



D.J. SINDH GOVT. SCIENCE COLLEGE, KARACHI

Dr. Zia-uddin-Ahmed Road Karachi

PRELIMINARY EXAMINATION 2017

DATE: 13/03/2017

PHYSICS XI

TIME: 9:00 TO 12:00

SECTION 'A'

(Max. Marks 17)

Multiple Choice Question (MCO's)

Q.1. Select the most appropriate answer from the given option

- (i) If R_x is negative and R_y component is positive the direction of resultant R is
* $\theta = \phi$ * $\theta = 180^\circ - \phi$ * $\theta = 180^\circ + \phi$ * $\theta = 360^\circ - \phi$
- (ii) If the range of projectile is half of its maximum range, the angle of projection is
* 30° * 15° * 45° * 60°
- (iii) If a man goes to a height equal to twice the radius of earth from its surface, his weight relative to that of earth would become:
* One-fourth * One-ninth * Same * Half
- (iv) The waves which propagate by the oscillation of material particles are known as
* E.M waves * De Broglie waves * mechanical waves * none of these
- (v) To determine the interplaner space in a crystal, the equation used is
* $d \sin \theta = n\lambda$ * $2d \sin \theta = n\lambda$ * $\frac{d \sin \theta}{2} = n\lambda$ * $n\lambda \sin \theta = d$
- (vi) An organ pipe is 50m long, with one end closed. Its fundamental frequency will be
* 250Hz * 330 Hz * 360 Hz * none of these
- (vii) Glass-air boundary acts as a/an
* mirror * glass * water * air
- (viii) The maximum velocity ' v ' of the mass attached to an elastic spring is
* $v = x \sqrt{k/m}$ * $v = x_0 \sqrt{k/m}$ * $v = x \sqrt{m/k}$ * $v = x_0 \sqrt{m/k}$
- (ix) A spectrometer does not consist of
* turntable * collimeter * microscope * telescope
- (x) A 1Kg block slides down a smooth inclined plane whose height is 5 m. the velocity of the block at the bottom is
* $\sqrt{9.8} \text{ ms}^{-1}$ * $7\sqrt{2} \text{ ms}^{-1}$ * 9.8 ms^{-1} * none of these
- (xi) Which one of the following statements is correct for an object released from rest?
* The average velocity during the first second of time is 4.9m/s
* During each second the object falls 9.8m
* The acceleration changes by 9.8 m/s^2 every second
* The object falls 9.8m during the first second of time
- (xii) Which of the following is dimension less ratio
* $\frac{\text{Momentum}}{\text{Velocity}}$ * $\frac{\text{Volume}}{\text{Area}}$ * $\frac{\text{Energy}}{\text{Work}}$ * $\frac{\text{Force}}{\text{Power}}$
- (xiii) A defect of eye called Myopia can be corrected by using
* Convex lens * Concave lens * Bi-Focal lens * Cylindrical lens
- (xiv) Every point on a rotating body has same
* Linear velocity * Angular velocity * Linear momentum * Linear acceleration
- (xv) After winding, the spring of the watch possesses
* Potential energy * Kinetic energy * both energies * Electrical energy
- (xvi) The number of significant figures in 0.00150 is:
* 2 * 3 * 4 * 5
- (xvii) If a cube floats on the surface of water in a glass of water melt, the level of water
* rises * falls * cannot be determined * unchanged

SECTION B

(Short Answered Questions)

(40 Marks)

Q2. Answer any 10 questions from this section. All questions carry equal marks.

- (i) A girl is swinging in a swing in a sitting position. How will the period of the swing be affected if she stands up?
- (ii) A virtual Image, we always say, cannot be obtained on a screen yet we "see" a virtual image, we are obviously bringing it on the "screen" (on retina) of our eye. Is there a contradiction?



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- (iii) In a satellite around the earth in a circular orbit, if a cork is immersed in a jar of water, will the cork rise when released? Explain?
- (iv) Water is falling over a water-fall of height 30m at a rate of 45000gm/min. determine the power generated
- (v) If $\vec{P} = 2i - 2j + 3k$ and $\vec{Q} = 3i + 3j + 3k$, find a unit vector perpendicular to the plane containing both \vec{P} and \vec{Q} . If \vec{P} and \vec{Q} form the sides of a parallelogram, find the area of the parallelogram.
- (vi) A wooden ball of mass 10gm is suspended by a thread. The horizontal current of air blows it to one side so that thread makes an angle of 60° with the vertical find the tension in the thread and the force of air current.
- (vii) A bullet is fired horizontally with 20m/s from top of a building 20m high; when the bullet is 10m above the ground incidentally it hits a bird. Find the time taken to hit the bird.
- (viii) Show that the expression $f = \frac{1}{2l} \sqrt{\frac{T}{m}}$ is dimensionally correct, when f is frequency of vibration on stretched string of tension T , length l and mass m .
 $f = \frac{1}{2L} \sqrt{\frac{Tx}{m}}$
- (ix) The period of vibration of a body of mass 25gm attached to a spring, vibrating on a smooth horizontal surface, when it is displaced 10cm to the right of its extreme position is 1.57s and the velocity at the end of this displacement is 0.4m/s. Determine the (a) spring constant (b) total energy (c) amplitude.
- (x) What do "RADAR" and "SONAR" stand for? Which has larger wavelength: Sound or Light?
- (xi) The period of a pendulum is 2 seconds at the surface of the earth. calculate its time period on the surface of moon where acceleration due to gravity is one sixth that the value of "g" at the surface of earth.
- (xii) How we define the term Waves? Derive the expression for Energy and power transmitted through waves.
- (xiii) In a double slit experiment the second order maximum occurs at $\theta = 0.25^\circ$. the wavelength is 650nm. Determine the slit separation.
- (xiv) A compound microscope has an objective and an eyepiece of focal length 1 cm and 5 cm respectively. The object is located at a distance 1.05 cm from the objective and forms an image 4.17 cm close to the eyepiece, find the separation of the lenses and magnifying power of microscope. ($d=25\text{cm}$).
- (xv) State and prove law of conservation of angular momentum.

SECTION C

(Detailed Answered Questions)

(28 Marks)

Note: Answer any Two questions from this section. All questions carry equal marks.

- Q.3(a) State the law of conservation of energy? How is it verified in mass-spring system?
- (b) What is the cause of weightlessness in a satellite orbiting round the earth? Show that the block suspended from the ceiling of an elevator through a spring balance will become weightless if the cable holding the elevator suddenly breaks.
- Q.4(a). Describe construction and working of an Astronomical Telescope. Draw a labeled diagram and derive the formula for its magnification.
- (b). F_1 and F_2 are two vectors which are acting at a point and make angles 45° and 60° respectively with X-axis. Find an expression for the magnitude and direction of their resultant using rectangular component method.
- Q.5(a). Describe the experimental setup and related mathematical relation which is the first proof of wave nature of light.
- (b) A ball is throw horizontally from height h derive the expression for (i) component of its velocity after time t (ii) time taken to hit the ground (iii) range it cover