

MODEL PAPER CLASS-XI (PHYSICS)

SECTION – A

Time Allowed: 25 Minutes

Marks: 17

Q#1. Choose the correct answer:

1. A student added three figures 72.1, 3.32 and 0.003. The correct answer regarding the rules of the addition of the significant figures will be:
A. 75.423 B. 75.42 C. 75.4 D. 75
2. The magnitude of cross-product and dot-product of two vectors are equal, the angle between them is:
A. Zero B. 45° C. 90° D. 180°
3. If the slope of velocity-time graph gradually decreases, then the body is said to be moving with:
A. Positive acceleration B. Negative acceleration C. Uniform velocity D. Variable velocity
4. A snooker ball moving with velocity v collides head on with another snooker ball of same mass at rest. If the collision is elastic, the velocity of the second snooker ball is:
A. Zero B. Infinity C. v D. $2v$
5. The range of projectile is same for angles of projection:
A. 30° and 45° B. 45° and 60° C. 50° and 45° D. 30° and 60°
6. Slope of work time graph is equal to.
A. Displacement B. Acceleration C. Power D. Energy
7. The consumption of energy by 60-watt bulb in 2 seconds is:
A. 20 J B. 120 J C. 30 J D. 0.02 J
8. A particle is moving in a circle with constant speed. The direction of centripetal force will be:
A. Along the tangent B. Along radius towards center
C. Along radius away from center D. Changing with motion
9. An object moving through a fluid experience a retarding force called:
A. Drag force B. Gravitational force C. Terminating force D. Frictional force
10. When the weight of an object falling freely becomes equal to the drag force, then the body will move with:
A. Increasing speed B. Decreasing speed C. Constant speed D. None of these
11. For a body executing S.H.M, its:
A. Momentum remains constant B. Potential energy remains constant
C. Kinetic energy remains constant D. Total energy remains constant
12. The constant K in Coulomb's Law depends upon:
A. Nature of medium B. System of units C. Intensity of charge D. Both A & B

13. A charge of 0.01 C accelerated through a p.d of 1000 V acquires K.E:
A. 10 J B. 100 J C. 200 J D. 400 eV
14. During charging of a capacitor, the ratio of instantaneous charge and maximum charge on plates of capacitors at $t = RC$ is:
A. 36.8% B. 63.2% C. 20% D. 30%
15. The fractional change in resistivity per Kelvin:
A. Co-efficient in resistance B. Co-efficient of resistivity
C. Resistance D. None of these
16. The algebraic sum of voltages changes around a closed circuit or loop is zero, is Kirchhoff's:
A. 1st law B. 2nd law C. 3rd law D. 4th law
17. The colors of strips on a certain carbon resistor from extreme left are yellow, black and red respectively. Its resistance is:
A. 4k Ω B. 400 Ω C. 40 Ω D. 40k Ω

SECTION – B

Time Allowed: 2.35 Hours

MARKS: 68

MARKS: 21

(Chapters 1 to 7)

(Marks: 7 × 3 = 21)

Q#2. Attempt any seven (07) parts. All parts carry equal marks.

Two students derive following equations in which 'x' refers to distance travelled, 'v' the speed, 'a' the acceleration and 't' be the time an subscript 'o' means a quantity at t = 0, which of these could possibly be correct according to dimensional analysis?

(a) $x=vt^2+2at$

(b) $x=v_0t+2at^2$

- (i) Define unit vector. Find unit vector perpendicular to $A=2i+2j+k$ and $B=3i-5j+2k$.
- (ii) Derive angle of projection for a projectile at which the maximum height reached and horizontal range covered is equal?
- (iii) Define Newton's second law of motion and give its relation with momentum and impulse.
- (iv) **Draw displacement-time graph for moving object when:**
- (a) Velocity of object is constant (b) Velocity is uniformly increasing (c) Velocity is variable
- (v) **Write down the cause of:**
- (a) Centripetal acceleration (b) Tangential acceleration (c) Angular acceleration
- (vi) Ten bricks, each 6.0 cm thick and mass 1.5kg, lie flat on a table. How much work is required to stack them one on the top of another?
- (vii) The Earth rotates on its once a day. Suppose, by some process the Earth contracts so that its radius is only half as large as at present. How fast will it be rotating then?
- (viii) What is meant by drag force? What are the factors upon which drag force acting upon a small sphere of radius 'r', moving down through liquid, depend?
- (ix) Water flows through a house, whose internal diameter is 1cm at a speed of 1ms^{-1} . What should be the diameter of the nozzle if the water is to emerge at 21ms^{-1} ?
- (x) What is meant by drag force? What are the factors upon which drag force acting upon a small sphere of radius r, moving down through liquid, depend?
- (xi) Define absolute potential energy. Which mass is closer to earth, one having potential energy -100 J or one with potential energy -10J ?

SECTION – C

MARKS: 21

(Chapters 8 to 14)

(Marks: 7 × 3 = 21)

Q#3. Attempt any seven (07) parts. All parts carry equal marks.

- (i) What happens to the period of a simple pendulum if:
- (a) Its length is doubled?
(b) The suspended mass is doubled?
(c) It is moved vertically upward from surface of earth?
- (ii) A load of 15.0g elongates a spring by 2.00 cm. If body of mass 294 g is attached to the spring and is into vibration with an amplitude of 10.0 cm, what will be its
- (a) Period (b) Spring constant (c) Maximum speed of its vibration
- (iii) Explain the terms crest, trough, node and anti-node.
- (iv) Is it possible for two identical waves travelling in the same direction along a string to give rise to a stationary wave?
- (v) The frequency of the note emitted by a stretched string is 300 Hz. What will be the frequency of this note when;
- (a) The length of the wave is reduced by one-third without changing the tension.
(b) The tension is increased by one-third without changing the length of the wire.
- (vi) Explain whether the Young's experiment is an experiment for studying interference or diffraction effects of light.
- (vii) Under what conditions two or more sources of light behave as coherent sources?
- (viii) Describe the force or forces on a positive point charge when placed between parallel plates:
- (a) With similar and equal charges. (b) WITH opposite and equal charges.
- (ix) Electric lines of force never cross. Why?
- (x) Two point charges $q_1 = -1\mu C$, and $q_2 = +4\mu$, are separated by a distance of 3.0m. Find and justify the zero-field location.
- (xi) A proton placed in a uniform electric field of 5000 NC⁻¹ directed to right is allowed to go a distance of 10.0cm from A to B. Calculate.
- (a) Potential difference between the two points
(b) Work done by the field
(c) The change in P.E. of proton
(d) The change in K.E. of the proton
(e) Its velocity
- (xii) How can you identify that which plate of capacitor is positively charged?

SECTION – D

MARKS: 26

(Chapters 1 to 07)

PART - I

(Marks: 1×13 = 13)

Note: Attempt any ONE (01) question.

(07)

- Q#4.** (a) Define projectile motion. Find a relation for.
(i) Maximum height attained by it
(ii) Its time of flight.
(iii) Horizontal range.
- (b) A helicopter is ascending vertically at the rate of 19.6 ms^{-1} . When it is at a height of ground, a 156.8 m above the stone is dropped. How long does the stone take to reach the ground and with what velocity? **(04)**
- (c) Define impulse and show that how it is related to linear momentum. **(02)**
- Q#5.** (a) Define absolute gravitational potential energy, derive expression for absolute gravitational potential energy. **(07)**
(i) A child starts from rest at the top of a slide of height 4.0m .
(ii) What is his speed at the bottom if the slide is frictionless?
- (b) If he reaches the bottom, with a speed of 6 ms^{-1} , what percentage of his energy at the top of the slide is lost as a result of friction?
- (c) What is the Effect of temperature on viscosity of liquid and gases?

(Chapters 08 to 14)

PART - II

(Marks: 13)

Note: Attempt any ONE (01) question.

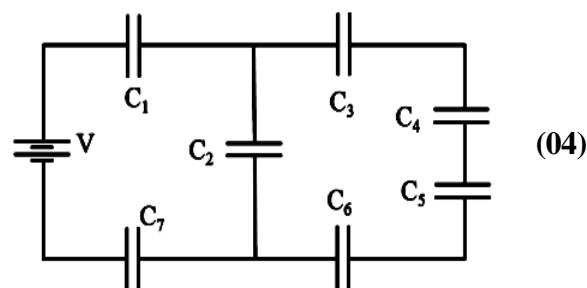
(Marks: 1 × 13 = 13)

- Q#6.** (a) Describe the experimental arrangement for the production of interference fringes by young's double slit method, and get an expression for the fringe spacing. **(07)**
- (b) In a certain X-rays diffraction experiment the first order image is observed at an angle of 5° for a crystal plane spacing of $2.8 \times 10^{-10}\text{m}$. What is the wave length of X-ray used? **(04)**
- (c) Why x-ray diffraction is not possible through ordinary slits? **(02)**

Q#7

- a) State and explain Coulomb law, discuss its vector form and give effect of medium on it. **(07)**

- b) Seven identical capacitors with capacitance $C = 8.5\text{nF}$ are connected to a 12 Volt battery as shown in the figure above. Calculate equivalent capacitance. **(04)**



- b) Charging and discharging of capacitor is linear or non-linear? **(02)**