

Practice paper (2021-22)

Term 1

Subject: Physics (042)

Class: xi

General Instructions:

- 1. The Question Paper contains three sections.**
- 2. Section A has 25 questions. Attempt any 20 questions.**
- 3. Section B has 24 questions. Attempt any 20 questions.**
- 4. Section C has 6 questions. Attempt any 5 questions.**
- 5. All questions carry equal marks.**
- 6. There is no negative marking.**

Section A

This section consists of 25 multiple choice questions with overall choice to attempt any 20 questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation.

Q1. Which of the following unit is not a derived unit?

- joule
- kilogram
- watt
- newton

Q2. The area under velocity-time graph for a particle in a given interval of time represents

- velocity
- acceleration
- work done
- displacement

Q3. Which of the following is a vector quantity?

- Time
- Acceleration
- Speed
- Distance

Q4. When a particle moves on a circular path then the force that keeps it moving with velocity of constant magnitude is

- a. Centripetal force
- b. Gravitational force
- c. Internal force
- d. Atomic force

Q5. Area under the Force-Displacement graph represents

- a. Velocity
- b. Impulse
- c. Acceleration
- d. Work done

Q6. S.I unit of “Universal Gravitational constant (G)” is

- a. $\text{Nm}^{-2}\text{Kg}^{-2}$
- b. NmKg^{-2}
- c. Nm^{-2}Kg
- d. $\text{N m}^2 \text{Kg}^{-2}$

Q7. If we go downward from the earth’s surface, the value of acceleration due to gravity (g)

- a. decreases
- b. remains constant
- c. increases
- d. None of these

Q8. Strongest force in nature

- a. Gravitational force
- b. Weak nuclear force
- c. Electromagnetic force
- d. Strong nuclear force

Q.9 S.I unit of moment of inertia is

- a. Kg m
- b. Kg m^2
- c. Kg m^{-1}
- d. Kg m^{-2}

Q10 The product of mass and velocity is called

- a. momentum

- b. force
- c. impulse
- d. pressure

Q11. Which of the following is a unit that of force?

- a. N m
- b. m N
- c. n m
- d. N s

Q12. Major contribution of J.J.Thomson

- a. Generation of electromagnetic waves
- b. Laws of electromagnetic induction
- c. X-rays
- d. Discovery of electron

Q13. The moon is observed from two diametrically opposite points A and B on Earth. The angle θ subtended at the moon by the two directions of observation is $1^\circ 54'$. Given the diameter of the Earth to be about 1.276×10^7 m, the distance of the moon from the earth is

- a. 3.84×10^8 m
- b. 3.84×10^9 m
- c. 3.84×10^7 m
- d. 3.84×10^{10} m

Q14. A body starts from rest and travels on straight path for t second with uniform acceleration of 2 m/s^2 . If the displacement made by it is 25 m, the time of travel t is

- a. 4 s
- b. 3 s
- c. 6 s
- d. 5 s

Q15. Which of the following physical quantities has unit Watt hour?

- a. Energy
- b. Force
- c. Momentum
- d. Pressure

Q16. A boy starts from a point A, travels on straight line to a point B at a distance of 3 km from A and returns to A. If he takes 2 hours to do so, his average speed is

- a. zero
- b. 3 km/h
- c. 1.5 km/h
- d. 2 km/h

Q17. A cricket ball is thrown at a speed of 28 m s^{-1} in a direction 30° above the horizontal. The maximum height of ball will be

- a. 10m
- b. 12m
- c. 11m
- d. 1m

Q18. A cyclist comes to a skidding stop in 10 m. During this process, the force on the cycle due to the road is 200 N and is directly opposed to the motion. How much work does the cycle do on the road ?

- a. 2000J
- b. -2000J
- c. 1000J
- d. Zero

Q19. We know the “time rate of change of the angular momentum” (dl/dt) of a single particle about the origin is equal to

- a. $2r \times f$
- b. r / f
- c. $r \times f$
- d. $r / 2 f$

Q20. For which of the following does the centre of mass lie outside the body?

- a. Disc
- b. Dice
- c. Bangle
- d. Pencil

Q21. Which of the following ratios express pressure?

- a. Energy/Volume
- b. Force /area

- c. Both a and b options
- d. Energy/Area

Q22. Which of the measurement is most precise?

- a. 5.00 m
- b. 5.00 mm
- c. 5.00 cm
- d. 5.00 km

Q23. According to work energy theorem the work done by the net force on a particle is equal to the change in its

- a) Kinetic energy
- b) Angular momentum
- c) Linear momentum
- d) Potential energy

Q24 What remains constant during the free fall ?

- a. Kinetic energy
- b. Potential energy
- c. Total mechanical energy
- d. None of these.

Q25. The smallest unit of energy is-

- a. Joule
- b. Erg
- c. Kilowatt hour
- d. Electron volt

This section consists of 24 multiple choice questions with overall choice to attempt any 20 questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation.

Q26. Which one of the following statement is true.

- a. a scalar quantity is one that is conserved in a process.
- b. a scalar quantity is the one that can never take negative values.
- c. a scalar quantity is the one that does not vary from one point to another in space.
- d. scalar quantity has the same value for observers with different orientations of the axes.

Q27. Gravitational force is

- a. repulsive
- b. electrostatic
- c. conservative
- d. non conservative

Q 28. When a satellite revolves close to the surface of the earth, orbital velocity becomes

- a. $(g R)^{1/2}$
- b. $(g R)^{3/2}$
- c. $(g R)^{5/2}$
- d. $(g R)^{7/2}$

Q29. The angle $1'$ (arcmin) equals to

- a. 2.91×10^{-5} rad
- b. 2.91×10^{-3} rad
- c. 2.91×10^{-4} rad
- d. 2.91×10^{-2} rad

Q30. The resistance $R = V/I$ where $V = (100 \pm 5)V$ and $I = (10 \pm 0.2)A$. The percentage error in R will be

- a. 5%
- b. 2%
- c. 0.2%
- d. 7%

Q31. The SI unit of energy is $J = \text{kg m}^2 \text{s}^{-2}$; that of speed v is m s^{-1} and of acceleration a is m s^{-2} . Which of the formulae for kinetic energy (K) given below is correct on the basis of dimensional arguments (m stands for the mass of the body)

(a) $K = m^2 v^3$

(b) $K = (1/2) m^2 v^2$

(c) $K = ma$

(d) $K = 1/2 mv^2$

Q32. Which of the following is the most precise device for measuring length

- a. A vernier callipers with 20 divisions on the sliding scale with 1mm least count of main scale.
- b. A screw gauge of pitch 1 mm and 100 divisions on the circular scale.
- c. An optical instrument that can measure length to within a wavelength of light ?
- d. All above having equal precision.

Q33. The number of significant figures in 0.2370

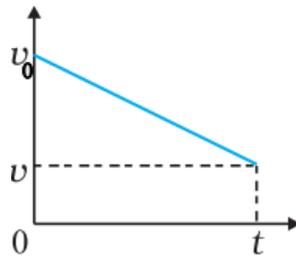
- a. 5
- b. 4
- c. 3
- d. 2

Q34. The position of an object moving along x-axis is given by $x = a + bt^2$ where $a = 8.5 \text{ m}$, $b = 2.5 \text{ m s}^{-2}$ and t is measured in seconds. Its velocity at $t = 0 \text{ s}$ will be

- a. 0 m/s
- b. 2 m/s
- c. 4 m/s

d. 6 m/s

Q35.



Above velocity-time graph shows

- a. Motion in positive direction with positive acceleration
- b. Motion in positive direction with negative acceleration
- c. Motion in negative direction with negative acceleration
- d. Motion of an object with negative acceleration that changes direction at time t

Q36. A police van moving on a highway with a speed of 30 km h^{-1} fires a bullet at a thief's car speeding away in the same direction with a speed of 192 km h^{-1} . If the muzzle speed of the bullet is 150 m s^{-1} . Speed with which bullet hit the thief's car is

- a. 1005 m/s
- b. 25 m/s
- c. 105 m/s
- d. 205 m/s

Q37. Three identical metal balls each of radius r are placed touching each other on a horizontal surface such that an equilateral triangle is formed, when centres of three balls are joined. The centre of mass of system is located at

- a. Horizontal surface
- b. centre of one of the balls
- c. line joining centre of any two balls
- d. point of intersection of the medians

Q38 The doors are provided with handles near the outer edge far away from hinges to

- a. Exert maximum torque on the door
- b. Exert moderate torque on the door
- c. Exert least torque on the door
- d. None of these

Q39. Rate of change of angular momentum related to

- a. Moment of inertia
- b. Linear momentum
- c. Torque
- d. None of these

Q40. Two identical particles move towards each other with velocity $2v$ and v , respectively. The velocity of centre of mass is

- a. v
- b. $v/3$
- c. $v/2$
- d. Zero

Q41. The value of 'G' in "Newton's law of gravitation" varies with

- a. Height above the earth
- b. Radius of the planet
- c. Depth below the ground
- d. None of these

Q42. Dimensional formula of G is

- a. $[M^{-1}L^3T^{-2}]$
- b. $[M^{-2}L^3T^{-2}]$
- c. $[M^{-1}L^3T^{-1}]$
- d. $[M^{-1}L^2T^{-2}]$

Q43. The earth is acted upon by the gravitational force of attraction due to the sun. The earth does not fall towards the sun due to

- a. Centripetal force
- b. Centrifugal force
- c. Electrostatic force
- d. None of these

Q44. A 10 N force is applied on a body to produce in it an acceleration of 1 m/s^2 . The mass of the body is

- a. 25 kg
- b. 30 kg
- c. 10 kg
- d. 20 kg

Assertion and Reason Questions

Directions : Each of these questions contain two statements, Assertion (A) and Reason(R). Each of these questions also has four alternative choices,

only one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

- a. Both A and R are true and R is the correct explanation of A.
- b. Both A and R are true and R is not the correct explanation of A.
- c. A is true but R is false.
- d. A is false and R is also false.

Q.45 Assertion : (A) On a rainy day, it is difficult to drive a car or bus at high speed.

Reason : (R) The value of coefficient of friction is lowered due to wetting of the surface.

Q.46 Assertion: (A) Impulse of force and momentum have same units.

Reason: (R) Impulse of force and momentum are same physical quantities.

Q.47 Assertion: (A) A cricketer moves his hands forward to catch a ball so as to catch it easily without hurting.

Reason: (R) He tries to decrease the distance travelled by the ball so that it hurts less.

Q.48 Assertion: Friction is a necessary evil.

Reason: Friction dissipates energy, but without friction we cannot walk.

Q.49 Assertion: (A) On a banked curved track, vertical component of normal reaction provides the necessary centripetal force.

Reason: (R) Centripetal force is not always required for turning.

Section C

This section consists of 06 multiple choice questions with overall choice to attempt any 05 questions. In case more than desirable number of questions are attempted, ONLY first 05 will be considered for evaluation.

Q50. The magnitude of vector **A** is 2.5 m and is directed towards east.

The magnitude and direction of $\mathbf{A}/2$ will be

- 1.25 m due west
- 2.5 m due west
- 2.5 m due south
- 1.25m due east

Q51. A body of mass 10 kg revolves in a circle of diameter 0.40m making 1000 revolutions per minute. Linear velocity will be

- $10\frac{\pi}{5} \text{ ms}^{-1}$
- $10\frac{\pi}{3} \text{ ms}^{-1}$
- $20\frac{\pi}{3} \text{ ms}^{-1}$
- $10\frac{\pi}{7} \text{ ms}^{-1}$

Case Study

Read the following paragraph and answer the questions .

The scalar product of two vectors **A** and **B** is a scalar.

$$\mathbf{A} \cdot \mathbf{B} = A B \cos \theta.$$

$B \cos \theta$ is the projection of **B** onto **A**.

$A \cos \theta$ is the projection of **A** onto **B**.

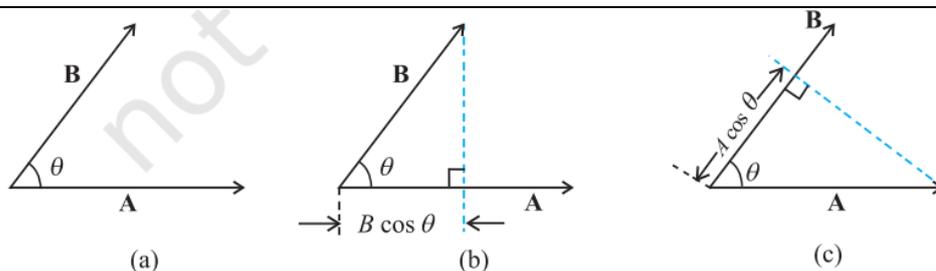


Figure:(a) The scalar product of two vectors A and B is a scalar : $\mathbf{A} \cdot \mathbf{B} = A B \cos \theta$

(b) $B \cos \theta$ is the projection of **B** onto **A**

(c) $A \cos \theta$ is the projection of **A** onto **B**

Q 52. For unit vectors **i**, **j**, **k** we have

- $\mathbf{i} \cdot \mathbf{i} = \mathbf{j} \cdot \mathbf{j} = \mathbf{k} \cdot \mathbf{k} = 0$
- $\mathbf{i} \cdot \mathbf{i} = \mathbf{j} \cdot \mathbf{j} = \mathbf{k} \cdot \mathbf{k} = 1$
- $\mathbf{i} \cdot \mathbf{i} = \mathbf{j} \cdot \mathbf{j} = \mathbf{k} \cdot \mathbf{k} = 2$
- $\mathbf{i} \cdot \mathbf{i} = \mathbf{j} \cdot \mathbf{j} = \mathbf{k} \cdot \mathbf{k} = 3$

Q53. For unit vectors i, j, k we have

- a. $i \cdot j = j \cdot k = k \cdot i = 1$
- b. $i \cdot j = j \cdot k = k \cdot i = 2$
- c. $i \cdot j = j \cdot k = k \cdot i = 0$
- d. $i \cdot j = j \cdot k = k \cdot i = 3$

Q54. A force $\mathbf{F} = i^{\wedge} + 5j^{\wedge} + 7k^{\wedge}$ acts on a particle and displaces it through $\mathbf{S} = 6i^{\wedge} + 9k^{\wedge}$. The work done if the force is in Newton and displacement in metre will be

- a. 79J
- b. 89J
- c. 69J
- d. 50J

Q55. The work done on a particle when angle between force and displacement is 90 degree, (the force in Newton and displacement in metre), will be

- a. 1J
- b. 5j
- c. Zero J
- d. maximum