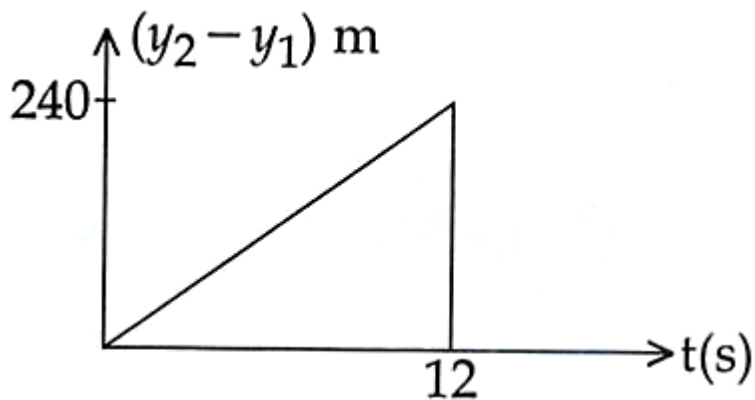
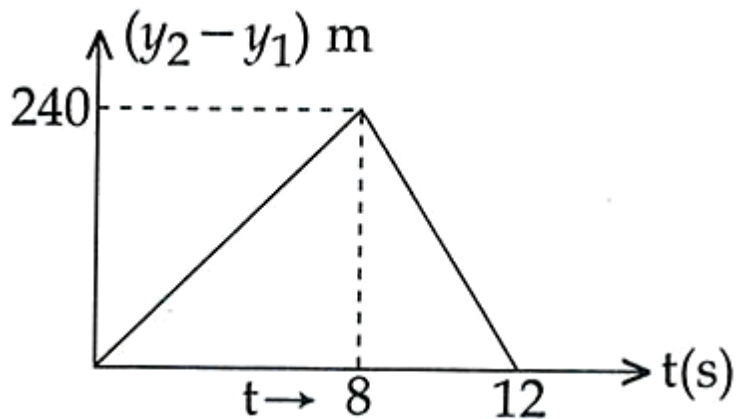
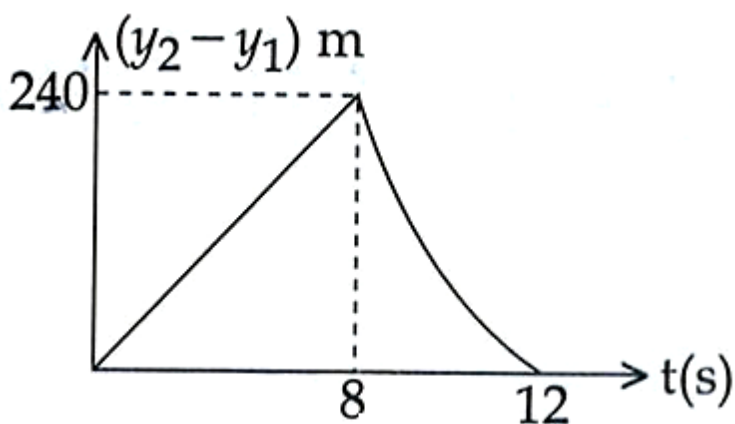


PART- A : PHYSICS

Q.1 Two stones are thrown up simultaneously from the edge of a cliff 240 m high with initial speed of 10 m/s and 40 m/s respectively. Which of the following graph best represents the time variation of relative position of the second stone with respect to the first? (Assume stones do not rebound after hitting the ground and neglect air resistance, take $g = 10 \text{ m/s}^2$). (The figures are schematic and not drawn to scale)





Answer:3

Solve: For the second stone time required to reach the ground is given by $-y = ut - \frac{1}{2}gt^2 - 240 = 40t - \frac{1}{2} \times 10t^2 - 5t^2$. $\therefore 40 = 0 - 40t - 12(t + 8) = 0 - (t + 12) \times 8 = 0 - (t + 12) \times 8$. $\therefore t + 12 = -5$. $\therefore t = -17$ s. For the first stone: $-240 = 10t - \frac{1}{2} \times 10t^2 - 5t^2$. $-240 = 10t - 5t^2$. $\therefore 5t^2 - 240 = 10t - 5t^2$. $\therefore 5t^2 - 10t - 240 = 0$. $\therefore (t + 6)(t - 8) = 0$. $\therefore t = 8$ s. During first 8 seconds both the stones are in air :

$u_1 t = 30 - y_1 = (u_2 - y_2 \therefore y_1)$ against t is a straight line.— graph of $(y_2 \therefore y_1)$ After 8 seconds $-y_2 = u_2 t + \frac{1}{2} g t^2$ — Stones two has acceleration with respect to stone one. Hence graph (3) is the correct description.

Q.2 The period of oscillation of a simple pendulum is $T = 2\pi\sqrt{L/g}$. Measured value of L is 20.0 cm known to 1 mm accuracy and time for 100 oscillations of the pendulum is found to be 90 s using a wrist watch of 1s resolution. The accuracy in the determination of g is

- a. 2 %
- b. 3 %
- c. 1 %

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d. 5 %

Answer:2

Solve: $T^2 = 4\pi^2 \cdot L/g$

$$\therefore g = 4\pi^2 \cdot L/T^2$$

$$\Delta g/g \times 100 = \Delta L/L \times 100 + 2 \cdot \Delta T/T \times 100$$

$$= 0.1/20 \times 100 + 2 \times 1/90 \times 100 = 0.5 + 2.2 = 2.7 = 3$$

Q.3

. Given in the figure are two blocks A and B of weight 20 N and 100 N, respectively. These are being pressed against a wall by a force F as shown. If the coefficient of friction between the blocks is 0.1 and between block B and the wall is 0.15, the frictional force applied by the wall on block B is :

- a. 100 N
- b. 80 N
- c. 120 N
- d. 150 N

Answer:3

Solve: $m_1 g = \mu_1 F$

$$20 = 0.1 \times F$$

$$F = 20/0.1 = 200 \text{ N}$$

Frictional force on block A in upward direction = $\mu_1 F = 0.1 \times 200 = 20 \text{ N}$

ward direction. –Block A exert a frictional force of 20 N on block B in down

∴ For block B :

$$\therefore \mu_2 F = m_2 g + \mu_1 F = 100 + 20 = 120 \text{ N}$$

Q.4 A particle of mass m moving in the x direction with speed $2v$ is hit by another particle of mass $2m$ moving in the y direction with speed v . If the collision is perfectly inelastic, the percentage loss in the energy during the collision is close to :

A. 44 %

B. 50 %

C. 56 %

D. 62 %

Answer: 3

$$\text{Solve } E_1 = \frac{1}{2} m (2v)^2 + \frac{1}{2} 2m \cdot v^2$$

$$= \frac{1}{2} m \cdot 4v^2 + mv^2$$

$$= 2mv^2 + mv^2$$

$$= 3mv^2$$

After Collision

$$3mV = \sqrt{2} \cdot 2mv$$

$$V = \frac{2\sqrt{2}}{3} v$$

$$E_2 = \frac{1}{2} 3m \cdot \left(\frac{2\sqrt{2}v}{3}\right)^2 = \frac{3}{2} m \cdot \frac{8v^2}{9} = \frac{4}{3} mv^2$$

$$E_1 - E_2 = 3mv^2 - \frac{4}{3} mv^2$$

Q.5 Distance of the centre of mass of a solid uniform cone from its vertex is z_0 . If the radius of its base is R and its height is h the z_0 is equal to

a. $\frac{h^2}{4R}$

b. $\frac{3h}{4}$

c. $\frac{5h}{8}$

d. $\frac{3h^2}{8R}$

Answer: 2

Q.6 From a solid sphere of mass M and radius R a cube of maximum possible volume is cut. Moment of inertia of cube about an axis passing through its centre and perpendicular to one of its faces is :

a. $MR^2/32\sqrt{2}\pi$

b. $MR^2/16\sqrt{2}\pi$

c. $4MR^2/9\sqrt{3}\pi$

d. $4MR^2/3\sqrt{3}\pi$

Answer:3

Q.7 From a solid sphere of mass M and radius R , a spherical portion of radius $R/2$ is removed, as shown in the figure. Taking gravitational , the potential at the centre of the cavity thus formed is : (G = gravitational constant)

a. $-GM/2R$

b. $-GM/R$

c. $-2GM/3R$

d. $-2Gm/R$

Answer:2

Q.8 Consider a spherical shell of radius R at temperature T . The black body radiation inside it can be considered as an ideal gas of photons with internal energy per unit volume $u = U/V \propto T^4$ and pressure $P = 1/3 (U/V)$. If the shell now undergoes an adiabatic expansion the relation between T and R is :

a. $T \propto e^{-R}$

b. $T \propto e^{-3R}$

c. $T \propto 1/R$

d. $T \propto 1/R^3$

Answer:3

Solve : $P = 1/3 (U/V) \propto T^4$

T'For an ideal gas $PV = nR$

$$\therefore P = nR'T/V \quad R' \text{ -molar gas constant)}$$

$$\therefore nR'T/V \propto T^4$$

$$\therefore nR'/V \propto T^3$$

$$\therefore T/V \propto T^3$$

$$1/4\pi/3R^3 \propto T^3$$

$$T^3 \propto 1/R^3$$

$$T \propto 1/R$$

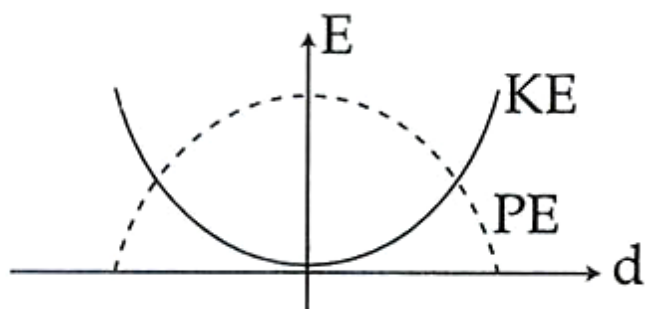
Q.9 A solid of constant heat capacity $1 \text{ J/}^\circ\text{C}$ is being heated by keeping it in contact with reservoirs in two ways :

- (i) Sequentially keeping in contact with 2 reservoirs such that each reservoir supplies same amount of heat.
- (ii) Sequentially keeping in contact with 8 reservoirs such that each reservoir supplies same amount of heat. In both the cases body is brought from initial temperature 100°C to final temperature 200°C . Entropy change of the body in the two cases respectively is :

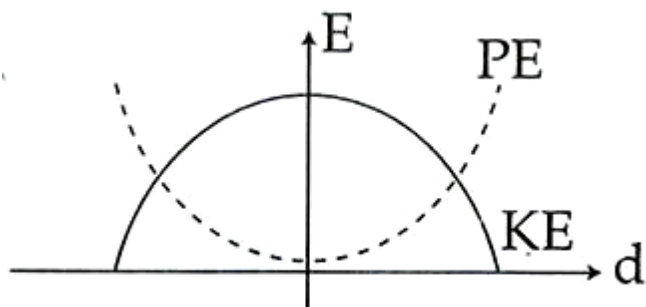
- a. $n2, 4 n2$
- b. $n2, n2$
- c. $n2, 2 n2$
- d. $2 n2, 8 n2$

Answer:c

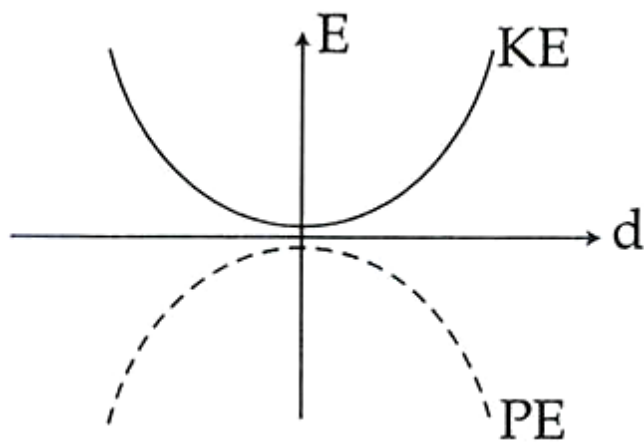
Q.10 For a simple pendulum, a graph is plotted between its kinetic energy (KE) and potential energy (PE) against its displacement d . Which one of the following represents these correctly?
(graph are schematic and not drawn to scale)



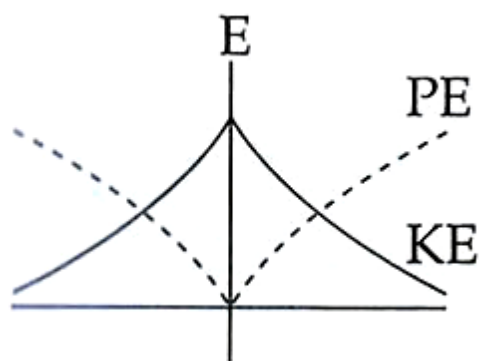
a.



b.



c.



d.

Answer:2

Solve: A simple pendulum performs simple harmonic motion.

For simple harmonic motion.

Potential energy goes as $\frac{1}{2} m \omega^2 x^2$

The maximum potential energy being $\frac{1}{2} m \omega^2 A^2$.

Kinetic energy goes as $\frac{1}{2} m \omega^2 (A^2 - X^2)$ Graph (2) fits these plots.

Q.11 1—A train is moving on a straight track with speed 20 ms^{-1} . It is blowing its whistle at the frequency of 1000 Hz. It is blowing its whistle at the frequency of 1000 Hz. The percentage change in the frequency heard by a person standing near the track as the train passes him is $1 - (\text{speed of sound} = 320 \text{ ms}^{-1})$ close to :

- a. 6 %
- b. 12%
- c. 18%
- d. 24%

Answer:2

Solve: A train is moving on a straight track with speed $v_s = 20 \text{ m/s}$. It is blowing its whistle at the frequency of $v_0 = 1000 \text{ Hz}$. A person is standing near the track. As the train approaches him, the frequency of the whistle as heard by him is

$$V_1 = V_0 \frac{V}{V - v_s} \text{ (where } v = 320 \text{ m/s is the speed of sound in air)}$$

$$\therefore V_1 = 1000 \times \frac{320}{(320 - 20)} = 1000 \times \frac{320}{300} = 1066.67 \text{ Hz.}$$

As the train goes away from him, the frequency of the whistle as heard by him is

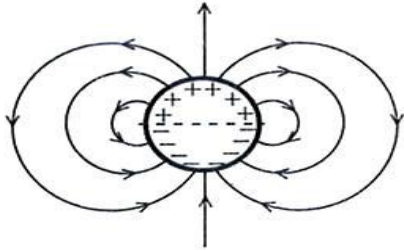
$$V_2 = V_0 \frac{V}{V + v_s}$$

$$V_2 = 1000 \times \frac{320}{(320 + 20)} = 1000 \times \frac{320}{340} = 941.17 \text{ Hz}$$

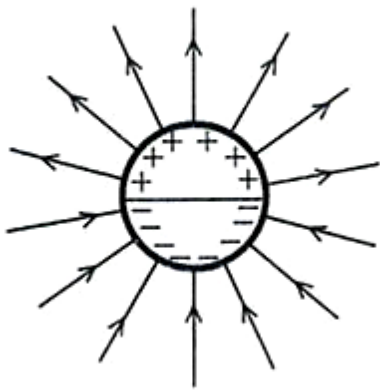
Percentage change in frequency heard by the person standing near the track as the train passes him is

$$\frac{V_1 - V_2}{V_0} \times 100 = \frac{1066.67 - 941.17}{1000} \times 100 = 125.5\%$$

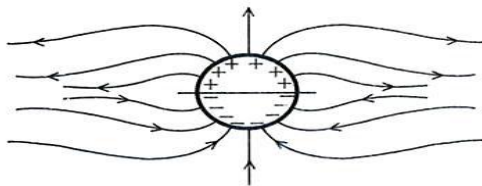
Q.12 in the upper half and negative surface σ A long cylindrical shell carries positive surface charge in the lower half. The electric field lines around the cylinder will look like figure given σ —charge in : (figure are schematic and not drawn to scale)



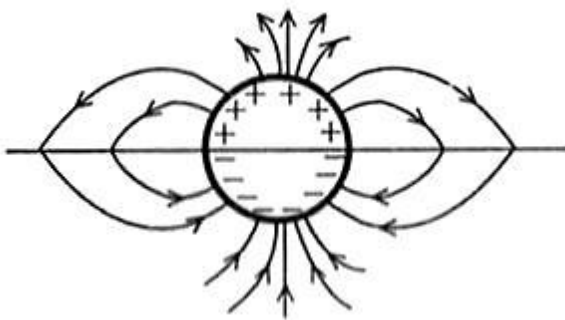
a.



b.



c.



d.

Answer:1

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Q.13) on its surface a uniformly charged solid sphere of radius R has potential V_0 (measured with respect to surface). For this sphere the equipotential surfaces with potentials $3V_0/2$, $5V_0/4$, $3V_0/4$ and $V_0/4$ have radius R_1 , R_2 , R_3 , and R_4 respectively. Then

- $R_1 = 0$ and $R_2 > (R_4 - R_3)$
- $R_1 \neq 0$ and $(R_2 - R_1) > (R_4 - R_3)$
- $R_1 = 0$ and $R_2 < (R_4 - R_3)$
- $2R < R_4$

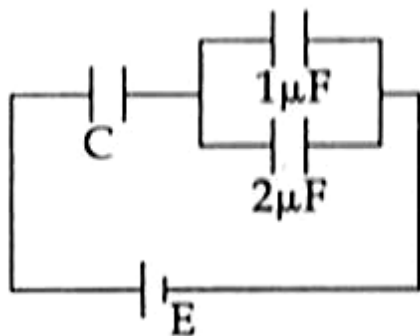
Answer:3

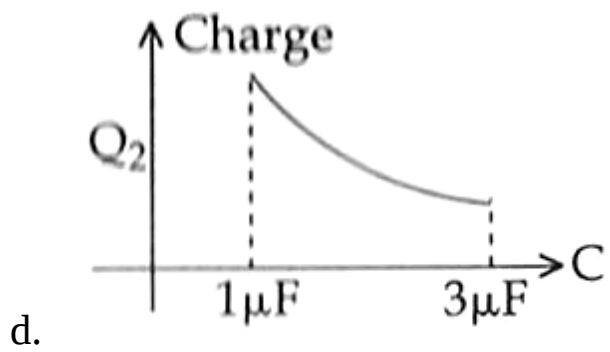
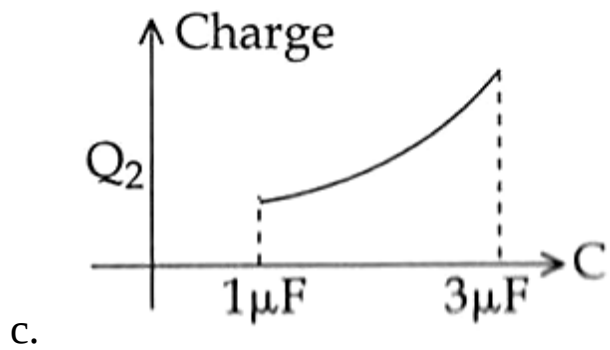
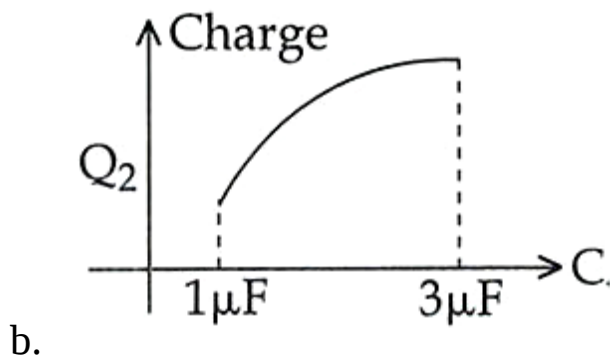
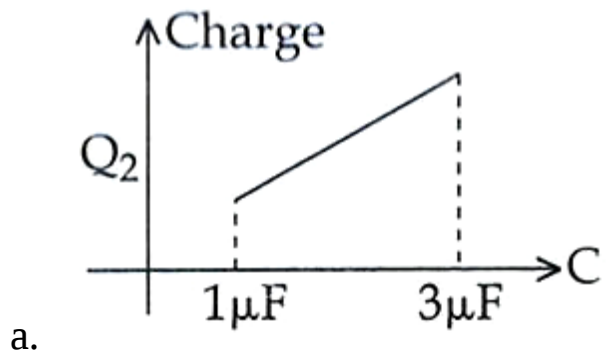
Q.14 When 5V potential difference is applied across a wire of length 0.1 m, the drift speed of electrons is $2.5 \times 10^{-4} \text{ ms}^{-1}$. If the electron density in the wire is $8 \times 10^{28} \text{ m}^{-3}$, the resistivity of the material is close to :

- $1.6 \times 10^{-8} \Omega \text{m}$
- $1.6 \times 10^{-7} \Omega \text{m}$
- $1.6 \times 10^{-6} \Omega \text{m}$
- $1.6 \times 10^{-5} \Omega \text{m}$

Answer:4

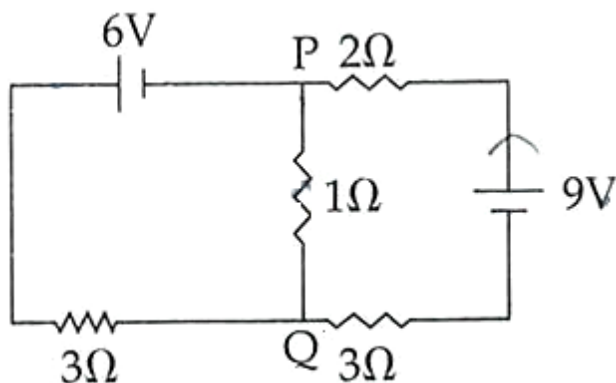
Q.15 . In the given circuit, charge Q_2 on the $2\mu\text{F}$ capacitor changes as C is varied from $1\mu\text{F}$ to $3\mu\text{F}$. Q_2 as a function of ' C ' is given properly by : (figures are drawn schematically and are not to scale)





Answer:2

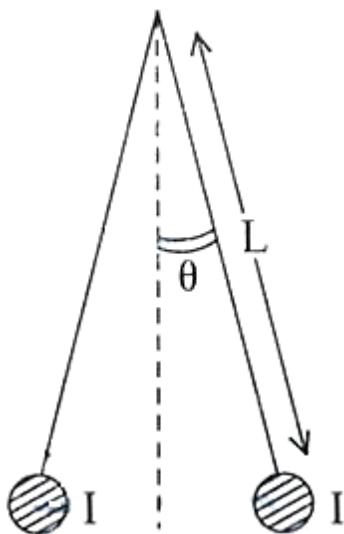
Q.16 In the circuit shown, the current in the $1\ \Omega$ resistor is :



- a. 1.3 A, from P to Q
- b. 0 A
- c. 0.13 A, from Q to P
- d. 0.13 A, from P to Q

Answer:3

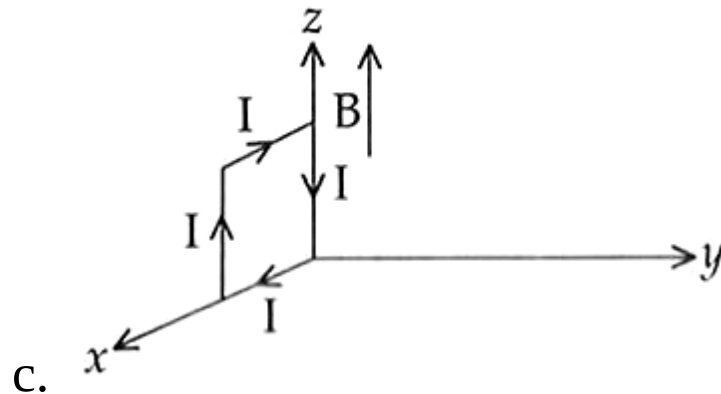
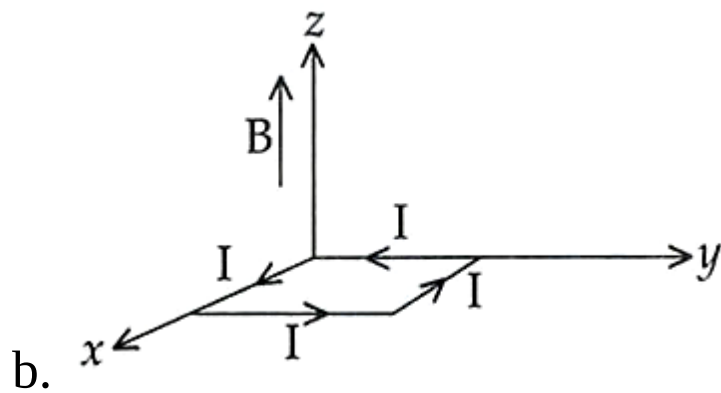
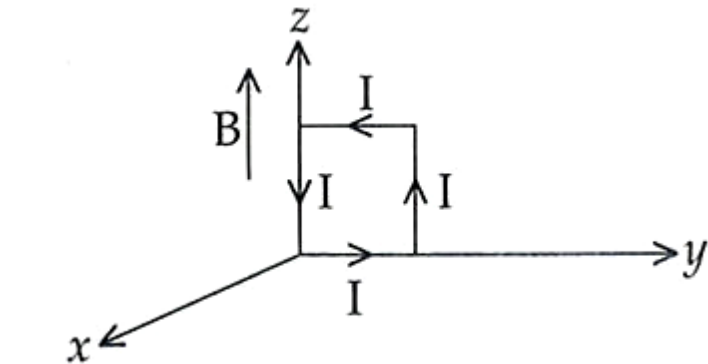
Q.17 Two long current carrying thin wires, both with current I , are held by insulating threads of length L and are in equilibrium as shown in the figure with the threads making an angle θ with the vertical. If wires have mass λ per unit length then the value of I is : (g = gravitational acceleration)

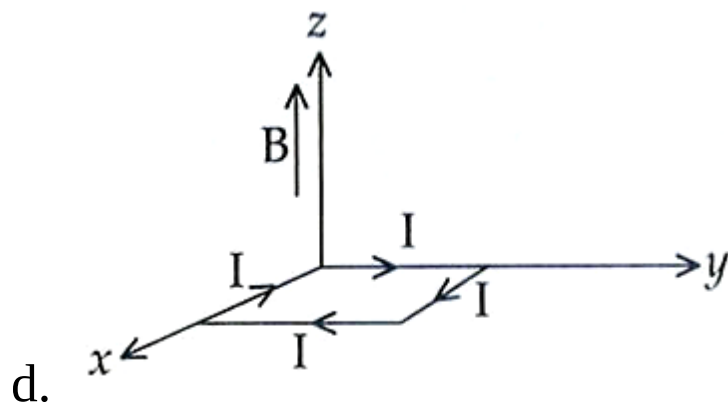


- a. $\sin\theta \sqrt{\pi\lambda gL/\mu_0 \cos\theta}$
- b. $2 \sin\theta \sqrt{\pi\lambda gL/\mu_0 \cos\theta}$
- c. $2\sqrt{\pi\lambda gL/\mu_0 \tan\theta}$

d. $\sqrt{\pi \lambda g L / \mu_0 \tan \theta}$
 Answer:2

Q.18 A rectangular loop of sides 10 cm and 5 cm carrying a current I of 12 A is placed in different orientations as shown in the figures below :



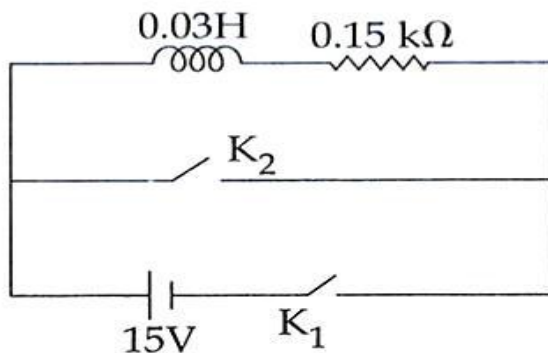


If there is a uniform magnetic field of 0.3 T in the positive z direction, in which orientations the loop would be in (i) stable equilibrium and (ii) unstable equilibrium?

1. (a) and (b), respectively
2. (a) and (c), respectively
3. (b) and (d), respectively
4. (b) and (c), respectively

Answer:3

Q.19 An inductor ($L = 0.03 \text{ H}$) and a resistor ($R = 0.15 \text{ K}\Omega$) are connected in series to a battery of 15V EMF in a circuit shown below. The key K_1 has been kept closed for a long time. Then at $t = 0$, K_1 is opened and key K_2 is closed simultaneously. At $t = 1 \text{ ms}$, the current in the circuit will be : ($e^5 \cong 150$)



- a. 100 mA
- b. 67 mA

C. 6.7 mA

d. 0.67 mA

Answer:4

Q.20. A red LED emits light at 0.1 watt uniformly around it. The amplitude of the electric field of the light at a distance of 1 m from the diode is :

a. 1.73 V/m

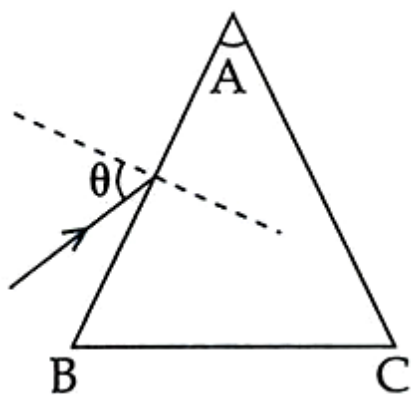
b. 2.45 V/m

c. 5.48 V/m

d. 7.75 V/m

Answer:2

Q.21 . Monochromatic light is incident on a glass prism of angle A. If the , refractive index of the material of the prism is μ a ray, incident at an angle θ , on the face AB would get transmitted through the face AC of the prism provided :



a. $\theta > \sin^{-1} [\mu \sin(A - \sin^{-1}(1/\mu))]$

b. $\theta < \sin^{-1} [\mu \sin(A - \sin^{-1}(1/\mu))]$

c. $\theta > \cos^{-1} [\mu \sin(A + \sin^{-1}(1/\mu))]$

d. $\theta > \cos^{-1} [\mu \sin(A + \sin^{-1}(1/\mu))]$

Answer:1

Q.22 On a hot summer night, the refractive index of air is smallest near the ground and increases with height from the ground. When a light beam is directed horizontally, the Huygens' principle leads us to conclude that as it travels, the light beam :

a. becomes narrower

b. goes horizontally without any deflection

c. bends downwards

d. bends upward

Answer:4

Q.23 Assuming human pupil to have a radius of 0.25 cm and a comfortable viewing distance of 25 cm, the minimum separation between two objects that human eye can resolve at 500 nm wavelength is :

- a. $1\mu\text{m}$
- b. $30\mu\text{m}$
- c. $100\mu\text{m}$
- d. $300\mu\text{m}$

Answer:2

Q.24 As an electron makes a transition from an excited state to the ground state of a hydrogen-like atom/ion :

- a. its kinetic energy increases but potential energy and total energy decrease
- b. kinetic energy, potential energy and total energy decrease
- c. kinetic energy decreases, potential energy increases but total energy remains same
- d. kinetic energy and total energy decrease but potential energy increases

Answer:1

Q.25–Match List- I (Fundamental Experiment) with List –II (its conclusion) and select the correct option from the choices given below the list :

	List -I		List -II
(A)	Franck-Hertz Experiment	(i)	Particle nature of light
(B)	Photo-electric experiment	(ii)	Discrete energy levels of atom
(C)	Davison-Germer Experiment	(iii)	Wave nature of electron
			Structure of atom

- (1) (A) – (i) (B) – (iv) (C) – (iii)
- (2) (A) – (ii) (B) – (iv) (C) – (iii)

(3)(A) – (ii) (B) – (i) (C) – (iii)

(4)(A) – (iv) (B) – (iii) (C) – (iii)

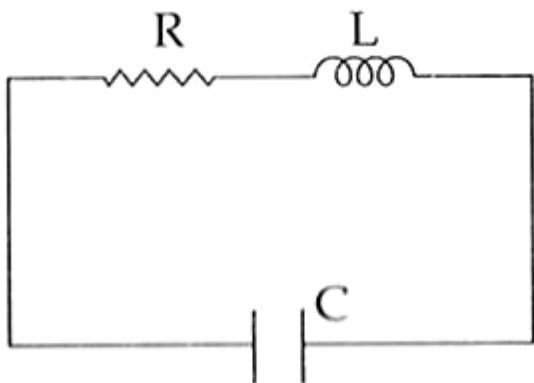
Answer:3

Q.26 A signal of 5 kHz frequency is amplitude modulated on a carrier wave of frequency 2 MHz. The frequencies of the resultant signal is/are :

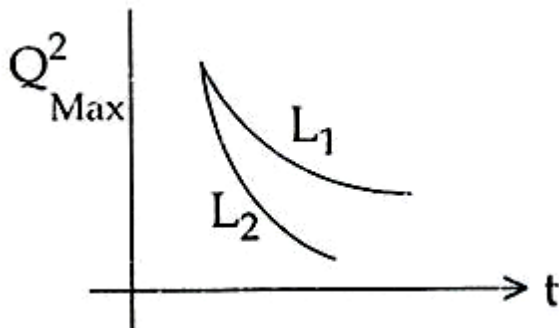
- 2 MHz only
- 2005 kHz, and 1995 kHz
- 2005 kHz, 2000 kHz and 1995 kHz
- 2000 kHz and 1995 kHz

Answer:3

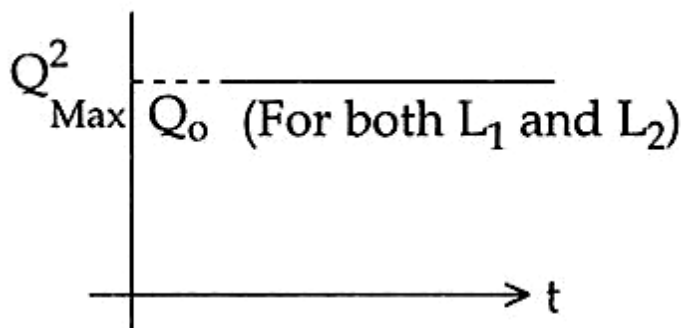
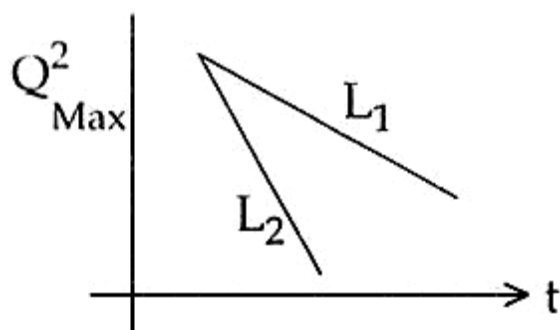
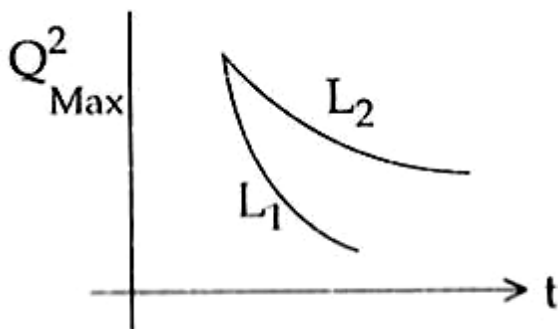
Q.27 An LCR circuit is equivalent to a damped pendulum. In an LCR circuit the capacitor is charged to Q_0 and then connected to the L and R as shown below :



If a student plots graphs of the square of maximum charge (Q_{Max}^2) on the capacitor with time (t) for two different values L_1 and L_2 ($L_1 > L_2$) of L then which of the following represents this graph correctly? (plots are schematic and not drawn to scale)



1.



Answer:1

PART- B : CHEMISTRY

Q.28 The molecular formula of a commercial resin used for exchanging ions in water softening is $\text{C}_8\text{H}_7\text{SO}_3\text{Na}$ (Mol. Wt .2006). What would be the maximum uptake of Ca^{2+} ions by the resin when expressed in mole per gram resin?

- a. 1/103
- b. 1/206
- c. 2/309
- d. 1/412

Answer:4

Q.29 Sodium metal crystallizes in a body centred cubic lattice with a unit cell edge of 4.29 Å. The radius of sodium atom is approximately :

- a. 1.86 Å
- b. 3.22 Å**
- c. 5.72 Å
- d. 0.93 Å

Answer:1

Q.30 Which of the following is the energy of a possible excited state of hydrogen?

- a. +13.6 eV
- b. 6.8 eV–**
- c. 3.4 eV–
- d. +6.8 eV

Answer:3

Q.31 The intermolecular interaction that is dependent on the inverse cube of distance between the molecules is :

- a. ion interaction–ion
- b. dipole interaction–ion**
- c. London force
- d. hydrogen bond

Answer:2

Q.32 The vapour pressure of acetone at 20°C is 185 torr. When 1.2 volatile–g of a non substance was dissolved in 100 g of acetone a 20°C, its vapour pressure was 183 torr. The molar mass (g mol⁻¹) of the substance is :

- a. 32**

b. 64

c. 128

d. 488

Answer:2

Q.33 Two Faraday of electricity is passed through a solution of CuSO_4 The mass of copper deposited at the cathode is :

(at. mass of Cu = 63.5 amu)

a. 0 g

b. 63.5 g

c. 2 g

d. 127 g

Answer:2

Q.34 Higher order (>3) reactions are rare due to :

a. low probability of simultaneous collision of all the reacting species

b. increase in entropy and activation energy as more molecules are involved

c. shifting of equilibrium towards reactants due to elastic collisions

d. loss of active species on collision

Answer:1

Q. 35 0.3 g of activated charcoal was added to 50 mL of acetic acid solution (0.06 N) in a flask. After an hour it was filtered and the strength of the filtrate was found to be 0.042 N. The amount of acetic acid adsorbed (per gram of charcoal) is :

a. 18 mg

b. 36 mg

c. 42 mg

d. 54 mg

Answer:1

Q.36 –The ionic radii (in Å) of N^{3-} , O^{2-} and F^- are respectively :

a. 1.36, 1.40 and 1.71

b. 1.36, 1.71 and 1.40

c. 1.71, 1.40 and 1.36

d. 1.71, 1.36 and 1.40

Answer:3

Q.37 From the following statements regarding H_2O_2 , choose the incorrect statement :

- a. It can act only as an oxidizing agent
- b. It decomposes on exposure to light
- c. It has to be stored in plastic or wax lined glass bottles in dark
- d. It has to be kept away from dust

Answer:1

Q.38 Which one of the following alkaline earth metal sulphates has its hydration enthalpy greater than its lattice enthalpy?

- a. CaSO_4
- b. BeSO_4
- c. BaSO_4
- d. SrSO_4

Answer:2

Q.39 . Which among the following is the most reactive?

- a. Cl_2
- b. Br_2
- c. I_2
- d. ICl

Answer:4

Q.40 Which one has the highest boiling point?

- a. He
- b. Ne

c. Kr

d. Xe

Answer:4

Q.41 The number of geometric isomers that can exist for square planar $[\text{Pt}(\text{Cl})(\text{py})(\text{NH}_3)(\text{NH}_2\text{OH})]^+$ is (py = pyridine) :

a. 2

b. 3

c. 4

d.6

Answer:2

Q.42 The color of KMnO_4 is due to :

a. $\text{M} \rightarrow \text{L}$ charge transfer transition

b. d –d transition

c. $\text{L} \rightarrow \text{M}$ charge transfer transition

d. $\sigma - \sigma^*$ transition

Answer:3

Q.43 **Assertion** : Nitrogen and Oxygen are the main components in the atmosphere but these do not react to form oxides of nitrogen.

Reason : The reaction between nitrogen and oxygen requires high temperature

- a. Both assertion and reason are correct, and the reason is the correct explanation for the assertion

- b. Both assertion and reason are correct, but the reason is not the correct explanation for the assertion
- c. The assertion is incorrect, but the reason is correct
- d. Both the assertion and reason are incorrect

Answer:1

Q.44 In Carius method of estimation of halogens, 250 mg of an organic compound gave 141 mg of AgBr. The percentage of bromine in the compound is :

(at. mass Ag = 108; Br = 80)

- a. 24
- b. 36
- c. 48
- d. 60

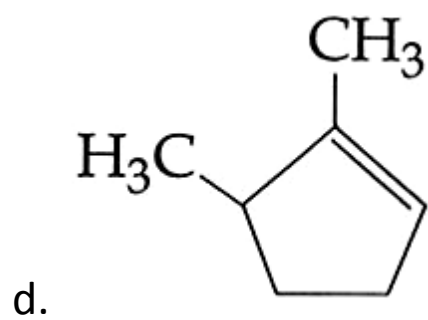
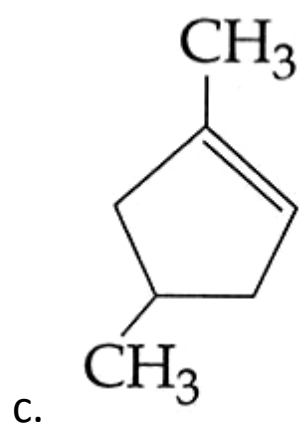
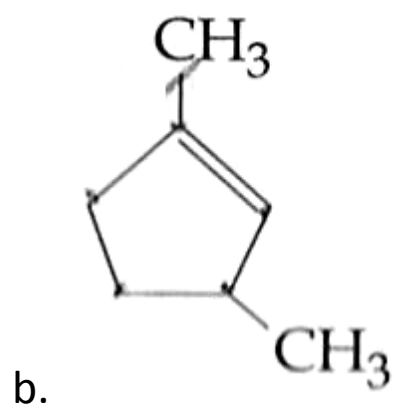
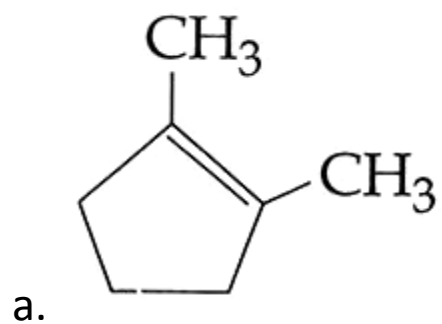
Answer:1

Q.45 Which of the following compounds will exhibit geometrical isomerism?

- a. 1 – Phenyl -2 – butane
- b. 3 – Phenyl – 1 – butane
- c. 2 – Phenyl – 1 – butane
- d. 1, 1 – Diphenyl – 1 – propane

Answer:1

Q.46 Which compound would give 5 – keto -2 methyl hexanal upon ozonolysis?

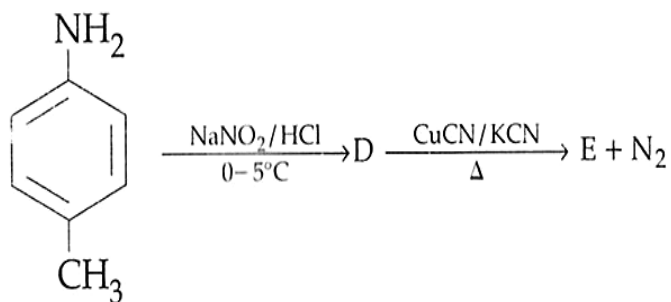


Answer:2

Q.47 . The synthesis of alkyl fluorides is best accomplished by :

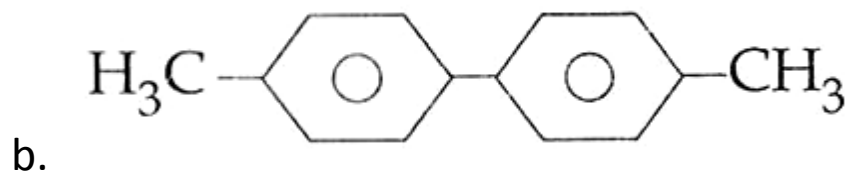
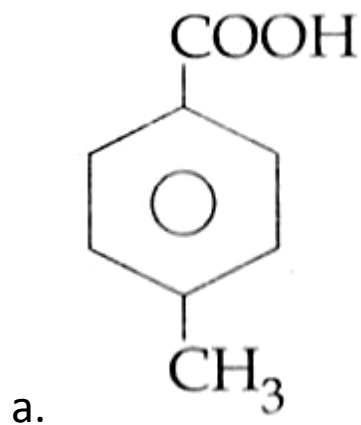
- Free radical fluorination
- Sandmeyer's reaction
- Finkelstein reaction
- Swarts reaction

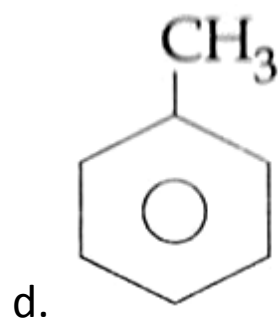
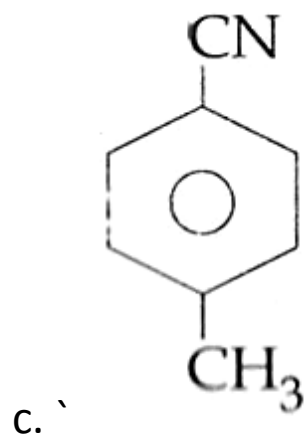
Answer:4



Q.48 In the reaction

the product E is :





Answer: 3

Q.49 Which polymer is used in the manufacture of paints and lacquers?

- a. Bakelite
- b. Glyptal
- c. Polypropene
- d. Poly vinyl chloride

Answer:2

Q.50 Which of the vitamins given below is water soluble ?

- a. Vitamin C
- b. Vitamin D
- c. Vitamin E
- d. Vitamin K

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Answer:1

Q.51 Which of the following compounds is not an antacid?

- a. Aluminium hydroxide
- b. Cimetidine
- c. Phenelzine
- d. Ranitidine

Answer:3

Q.52 Which of the following compounds is not colored yellow?

- A. $\text{Zn}_2[\text{Fe}(\text{CN})_6]$
- B. $\text{K}_3[\text{Co}(\text{NO}_2)_6]$
- C. $(\text{NH}_4)_3 [\text{As} (\text{Mo}_3 \text{O}_{10})_4]$
- D. BaCrO_4

Answer:1

PART- C : MATHEMATICS

Q. 53 Let A and B be two sets containing four and two elements respectively. Then the number of subsets of the set $A \times B$, each having at least three elements is :

- a. 219
- b. 256
- c. 275
- d. 510

Answer:1

Q. 54 for which the system of linear equations : λ The set of all values of

$$2x_1 - 2x_2 + x_3 = \lambda x_1$$

$$2x_1 - 3x_2 + 2x_3 = \lambda x_2$$

$$-x_1 - 2x_2 + 2x_3 = \lambda x_3$$

trivial solution,—has a non

- a. is an empty set
- b. is a singleton
- c. contains two elements
- d. contains more than two elements

Answer:3

Q.55 The number of integers greater than 6,000 that can be formed, using the digits 3, 5, 6, 7 and 8, without repetition, is

- a. 216
- b. 192
- c. 120
- d. 72

Answer:2

Q.56 The normal to the curve, $x^2 + 2xy - 3y^2 = 0$, at (1,1)

- a. does not meet the curve again
- b. meets the curve again in the second quadrant
- c. meets the curve again in the third quadrant
- d. dmeets the curve again in the fourth quadrant

Answer:4

Q.57 The area (in sq. units) of the region described by $\{(x,y) : y^2 \leq 2x \text{ and } y \geq 4x - 1\}$ is :

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a. $7/32$

b. $5/64$

c. $15/64$

d. $9/32$

Answer:4

Q.58 . Let $y(x)$ be the solution of the differential equation $(x \log x) dy/dx + 2x \log x$, $(x \geq 1)$. Then $y(e)$ is equal to :

a. e

b. 0

c. 2

d. $2e$

Answer3

Q.59 The number of points, having both co-ordinates as integers, that lie in the interior of the triangle with vertices $(0, 0)$, $(0, 41)$ and $(41, 0)$, is :

a. 901

b. 861

c. 820

d. 780

Answer:4

Q. 60 Locus of the image of the point $(2, 3)$ in the line $(2x - 3y + 4) + K(x - 2y + 3) = 0$, $k \in \mathbb{R}$, is a

a. straight line parallel to $x - y$ axis

b. a straight line parallel to y

c. circle of radius $\sqrt{2}$

d. circle of radius $\sqrt{3}$

Answer:3

Q.61 The area(in sq. units) of the quadrilateral formed by the tangents at the end points of the latera recta to the ellipse $x^2/9 + y^2/5 = 1$, is

- a. $27/4$
- b. 18
- c. $27/2$
- d. 27

Answer:4

Q.62 Let O be the vertex and Q be any point on the parabola, $x^2 = 8y$. If the point P divides the line segment OQ internally in the ratio 1 : 3, then the locus of P is :

- a. $x^2 = y$
- b. $y^2 = x$
- c. $y^2 = 2x$
- d. $x^2 = 2y$

Answer:4

Q.63 The equation of the plane containing the line $2x - 5y + z = 3$: $x + y + 4z = 5$ and parallel to the plane, $x + 3y + 6z = 1$, is :

- a. $2x + 6y + 12z = 13$
- b. $x + 3y + 6z = -7$
- c. $x + 3y + 6z = 7$
- d. $2x + 6y + 12z = -13$

Answer:3

Q. 64 The mean of the data set comprising of 16 observations is 16. If one of the observation valued 16 is deleted and three new observations valued 3, 4 and 5 are added to the data, then the mean of the resultant data, is :

- a. 16.8
- b. 16.0
- c. 15.8
- d. 14.0

Answer:4

Q.65 If the angles of elevation of the top of a tower from three collinear points A, B and C, on a line leading to the foot of the tower, are 30° , 45° and 60° respectively, then the ratio, AB : BC, is :

- a. $\sqrt{3}:1$
- b. $\sqrt{3}:\sqrt{2}$
- c. $1:\sqrt{3}$
- d. 2:3

Answer:1

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