

Class: 9
Subject: Science
Topic: ASK1509SUPER01
No. of Questions: 20+40

Physics

- Q1. A stone is just released from the window of a train moving along a horizontal straight track. The stone will hit the ground following a
- (a) Straight line path
 - (b) Circular path
 - (c) Parabolic path
 - (d) Hyperbolic path

Sol. (c)
The horizontal velocity of the stone will be the same as that of the train. IN this way, the horizontal motion will be uniform motion. The vertical motion will be controlled by the force of gravity, i.e., vertical motion is accelerated motion. Thus the resultant motion will be along a parabolic trajectory.

- Q2. A particle is moving eastwards with a velocity of $5ms^{-1}$. In 10 seconds the velocity changes to $5ms^{-1}$ northwards. The average acceleration in this time is
- (a) $\frac{1}{2} ms^{-1}$ towards north
 - (b) $\frac{1}{\sqrt{2}} ms^{-2}$ towards north – east
 - (c) $\frac{1}{\sqrt{2}} ms^{-2}$ towards north – west
 - (d) zero

Sol. (c)
Average acceleration = $\frac{\text{change in velocity}}{\text{time interval}} = \frac{\Delta \vec{v}}{t}$
 $\vec{v}_1 = 5 \hat{i}, \vec{v}_2 = 5 \hat{j}$
 $\Delta \vec{v} = (\vec{v}_2 - \vec{v}_1)$
 $= \sqrt{v_1^2 + v_2^2 + 2v_1v_2 \cos 90}$
 $= \sqrt{5^2 + 5^2 + 0} \quad [As |v_1| = |v_2| = 5m/s]$
 $= 5\sqrt{2} m/s$
Average acceleration = $\frac{\Delta \vec{v}}{t} = \frac{5\sqrt{2}}{10} = \frac{1}{\sqrt{2}} m/s^2$
Which means θ is in the second quadrant.

Q3. A body starts from rest and moves with a uniform acceleration. Find the ratio of the distance covered in the nth sec to the distance covered in n sec.

- (a) $\frac{2}{n} - \frac{1}{n^2}$
- (b) $\frac{3}{n} - \frac{1}{n^2}$
- (c) $\frac{1}{n} - \frac{2}{n^2}$
- (d) None of these

Sol. (a)

$$S_n = u + \frac{a}{2} (2n - 1) \quad \text{or} \quad S_n = 0 + \frac{a}{2} (2n - 1) \dots\dots (1)$$

Further distance covered in n second is

$$s = ut + \frac{1}{2} at^2 = 0 + \frac{1}{2} an^2 \dots\dots (2)$$

$$\therefore \frac{S_n}{s} = \frac{\frac{a}{2}(2n-1)}{(an^2/2)} = \frac{2}{n} - \frac{1}{n^2}$$

Q4. A body is moved along a straight line by a machine delivering constant power. How is the distance moved by the body proportional to time t?

- (a) $s \propto t^{1/3}$
- (b) $s \propto t^{3/2}$
- (c) $s \propto t^{2/5}$
- (d) None of these

Sol. (b)

$$P = F \times v = mav. \text{ Also } s = \frac{1}{2} at^2$$

$$\therefore a = \frac{2s}{t^2} \text{ and } v = at = \frac{2s \cdot t}{t^2} = \frac{2s}{t}$$

$$\therefore P = m \left(\frac{2s}{t^2} \right) \left(\frac{2s}{t} \right)$$

$$\text{or } s^2 = \frac{P}{4m} \cdot t^3 \quad \text{or } s \propto t^{3/2}$$

Q5. The distance x covered in time t by a body having velocity v_0 and having a constant acceleration a is given by $x = v_0 t + \frac{1}{2} at^2$. This result follows from

- (a) Newton's first law
- (b) Newton's second law
- (c) Newton's third law

(d) None of these

Sol. (b)

Q6. A cricket ball of mass 150 gm is moving with a velocity of 12 m/sec. and is hit by a bat so that the ball is turned back with a velocity of 20 m/sec. The force of bat acts for 0.01 s on the ball then the average force exerted by the bat on the ball.

- (a) 840 N
- (b) 48 N
- (c) 84 N
- (d) 480 N

Sol. (d)

Q7. A force of 50 N is inclined to the vertical at an angle of 30° . Find the acceleration it produces in a body of mass 2 kg which moves in the horizontal direction.

- (a) 12.4 m/s^2
- (b) 12.3 m/s^2
- (c) 12.5 m/s^2
- (d) 12.2 m/s^2

Sol. (c)

Hint: Horizontal component of force = $F \sin \theta$

$$\Rightarrow a = \frac{F \sin \theta}{m} = \frac{50 \sin 30^\circ}{2} = 12.5 \text{ m/s}^2$$

Q8. A gun weighing 10 kg fires a bullet of 30 g with a velocity of 330 m/s. with what velocity does the gun recoil? What is the resultant momentum of the gun and the bullet before and after firing?

- (a) - 0.99 m/s
- (b) - 0.98 m/s
- (c) 0.98 m/s
- (d) None of these

Sol. (a)

-0.99 m/s zero before and after firing

Hints: $M = 10 \text{ k.g}$, $m = \frac{30}{1000} \text{ kg}$, $V = ?$, $v = 330 \text{ m/s}$

From conservation of momentum $MV + mv = 0$

$$\Rightarrow 10 \times V = -\frac{30}{1000} \times 330 \Rightarrow V = -0.99 \text{ m/s}$$

Resultant momentum before and after firing is zero as no external force is acting on it.

$$P_R = 0$$

- Q9. A wooden cube floating in water supports a mass $m = 0.2 \text{ kg}$ on its top. When the mass is removed the cube rises by 2 cm. The side of the cube is - (density of water 10^3 kg/m^3)
- (a) 6 cm
 - (b) 12 cm
 - (c) 8 cm
 - (d) 10 cm

Sol. (d)

- Q10. Two point masses each equal to 1 kg attract one another with a force of 10^{-10} N . The distance between the two point masses is ($G = 6.6 \times 10^{-11} \text{ MKS}$)
- (a) 8 cm
 - (b) 0.8 cm
 - (c) 80 cm
 - (d) 0.08 cm

Sol. (c)

According to Newton's Gravitation Law

$$F_g = \frac{GM_1M_2}{r^2} \text{ here } F_g = 10^{-10} \text{ Newton.}$$

$$m_1 = m_2 = 1 \text{ kg,}$$

$$G = 6.6 \times 10^{-11}$$

$$\text{so } r^2 = \frac{GM_1M_2}{F_g} = \frac{6.6 \times 10^{-11} \times 1 \times 1}{10^{-10}} = 0.66$$

$$\text{or } r = 0.8125 \text{ metres} = 81.25 \text{ cm} \approx 80 \text{ cm}$$

- Q11. The kinetic energy of a satellite in its orbit around the earth is E. What should be the kinetic energy of the satellite so as to enable it escape from the gravitational pull of the earth?
- (a) 4 E
 - (b) 2 E
 - (c) $\sqrt{2} E$

(d) E

Sol. (b)

We know that $V_e = \sqrt{2} v_0$, where v_0 is orbital velocity

$$K.E. \text{ in the orbit, } E = \frac{1}{2} M v_0^2$$

$$K.E. \text{ to escape } E = \frac{1}{2} M v_e^2 = \frac{1}{2} M (2v_0^2) \\ = \frac{1}{2} M v_0^2 \times 2 = 2E$$

Q12. The ratio of the radii of the planets R_1 and R_2 is k . The ratio of the acceleration due to gravity is r . The ratio of the escape velocities from them will be

(a) Kr

(b) \sqrt{kr}

(c) $\sqrt{(k/r)}$

(d) $\sqrt{(r/k)}$

Sol. (b)

We know that, $V_e = \sqrt{(2gR)}$

$$\therefore \frac{(V_e)_{P_1}}{(V_e)_{P_2}} = \frac{\sqrt{(2g_1 R_1)}}{\sqrt{(2g_2 R_2)}} = \sqrt{\left(\frac{g_1}{g_2}\right)} \times \sqrt{\left(\frac{R_1}{R_2}\right)}$$

$$= \sqrt{kr}$$

Q13. A wave travels through a medium with a speed of 340 m/s. if the frequency of the wave is doubled, what happens to the wave speed? What happens to the wavelength?

(a) Remains constant, doubles

(b) Doubles, reduced by a factor of two

(c) Remains constant, reduced by a factor of two

(d) Reduced by a factor of two, remains constant

Sol. (b)

Q14. A closed organ pipe (closed one end) is excited to support the third overtone. It is found that air in the pipe has

(a) Three nodes and three antinodes

(b) Three nodes and four antinodes

(c) Four nodes and three antinodes

(d) Four nodes and four antinodes

Sol. (d)

Third overtone has a frequency $7n$, which means $L = \frac{7\lambda}{4} = \text{Three full loops} + \text{one half loop}$, which would make four nodes and four antinodes.

Q15. A standing wave is represented by $y = A \sin(100t) \cos(0.01x)$, where y and A are in millimeter, t in second and x is in metre. Velocity of wave is

- (a) 10^4 m/s
- (b) 1 m/s
- (c) 10^{-4} m/s
- (d) Not derivable from above data

Sol. (a)

The wave equation is $y = A \sin(\omega t) \cos(kx)$;

$$c = \frac{\omega}{k} = \frac{100}{0.01} = 10^4 \text{ m/s}$$

Q16. A body of mass 5 gram is executing S.H.M. about a fixed point O. With an amplitude of 10 cm, its maximum velocity is 100 cm/s. At what distance its velocity will be 50 cm s^{-1}

- (a) $4\sqrt{3} \text{ cm}$
- (b) $5\sqrt{3} \text{ cm}$
- (c) $3\sqrt{3} \text{ cm}$
- (d) $2\sqrt{3} \text{ cm}$

Sol. (b)

$$V_{max} = 100 = a\omega; \omega = \frac{100}{a} = \frac{100}{10} = 10 \text{ rad/s}$$

$$V^2 = \omega^2 (a^2 - y^2) \text{ or } 50^2 = 10^2 (10^2 - y^2) \text{ or } 25 = 100 - y^2$$

$$\text{or } y = \sqrt{75} = 5\sqrt{3} \text{ cm.}$$

Q17. For a body falling freely under gravity from a height

- (a) Only the potential energy goes on increasing
- (b) Only the kinetic energy goes on increasing
- (c) Both kinetic energy as well as potential energy go on increasing
- (d) The kinetic energy goes on increasing while potential energy goes on decreasing

Sol. (d)

Q18. Work done in time t on a body of mass m which is accelerated from rest to a speed of v in time t_1 as a function of time t is given by

(a) $\frac{1}{2} m \frac{v}{t_1} t^2$

(b) $m \frac{v}{t_1} t^2$

(c) $\frac{1}{2} m \left(\frac{mv}{t_1}\right)^2 t^2$

(d) $\frac{1}{2} m \frac{v^2}{t_1^2} t^2$

Sol. (d)
work done is equals to change in kinetic energy, in which velocity attained as a function of time, Put the value and get the answer.

Q19. A man of weight 60 kg wt. takes a body of mass 15 kg at a height 10 m on a building in 3 minutes. The efficiency of mass is

(a) 10%

(b) 20%

(c) 30%

(d) 40%

Sol. (b)

Q20. If a stone of mass m falls a vertical distance d , the decreases in gravitational potential energy is

(a) mg/d

(b) $md^2/2$

(c) mgd

(d) md/g

Sol. (c)

Work done is equals to the change in potential energy against Gravitation.

Chemistry

Q1. Shaving cream produces foam. What kind of colloid is shaving cream?

(a) Liquid dispersed in gas.

(b) Gas dispersed in liquid

(c) Solid dispersed in liquid.

(d) Solid dispersed in gas.

Sol. (b)

Q2. Which of the following has a regular repeated molecular pattern and large number of free surfaces in three dimensional spaces?

- (a) Solid and liquids
- (b) Liquids and gases
- (c) Solids
- (d) Gases

Sol. (c)

Q3. Calculate the number of atoms present in 6.4 g of sulphur.

- (a) 2.4×10^{23} atoms
- (b) 2.4×10^{-23} atoms
- (c) 1.2×10^{23} atoms
- (d) 1.2×10^{-23} atoms

Sol. (c)

Q4. What kind of a colloid is milk?

- (a) Fat dispersed in water.
- (b) Fat dispersed in milk.
- (c) Fat dispersed in fat.
- (d) Water dispersed in milk.

Sol. (a)

Q5. What does the atomicity of an element tell us about?

- (a) Physical properties.
- (b) Number of electrons
- (c) Number of atoms in one molecule..
- (d) Its combining capacity.

Sol. (c)

Q6. How is Brownian motion caused?

- (a) Due to temperature fluctuations within the liquid phase.
- (b) Due to attractions and repulsions between the charges on the colloidal particles.
- (c) Due to impact of molecules of the dispersion medium on the colloidal particles.

(d) Due to pressure variations within the liquid phase.

Sol. (b)

Q7. In a solid – liquid mixture, the solid settle down at the bottom. What this is process known as?

- (a) Filtration
- (b) Sedimentation
- (c) Decantation
- (d) Stirring

Sol. (b)

Q8. A molecular formula is a short form representation of 'X'. Identify 'X' from the following.

- (a) A compound
- (b) An element
- (c) A mixture
- (d) An alloy

Sol. (a)

Q9. Which of the following obey the law of constant proportions in their formation?

- (a) Mixture
- (b) Compounds
- (c) Elements
- (d) Colloids

Sol. (b)

Q10. If formula of chromic acid is H_2CrO_4 , then what is the formula of divalent metal chromate?

- (a) $MCrO_4$
- (b) M_2CrO_4
- (c) $M_2(CrO_4)_3$
- (d) M_3CrO_4

Sol. (a)

Q11. If intermolecular forces in a solid, liquid and gas are represented by S, L and G respectively, then identify the correct relation amongst the three from the following.

- (a) $G > L > S$

- (b) $L > G > S$
- (c) $S > L > G$
- (d) $S > G > L$

Sol. (c)

Q12. When the same amount of zinc is treated separately with excess of dil. H_2SO_4 and excess of NaOH, what is the ration of volumes of H_2 evolved?

- (a) 1 : 1
- (b) 1 : 2
- (c) 2 : 1
- (d) 9 : 4

Sol. (a)

Q13. Which element has neither a definite shape nor a definite volume at $40^\circ C$?

- (a) Silver
- (b) Gallium
- (c) Mercury
- (d) Hydrogen

Sol. (d)

Q14. Which of the following statements is NOT true?

- (a) The particles which are present in an atom are known as sub – atomic particles.
- (b) The particles which are present in a nucleus are known as nucleons.
- (c) An alpha particle is a doubly ionized helium nucleus.
- (d) The mass of an electron is $1.06 \times 10^{-19}g$.

Sol. (d)

Q15. Which among the following is true about one mole of a gas?

- (a) It always occupies 1 litre.
- (b) It always occupies 2 litres.
- (c) It can occupy any volume at S.T.P.
- (d) It always occupies a fixed volume at N.T.P.

Sol. (d)

Q16. What is the mass of aluminum in 204 g of aluminum oxide (Al_2O_3)?

- (a) 26 g
- (b) 27 g
- (c) 54 g
- (d) 108 g

Sol. (d)

Q17. Identify the element from among the following.

- (a) Fog
- (b) Methane
- (c) Tin
- (d) Soil

Sol. (c)

Q18. A certain volume of ethane, (C_2H_6), at *S.T.P.* has a mass of 20 g. What is the mass of an equal volume of propene, (C_3H_6), at *S.T.P.*?

- (a) 20 g
- (b) 21 g
- (c) 28 g
- (d) 42 g

Sol. (c)

Q19. The particles of 'X' are observed to undergo Brownian motion. What kind of substance is 'X'?

- (a) Aqueous solution
- (b) True solution
- (c) Suspension
- (d) Colloidal solution

Sol. (d)

- Q20. Mg^{+2} and F^{-} ions differ in which of the following fundamental particles?
- (a) Electrons, protons and neutrons
 - (b) Protons and neutrons
 - (c) Only electrons
 - (d) Electrons and protons

Sol. (b)

BIOLOGY

- Q21. Plant cells contain cell wall. Which of the following substances is present in cell wall?
- (a) Protein
 - (b) Carbohydrate
 - (c) Starch
 - (d) Cellulose

Sol. (d)

- Q22. Which of the following is an air – borne disease?
- (a) Tuberculosis
 - (b) Cholera
 - (c) Jaundice
 - (d) Brain fever

Sol. (a)

- Q23. Which of the following organisms contain a cell bounded by a cell wall made up of chitin?
- (a) A plant
 - (b) An animal
 - (c) A fungus
 - (d) A bacterium

Sol. (c)

Q24. Which of the following tissues is made up of more than one type of cell?

- (a) Parenchyma
- (b) Sclerenchyma
- (c) Complex
- (d) Collenchyma

Sol. (c)

Q25. Which of the following diseases spread through infected needle or by blood transfusion?

- (a) Measles
- (b) Mumps
- (c) AIDS
- (d) Kalazar

Sol. (c)

Q26. Which of the following cells are NOT produced in the bones of humans?

- (a) Adipocytes
- (b) Leucocytes
- (c) Erythrocytes
- (d) Monocytes

Sol. (a)

Q27. Which of the following characteristics is NOT related to parenchyma tissue?

- (a) Presence of nucleus.
- (b) Presence of intercellular spaces
- (c) Presence of thick wall
- (d) Presence of vacuole.

Sol. (c)

Q28. Which of the following sequences of taxa in the animal kingdom is correct?

- (a) Kingdom → Phylum → Class → Order → Family → Species → Genus
- (b) Kingdom → Phylum → Class → Order → Family → Genus → Species
- (c) Kingdom → Phylum → Class → Family → Order → Genus → Species
- (d) Phylum → Kingdom → Class → Family → Order → Genus → Species

Sol. (b)

Q29. Which of the following is an egg laying mammal?

- (a) Kangaroo
- (b) Whale
- (c) Bat
- (d) Platypus

Sol. (d)

Q30. Algae are included in which of the following kingdoms?

- (a) Protista
- (b) Animalia
- (c) Fungi
- (d) Monera

Sol. (a)

Q31. Which of the following is a reptile?

- (a) Newt
- (b) Salamander
- (c) Frog
- (d) Lizard

Sol. (d)

Q32. Which of the following pathogens cause malaria?

- (a) Paramecium
- (b) Plasmodium
- (c) Paramyxovirus
- (d) Trypanosoma

Sol. (b)

Q33. Which of the following fungus extraction is used as an antibiotic?

- (a) Aspergillus
- (b) Penicillium
- (c) Agaricus
- (d) Bread Mould

Sol. (b)

Q34. Which of the following are called pathogens?

- (a) Viruses, Bacteria, Fungi and Protozoans
- (b) Measles, Mumps and Chicken pox
- (c) Cholesterol, Saturated fat and Helminthes
- (d) Cholera, Typhoid, Tuberculosis and Measles

Sol. (a)

Q35. Which of the following characteristics are NOT applicable to cockroach?

- (i) Bilaterally symmetrical and segmented body
 - (ii) Unjointed body and legs
 - (iii) Open circulatory system
 - (iv) Three pairs of wings and two pairs of legs
- (a) Only (i) and (ii)
 - (b) Only (ii) and (iii)
 - (c) Only (i) and (iii)
 - (d) Only (ii) and (iv)

Sol. (d)

- Q36. Which of the following control measures would not help prevent the spread of malaria?
- (a) Covering windows with netting
 - (b) Drinking boiled water.
 - (c) Keeping surroundings dry and clean
 - (d) Spraying insecticides on stagnant water.

Sol. (b)

- Q37. Which of the following cropping methods maintains soil fertility?
- (i) Mixed cropping
 - (ii) Crop rotation
 - (iii) Mono cropping
 - (iv) Intercropping
- (a) Only (i), (ii) and (iii)
 - (b) Only (ii), (iii) and (iv)
 - (c) Only (i), (iii) and (iv)
 - (d) Only (i), (ii) and (iv)

Sol. (d)

- Q38. Which of the following is a weed?
- (a) *Oryza sativa*
 - (b) *Cyperinus rotundus*
 - (c) *Arachis hypogea*
 - (d) *Triticum vulgare*

Sol. (b)

- Q39. Which of the following is / are the function(s) of the red blood cells in the body?
- (i) To transport oxygen to body cells
 - (ii) To transport digested food
 - (iii) To kill bacteria in blood
 - (iv) To transport materials away from body cells
- (a) Only (i)
 - (b) Only (ii)
 - (c) Only (iii) and (iv)
 - (d) Only (ii), (iii) and (iv)

Sol. (a)

Q40. Due to which of the reasons given in the box is a dolphin classified as a mammal?

- (i) It gives birth to its young alive
 - (ii) It lives in water
 - (iii) It suckles its young
 - (iv) It breathes through gills
- (a) Only (iii) and (iv)
 - (b) Only (i) and (ii)
 - (c) Only (i) and (iii)
 - (d) (i), (ii), (iii) and (iv)

Sol. (c)

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