part-I Examination, 2008 & Onward

Roll No.
In Figures _____
In Words _____

OBJECTIVE

Time: 20Minutes

Marks: 17

Note: Write your Roll No. in space provided. Over-writing, Cutting, Erasing, Using lead pencil will result in loss of marks.

Q.No.7. Each question has four possible answers. Choose the correct answer and in circle it.

17

- (i) The dimensions of Moment of inertia are
(a) ML^{-2} (b) ML^2 (c) M^2L (d) ML (e) None of these
- (ii) The resultant of two forces 10 N and 8 N cannot be:
(a) 2N (b) 18N (c) 10N (d) 12N (e) 20N
- (iii) $i \cdot (j \times k)$
(a) i (b) j (c) k (d) zero (e) 1
- (iv) The velocity – time graph is parallel to Time – axis, the acceleration of the moving body is
(a) Positive (b) Negative (c) Zero (d) Maximum (e) None of these
- (v) A body of weight 5 N falls through a height of 10m. Its energy 5m above the ground is:
(a) 25n (b) 50N (c) Both ‘a’ and ‘b’ (d) 75N (e) None of these
- (vi) The wt of man in a elevator moving down with an acceleration 9.8 ms^{-2} will become:
(a) Half (b) Double (c) Unchanged (d) Zero (e) Negative
- (vii) The moment of linear momentum is called:
(a) Impulse (b) Torque (c) Angular Momentum (d) Couple (e) None of these
- (viii) High concentration of red blood cells increases the viscosity of blood from
(a) 2 –3 times that of water (b) 3 – 4 times that of water (c) 3 –5 times that of water (d) 4 – 5 times that of water (e) None of these
- (ix) The production of time-period and frequency is equal to:
(a) 3 (b) 2 (c) 1 (d) 0 (e) both ‘a’ and ‘c’
- (x) The velocity of sound in Hydrogen as compared to Oxygen under similar condition is:
(a) $\frac{1}{4}$ the velocity of O₂ (b) Four times the velocity in O₂ (c) $\frac{1}{2}$ the velocity in O₂ (d) Two times the velocity in O₂ (e) None of these
- (xi) When two notes of frequencies f_1 and f_2 are formed. If f_1 and f_2 , then frequency of beats is:
(a) $f_1 + f_2$ (b) $f_1 - f_2$ (c) $f_1 + f_2$ (d) $f_1 - f_2$ (e) both ‘a’ and ‘c’
- (xii) Light from Sun reaches the earth in the form of:
(a) Cylindrical wave front (b) Spherical wave front (c) Plane wave front (d) All the above (e) None of these

- (xiii) The central part of Newton's Rings when observed with reflected light is dark due to the reason that;
- (a) The part of ray reflected from upper surface of convex lens undergoes a phase shift of 180° (b) The reflection from upper surface of air film undergoes a phase shift of 180° (c) The reflection from lower surface of air film undergoes a phase shift of 180° (d) All of above (e) None of these
- (xiv) A double convex lens acts as a diverging lens when the object is:
- (a) Inside the focus (b) Away from $2f$ (c) Between f and $2f$ (d) On $2f$ (e) Infinity
- (xv) Least distance of distinct vision:
- (a) Increase with increase of age (b) Remain same with increase of age (c) decrease with increase of age (d) All of these (e) None of these
- (xvi) The temp scale which is independent of the nature of the substance used in thermometer is called:
- (a) Centigrade scale (b) Fahrenheit scale (c) Kelvin or absolute scale (d) Thermodynamic scale (e) All of these
- (xvii) Which of the following forces is irreversible:
- (a) Slow compression of an elastic spring (b) Slow evaporation of a substance on an insulated vessel (c) Slow compression of a gas (d) A chemical explosion (e) Slow expansion of a gas

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SUBJECTIVE

Time: 2:40Hours **Marks: 68**
Note: - Attempt any TWENTY TWO (22) questions from Section -I and any THREE questions form Section-II

SECTION -I

Q.No.2. Attempt any TWENTY TWO (22) questions. **(22x2)=44**

- (i) Name the two physical quantities, which have the same dimensional formula.
Writ that dimensions also
- (ii) Find the dimensions of ω in the relation $F = 6 \omega r v$ $r =$ radius and $v =$ velocity
- (iii) Write the name of two supplementary units & define them
- (iv) In fig which force will give max. Work & Why?
- (v) Give that $A = I - 2j + 3k$ & $B = 3i - 4k$, find the length of the projection of A and B
- (vi) Find the value of unknown forces R in the figure (Rod AB Pivotat Point D) using 2nd condition of equilibrium.
- (vii) In figure the velocity of car is reduced due to the retarding force F, find its value.
- (viii) Define Impels & show that how it is related to linear Momentum?
- (ix) In figure, Maximum height & Horizontal range are equal; find the angle of projection of Projectile?
- (x) Prove that power is a Scalar product of force and velocity.
- (xi) In figure, there one three paths between points A and B on which path the work done in moving a body from A and B will be Maximum or remain same.
- (xii) A body of mass m is falling down with velocity V_1 and at a height h_1 from a point P. If there is no frictional force, write the work- energy equation for the body at point Q.
- (xiii) Figure shows a mass m attached to a mass less rod at O(Pivot Point). A force F is applied on it as shown. Find the value of Torque in terms of moment of Inertia I and Angular Acceleration.
- (xiv) A 1000 kg car traveling with a speed of 144 kmh⁻¹ round a curve of radius 100m. Find the necessary centripetal force.
- (xv) Describe what should be the minimum velocity for a satellite, to orbit close to the earth around it?!
- (xvi) State the Torricelli’s Theorem with diagram.
- (xvii) Explain the difference between Laminar flow and Trubulent flow.

- (xviii) Two row boats moving parallel in the same direction are pulled towards each other, explain?
- (xix) Define resonance with one example.
- (xx) A mass m is attached with a spring and pulled slowly through x_0 against the elastic restoring force F , using Hook's Law, calculate the work done in displacing the mass & hence calculate done in displacing the mass & hence calculate elastic PE of the spring.
- (xxi) Explain S. H. Motion for a body of mass m , attached with a spring of spring constant K .
- (xxii) Explain the terms crest, trough, node and antinode.
- (xxiii) Name the three important cases of super position of two waves when act simultaneously upon the particles of a medium.
- (xxiv) What is Doppler effect?
- (xxv) Draw the diagram of Michelson's Interferometer and write the equation by which we can find the displacement L of the mirror.
- (xxvi) Define grating element.
- (xxvii) How is the distance between interference fringes affected by the separation between the slits of Young's Experiment?
- (xxviii) Draw the Ray-diagram of a compound Microscope
- (xxix) How the magnification of (i) Simple Microscope and (ii) Astronomical Telescope changes by decreasing the focal length of an eyepiece, explain.
- (xxx) Name the three types of optical fibers.
- (xxxii) State 1st Law of Thermodynamics, with sign convention
- (xxxii) Why $C_p > C_v$
- (xxxiii) Explain the principle of Heat engine with diagram.

SECTION -II

- Note: - Attempt any THREE questions. 24**
- Q.No3.** (a) Define Vector Product of Two Vectors with examples. State right hand rule. 4
 Show that $A \times B = - B \times A$.
- (b) find the angle between two vectors, $A = 5i + j$ and $B = 2i + 4j$ 4
- Q.No4.** (a) Derive an expression for Centripetal force. 4
 (b) What is the least speed at which an aeroplane can execute a vertical loop of 1.0km radius so that there will be no tendency for the pilot to fall down at the height point. 4
- Q.No5.** (a) State and prove Bernoulli's Theorem 4
 (b) How large must a heating duct be if air moving 3.0 ms^{-1} along it can replenish the air in a room of 300 m^3 volume every 15 min 4
- Q.No6.** (a) Give draw back of Newton's formula for velocity of sound. How this was corrected by Laplace. 4
 (b) Find the temperature at which the velocity of sound in air is two times its velocity at 10°C 4