

Sub: Physics 1st paper (Creative)

Sub Code :

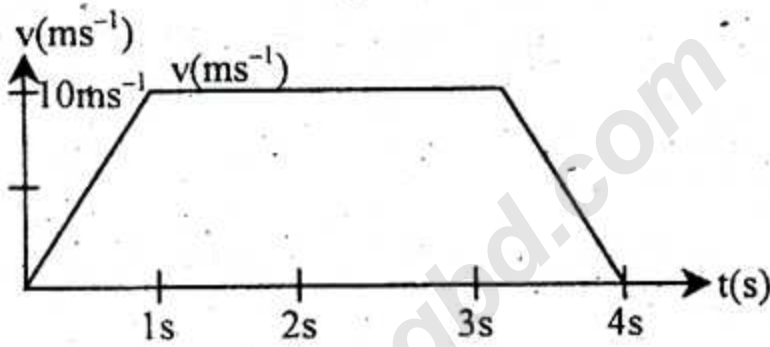
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Time: 2 Hrs 10 min

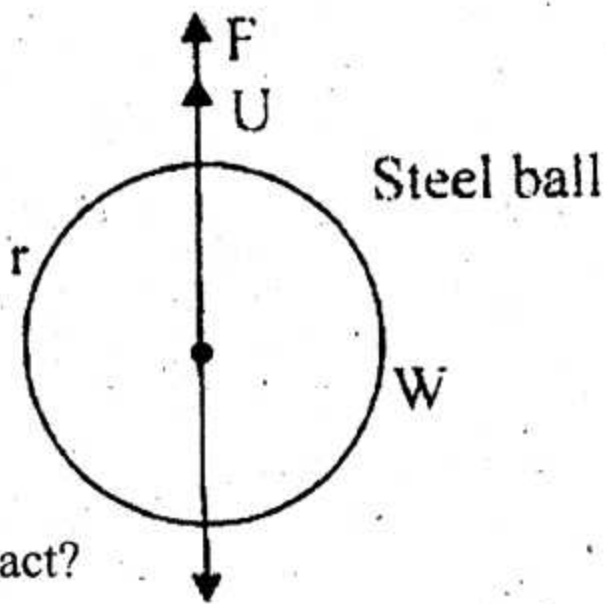
Full marks: 40

[Answer any four questions.]

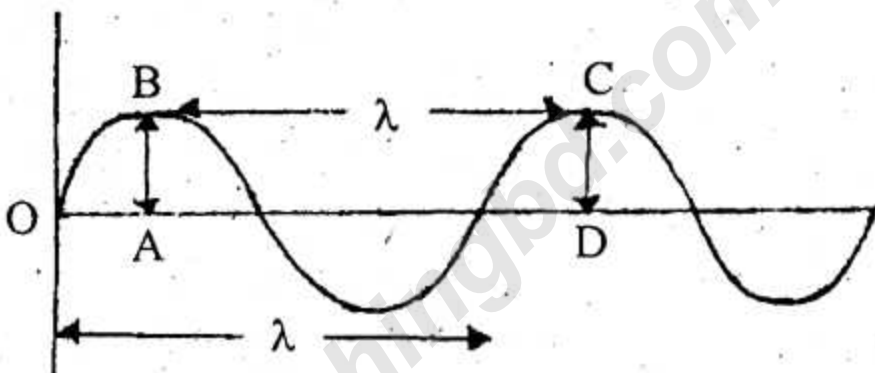
1. ► $P = 6i + 2j - 4k$ and $Q = 2i + mj + 8k$ are two vectors.
 - a. What is position vector? 1
 - b. What the difference between divergence and curl. 2
 - c. For What value of m the vectors cited in the stem would be mutually perpendicular. 3
 - d. It is possible for the vectors cited in the stem to become parallel in any way? 4
2. ► The velocity versus time garph of 1000 kg car is like this:



- a. What is reference frame? 1
 - b. What is the relation between linear velocity and angular velocity? 2
 - c. Find the distance traversed by the car for first 3 s 3
 - d. Show with the help of mathematical analysis that at fourth second a retarding force has acted on the car. 4
3. ► An artificial satellite S is revolving in a circular path around the earth at a height of 6 km from the ground Radius of earth is 6370 km.
 - a. What is Geostationary Satellite? 1
 - b. What do you mean by the gravitational intensity at a point? 2
 - c. Find the velocity of S satellite. 3
 - d. Determine the time period for this velocity if the height will be double. 4
 4. ► Set steel ball of radius 4 mm of density 7800 kgm^{-3} and water drop of radius 1 mm is falling through air.



- What is angle of contact? 1
 - Why does air bubble come up on the liquid surface? 2
 - Find the viscose force aeting on the steel ball getting the terminal velocity from the above stem. 3
 - According to the stem and figure which one have the maximum acceleration before getting the terminal velocity. 4
5. ► The wave forms a standing wave just after the reflection between the rigid obstacle and the free end



- What is wave front? 1
 - All harmonics are overtones but all overtones are not harmonics-explain. 2
 - Calculate the velocity of the wave? 3
 - According to standing wave as the stem, does the separation between the antinodes and nodes remain same. Analyze it. 4
6. ► Ohona reads a Hygrometer in a certain day. The dry and wet bulb thermometer readings are 20°C and 12.8°C . the Glaiser's factors at 20°C is 1.79. The saturated vapour pressure of water at 7° , 8° and 20°C are respectively 7.5×10^{-3} , 8.1×10^{-3} and 17.4×10^{-3} mHgP.
- What is called root mean square velocity? 1
 - What is the relation of density with the pressure of the gas? 2
 - What will be the dew point the day? 3
 - How can Ohona determine relative humidity of the day? Discuss. 4

1. If $F = -kx$ then differential equation is -

- i. $m \frac{d^2 x}{dt^2} = kx$
- ii. $\frac{d^2 x}{dt^2} + w^2 x = 0$
- iii. $\frac{d^2 \theta}{dt^2} + w^2 \theta = 0$

Which one of the following is correct?

- (a) ii, & iii
- (b) i & ii
- (c) i, ii & iii
- (d) i & iii

2. The maximum horizontal range of a projectile body with a velocity V_0 is—

- (a) v_0^2/g
- (b) $v_0/2g$
- (c) v_0/g
- (d) $2v_0/g^2$

3. A body of mass 6kg was at rest if 30N force is applied on it, then what will be the kinetic energy of the body after 10sec.

- (a) 500J
- (b) 600J
- (c) 5500J
- (d) 7500J

4. What is the unit of gravitational constant?

- (a) Nm/kg
- (b) Nm^2/kg
- (c) Nm/kg^2
- (d) Nm^2/kg^2

5. The average energy per molecule is—

- (a) $3KT/2$
- (b) $3RT/2$
- (c) $3MT/2$
- (d) $mc^2/2$

6. Keeping the length of a wire unchanged the tension applied on is made four times What will be the frequency of that wire.

- (a) Double
- (b) Triple
- (c) Same
- (d) Four times

7. Which is the unit of power?

- (a) Watt
- (b) J
- (c) cd
- (d) N

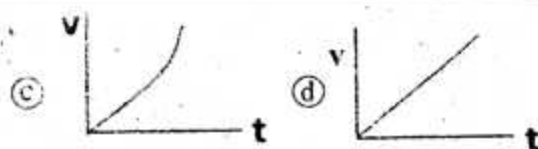
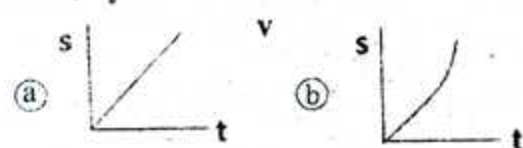
8. A gunman shot a bullet of mass 50gm with a velocity 30 ms^{-1} from a gun of mass 3kg. What will be the backward velocity of the gun?

- (a) 1800 ms^{-1}
- (b) 0.005 m/s
- (c) 500 ms^{-1}
- (d) 0.5 ms^{-1}

9. What is called the clear understanding about something?

- (a) Concept
- (b) Theory
- (c) Law
- (d) Principle

10. Which one is correct for uniform velocity?



11. If \hat{i} is normal \hat{j} then

- i. $\hat{i} \cdot \hat{j} = 0$
- ii. $\hat{i} \times \hat{j} = \hat{k}$
- iii. $\hat{i} \cdot \hat{j} \cdot \hat{k} = 0$

Which one is correct?

- (a) i & ii
- (b) i, ii & iii
- (c) ii & iii
- (d) i & iii

12. If I , r and f are respectively intensity, the distance between source & listener and frequency then—

- i. $I \propto A^2$
- ii. $I \propto 1/r$
- iii. $I \propto f^2$

Which one of the following is correct?

- (a) i & ii
- (b) i & iii
- (c) ii & iii
- (d) i, ii & iii

13. If velocity of a body initially rest condition increases with time it will be

- i. uniform acceleration
- ii. uniform velocity
- iii. straight line passing through origin of v vs t graph

Which one is correct?

- (a) i, ii & iii
- (b) i & ii
- (c) ii & iii
- (d) i & iii

14. What is the dimension of Youngs modulus of elasticity?

- (a) $ML^{-1}T^{-2}$
- (b) MLT^{-2}
- (c) $ML^{-2}T^{-2}$
- (d) $ML^{-1}T^{-2}$

15. What is the unit of angular velocity?

- (a) Tesla
- (b) rad/s
- (c) N
- (d) m/s

16. What will happen if a pendulum clock is taken under the earth?

- (a) It will gain time
- (b) The clock will be stopped.
- (c) It will loss time
- (d) Time will not change

17. What is the length of a second pendulum when $g = 9.8 \text{ ms}^{-2}$?

- (a) 9.8cm
- (b) 99.29cm
- (c) 99.29m
- (d) 98m

18. The momentum of a body of mass 10kg is 20kgms^{-1} what will be its kinetic energy?

- (a) 1 J (b) 200 J
(c) 20 J (d) 2 J

19. Work done by a force is—

- i. Fx ii. ma
iii. Δk

Which one of the following is correct?

- (a) i & ii (b) i & iii
(c) ii & iii (d) i & iii

20. Which one is longitudinal wave?

- (a) Heat wave (b) Radio wave
(c) Light wave (d) Sound wave

21. Which one is mechanical wave?

- (a) Sound wave (b) X-ray
(c) Radio wave (d) Light wave

22. Which of the following material has maximum elasticity?

- (a) Steel (b) Copper
(c) Rubber (d) Sponge

23. When the spring is compressed then—

- i. $x < 0$
ii. $x < 0$ and F_s is positive
iii. $x < 1$ and F_s is positive

Which one of the following is correct?

- (a) i & ii (b) ii & iii
(c) i & iii (d) i, ii & iii

24. Kerosene rises up in the wick of a lantern because

- (a) Boyant force of air
(b) Surface tension
(c) Gravitational pull of the wick
(d) Defusion of kerosene through the wick

25. Which one is correct?

- (a) $h \times t^3$ (b) $a = \Delta v / \Delta t$
(c) All things in the universe and perpendicular distance
(d) a scalar quantity

26. Torque is—

- i. a measure to produce rotation
ii. the product of force and perpendicular distance
iii. a scalar quantity

Which one of the following is correct?

- (a) i & ii (b) i, ii & iii
(c) ii & iii (d) i & iii

27. Which one is the ideal gas equation for one mole?

i. $PV = KT$ ii. $PV = RT$

iii. $PV = mRT/M$

Which one of the following is correct?

- (a) ii (b) iii
(c) i, ii & iii (d) i

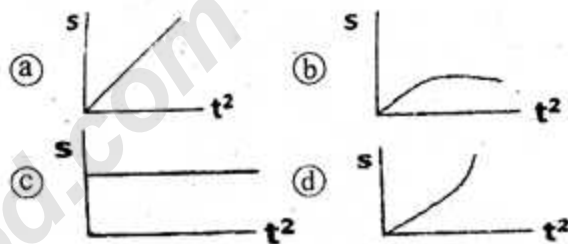
28. If the velocity of water is 8ms^{-1} and boatman is driving his boat with 8ms^{-1} making on angle 120° with each other What will be the resultant velocity?

- (a) 16ms^{-1} (b) 8ms^{-1}
(c) 4ms^{-1} (d) 24ms^{-1}

29. What is the root mean square velocity of hydrogen molecule at S.T.P? The density of Hydrogen at S T.P is 0.09kgm^{-3}

- (a) 1.84ms^{-1} (b) 1.84km/s
(c) 1.64ms^{-1} (d) 1.64km/s

30. Which one is correct?



31. Which one is operator?

- (a) $\sin 90^\circ$ (b) 90°
(c) \sin (d) $d/dx(x^n)$

32. Which one of the following is fundamental quantity?

- i. electric current
ii. amount of substance
iii. Luminus intensity

Which one of the following is correct?

- (a) i & ii (b) i & iii
(c) ii & iii (d) i, ii & iii

33. Example of uniform velocity is—

- i. velocity of sound ii. velocity of light
iii. velocity of water

Which one of the following is correct?

- (a) i & iii (b) i & ii
(c) ii & iii (d) i, ii & iii

34. What is the escape velocity from the earth surface?

- (a) 7.2km/s (b) 9.2km/s
(c) 11.2km/s (d) 4.2km/s

35. What is the dimension of acceleration?

- (a) LT^{-2} (b) LT^{-1}
(c) $L^\circ T^{-1}$ (d) $L^\circ T^{-2}$

1	(b)	2	(a)	3	(d)	4	(d)	5	(a)	6	(a)	7	(a)	8	(d)	9	(a)	10	(a)	11	(a)	12	(b)	13	(d)	14	(d)	15	(b)	16	(c)	17	(b)	18	(c)	19	(d)	20	(d)	
21	(a)	22	(a)	23	(a)	24	(b)	25	(b)	26	(a)	27	(b)	28	(b)	29	(b)	30	(a)	31	(c)	32	(d)	33	(b)	34	(c)	35	(a)											