

Test Date	08/01/2020
Test Time	9:30 AM - 12:30 PM
Subject	BTECH

Section : Physics

Q.1 The critical angle of a medium for a specific wavelength, if the medium has relative permittivity 3 and relative permeability $\frac{4}{3}$ for this wavelength, will be :

- Options**
1. 15°
 2. 30°
 3. 45°
 4. 60°

Question Type : **MCQ**
 Question ID : **4050361483**
 Option 1 ID : **4050365425**
 Option 2 ID : **4050365422**
 Option 3 ID : **4050365423**
 Option 4 ID : **4050365424**
 Status : **Answered**
 Chosen Option : **2**

Q.2 Effective capacitance of parallel combination of two capacitors C_1 and C_2 is $10 \mu\text{F}$. When these capacitors are individually connected to a voltage source of 1 V , the energy stored in the capacitor C_2 is 4 times that of C_1 . If these capacitors are connected in series, their effective capacitance will be :

- Options**
1. $4.2 \mu\text{F}$
 2. $3.2 \mu\text{F}$
 3. $1.6 \mu\text{F}$
 4. $8.4 \mu\text{F}$

Question Type : **MCQ**

Question ID : **4050361479**

Option 1 ID : **4050365407**

Option 2 ID : **4050365408**

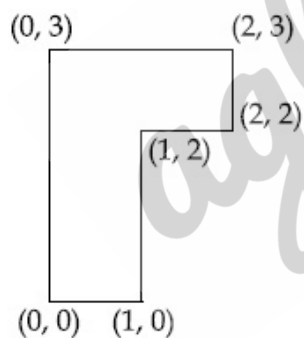
Option 3 ID : **4050365409**

Option 4 ID : **4050365406**

Status : **Answered**

Chosen Option : 1

Q.3 The coordinates of centre of mass of a uniform flag shaped lamina (thin flat plate) of mass 4 kg . (The coordinates of the same are shown in figure) are :



- Options**
1. $(1.25 \text{ m}, 1.50 \text{ m})$
 2. $(0.75 \text{ m}, 1.75 \text{ m})$
 3. $(0.75 \text{ m}, 0.75 \text{ m})$
 4. $(1 \text{ m}, 1.75 \text{ m})$

Question Type : **MCQ**

Question ID : **4050361471**

Option 1 ID : **4050365377**

Option 2 ID : **4050365374**

Option 3 ID : **4050365375**

Option 4 ID : **4050365376**

Status : **Answered**

Chosen Option : 1

Q.4 A particle of mass m is fixed to one end of a light spring having force constant k and unstretched length l . The other end is fixed. The system is given an angular speed ω about the fixed end of the spring such that it rotates in a circle in gravity free space. Then the stretch in the spring is :

Options

1. $\frac{m\omega^2}{k - \omega m}$
2. $\frac{m\omega^2}{k - m\omega^2}$
3. $\frac{m\omega^2}{k + m\omega^2}$
4. $\frac{m\omega^2}{k + m\omega}$

Question Type : **MCQ**

Question ID : **4050361470**

Option 1 ID : **4050365373**

Option 2 ID : **4050365371**

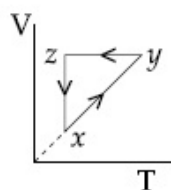
Option 3 ID : **4050365370**

Option 4 ID : **4050365372**

Status : **Answered**

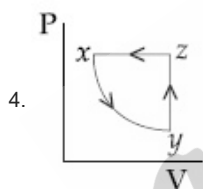
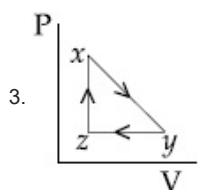
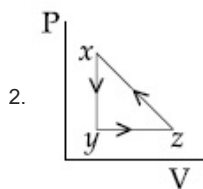
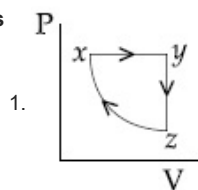
Chosen Option : **3**

- Q.5 A thermodynamic cycle $xyzx$ is shown on a V-T diagram.



The P-V diagram that best describes this cycle is : (Diagrams are schematic and not to scale)

Options



Question Type : **MCQ**

Question ID : **4050361476**

Option 1 ID : **4050365395**

Option 2 ID : **4050365396**

Option 3 ID : **4050365397**

Option 4 ID : **4050365394**

Status : **Answered**

Chosen Option : **4**

Q.6 A leak proof cylinder of length 1 m, made of a metal which has very low coefficient of expansion is floating vertically in water at 0°C such that its height above the water surface is 20 cm. When the temperature of water is increased to 4°C , the height of the cylinder above the water surface becomes 21 cm. The density of water at $T=4^{\circ}\text{C}$, relative to the density at $T=0^{\circ}\text{C}$ is close to :

- Options**
1. 1.26
 2. 1.04
 3. 1.01
 4. 1.03

Question Type : **MCQ**

Question ID : **4050361475**

Option 1 ID : **4050365392**

Option 2 ID : **4050365390**

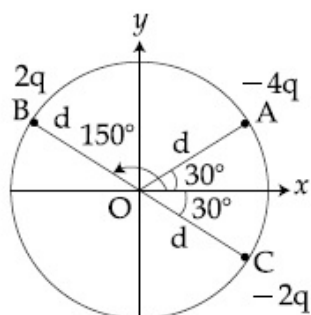
Option 3 ID : **4050365391**

Option 4 ID : **4050365393**

Status : **Answered**

Chosen Option : **3**

- Q.7 Three charged particles A, B and C with charges $-4q$, $2q$ and $-2q$ are present on the circumference of a circle of radius d . The charged particles A, C and centre O of the circle formed an equilateral triangle as shown in figure. Electric field at O along x -direction is :



Options

1. $\frac{\sqrt{3}q}{\pi\epsilon_0 d^2}$
2. $\frac{2\sqrt{3}q}{\pi\epsilon_0 d^2}$
3. $\frac{\sqrt{3}q}{4\pi\epsilon_0 d^2}$
4. $\frac{3\sqrt{3}q}{4\pi\epsilon_0 d^2}$

Question Type : MCQ

Question ID : 4050361478

Option 1 ID : 4050365405

Option 2 ID : 4050365404

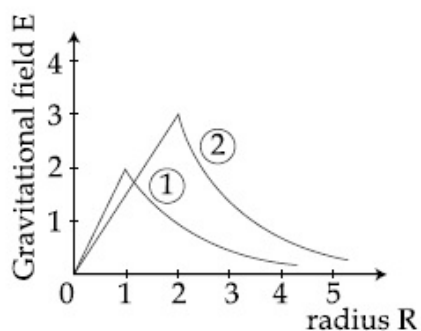
Option 3 ID : 4050365402

Option 4 ID : 4050365403

Status : Answered

Chosen Option : 2

- Q.8 Consider two solid spheres of radii $R_1 = 1\text{m}$, $R_2 = 2\text{m}$ and masses M_1 and M_2 , respectively. The gravitational field due to sphere ① and ② are shown. The value of $\frac{M_1}{M_2}$ is :



Options

1. $\frac{2}{3}$
2. $\frac{1}{6}$
3. $\frac{1}{2}$
4. $\frac{1}{3}$

Question Type : MCQ

Question ID : 4050361473

Option 1 ID : 4050365385

Option 2 ID : 4050365382

Option 3 ID : 4050365384

Option 4 ID : 4050365383

Status : Answered

Chosen Option : 3

Q.9

Consider a uniform rod of mass $M = 4m$ and length l pivoted about its centre. A mass m moving with velocity v making angle $\theta = \frac{\pi}{4}$ to the rod's long axis collides with one end of the rod and sticks to it. The angular speed of the rod-mass system just after the collision is :

Options

1. $\frac{3}{7\sqrt{2}} \frac{v}{l}$
2. $\frac{3}{7} \frac{v}{l}$
3. $\frac{3\sqrt{2}}{7} \frac{v}{l}$
4. $\frac{4}{7} \frac{v}{l}$

Question Type : MCQ

Question ID : 4050361472

Option 1 ID : 4050365379

Option 2 ID : 4050365378

Option 3 ID : 4050365380

Option 4 ID : 4050365381

Status : Answered

Chosen Option : 1

Q.10

The dimension of stopping potential V_0 in photoelectric effect in units of Planck's constant 'h', speed of light 'c' and Gravitational constant 'G' and ampere A is :

Options

1. $h^{1/3} G^{2/3} c^{1/3} A^{-1}$
2. $h^{2/3} c^{5/3} G^{1/3} A^{-1}$
3. $h^{-2/3} c^{-1/3} G^{4/3} A^{-1}$
4. $h^2 G^{3/2} c^{1/3} A^{-1}$

Question Type : MCQ

Question ID : 4050361469

Option 1 ID : 4050365367

Option 2 ID : 4050365368

Option 3 ID : 4050365369

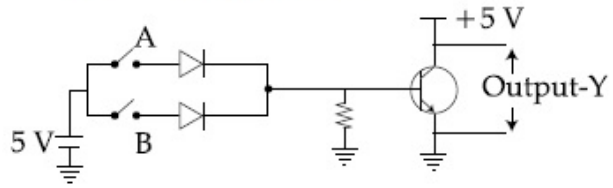
Option 4 ID : 4050365366

Status : Answered

Chosen Option : 4

Q.11

Boolean relation at the output stage-Y for the following circuit is :



- Options
1. $\overline{A} + \overline{B}$
 2. $A + B$
 3. $A \cdot B$
 4. $\overline{A} \cdot \overline{B}$

Question Type : MCQ

Question ID : 4050361487

Option 1 ID : 4050365440

Option 2 ID : 4050365438

Option 3 ID : 4050365439

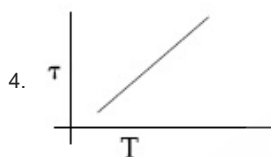
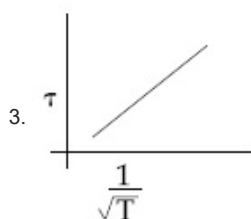
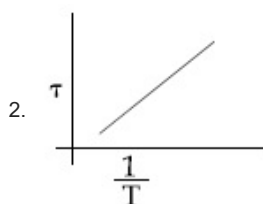
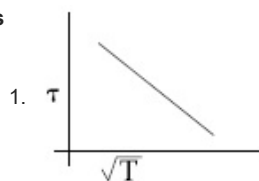
Option 4 ID : 4050365441

Status : Answered

Chosen Option : 4

Q.12 The plot that depicts the behavior of the mean free time τ (time between two successive collisions) for the molecules of an ideal gas, as a function of temperature (T), qualitatively, is : (Graphs are schematic and not drawn to scale)

Options



Question Type : MCQ

Question ID : 4050361477

Option 1 ID : 4050365399

Option 2 ID : 4050365401

Option 3 ID : 4050365400

Option 4 ID : 4050365398

Status : Marked For Review

Chosen Option : 4

Q.13 When photon of energy 4.0 eV strikes the surface of a metal A, the ejected photoelectrons have maximum kinetic energy T_A eV and de-Broglie wavelength λ_A . The maximum kinetic energy of photoelectrons liberated from another metal B by photon of energy 4.50 eV is $T_B = (T_A - 1.5)\text{eV}$. If the de-Broglie wavelength of these photoelectrons $\lambda_B = 2\lambda_A$, then the work function of metal B is :

- Options**
1. 4 eV
 2. 2 eV
 3. 1.5 eV
 4. 3 eV

Question Type : **MCQ**

Question ID : **4050361485**

Option 1 ID : **4050365431**

Option 2 ID : **4050365433**

Option 3 ID : **4050365430**

Option 4 ID : **4050365432**

Status : **Answered**

Chosen Option : **4**

Q.14 The magnifying power of a telescope with tube length 60 cm is 5. What is the focal length of its eye piece ?

- Options**
1. 20 cm
 2. 40 cm
 3. 30 cm
 4. 10 cm

Question Type : **MCQ**

Question ID : **4050361484**

Option 1 ID : **4050365427**

Option 2 ID : **4050365429**

Option 3 ID : **4050365428**

Option 4 ID : **4050365426**

Status : **Answered**

Chosen Option : **4**

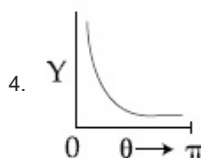
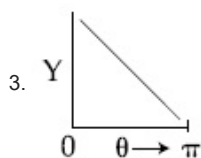
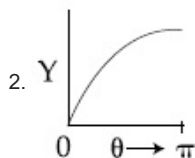
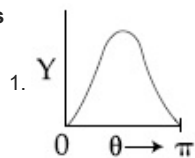
Q.15 The graph which depicts the results of Rutherford gold foil experiment with α -particles is :

θ : Scattering angle

Y : Number of scattered α -particles detected

(Plots are schematic and not to scale)

Options



Question Type : **MCQ**

Question ID : **4050361486**

Option 1 ID : **4050365436**

Option 2 ID : **4050365435**

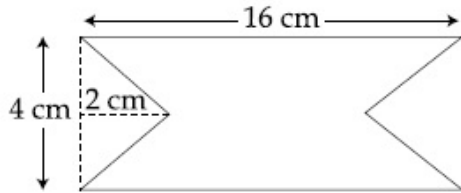
Option 3 ID : **4050365434**

Option 4 ID : **4050365437**

Status : **Answered**

Chosen Option : **2**

- Q.16 At time $t = 0$ magnetic field of 1000 Gauss is passing perpendicularly through the area defined by the closed loop shown in the figure. If the magnetic field reduces linearly to 500 Gauss, in the next 5 s, then induced EMF in the loop is :



- Options
1. $56 \mu\text{V}$
 2. $28 \mu\text{V}$
 3. $48 \mu\text{V}$
 4. $36 \mu\text{V}$

Question Type : **MCQ**

Question ID : **4050361482**

Option 1 ID : **4050365421**

Option 2 ID : **4050365418**

Option 3 ID : **4050365420**

Option 4 ID : **4050365419**

Status : **Answered**

Chosen Option : **4**

Q.17 In finding the electric field using Gauss law

the formula $|\vec{E}| = \frac{q_{\text{enc}}}{\epsilon_0 A}$ is applicable. In

the formula ϵ_0 is permittivity of free space, A is the area of Gaussian surface and q_{enc} is charge enclosed by the Gaussian surface. This equation can be used in which of the following situation ?

- Options
1. Only when the Gaussian surface is an equipotential surface.
 2. Only when the Gaussian surface is an equipotential surface and $|\vec{E}|$ is constant on the surface.
 3. Only when $|\vec{E}| = \text{constant}$ on the surface.
 4. For any choice of Gaussian surface.

Question Type : MCQ

Question ID : 4050361481

Option 1 ID : 4050365415

Option 2 ID : 4050365416

Option 3 ID : 4050365417

Option 4 ID : 4050365414

Status : Answered

Chosen Option : 3

Q.18 The length of a potentiometer wire is 1200 cm and it carries a current of 60 mA. For a cell of emf 5 V and internal resistance of 20Ω , the null point on it is found to be at 1000 cm. The resistance of whole wire is :

- Options
1. 80Ω
 2. 120Ω
 3. 60Ω
 4. 100Ω

Question Type : MCQ

Question ID : 4050361488

Option 1 ID : 4050365443

Option 2 ID : 4050365445

Option 3 ID : 4050365442

Option 4 ID : 4050365444

Status : Answered

Chosen Option : 2

Q.19 Proton with kinetic energy of 1 MeV moves from south to north. It gets an acceleration of 10^{12} m/s^2 by an applied magnetic field (west to east). The value of magnetic field : (Rest mass of proton is $1.6 \times 10^{-27} \text{ kg}$)

- Options**
1. 0.71 mT
 2. 7.1 mT
 3. 0.071 mT
 4. 71 mT

Question Type : **MCQ**

Question ID : **4050361480**

Option 1 ID : **4050365412**

Option 2 ID : **4050365411**

Option 3 ID : **4050365413**

Option 4 ID : **4050365410**

Status : **Answered**

Chosen Option : **3**

Q.20 Consider a solid sphere of radius R and

mass density $\rho(r) = \rho_0 \left(1 - \frac{r^2}{R^2} \right),$

$0 < r \leq R$. The minimum density of a liquid in which it will float is :

- Options**
1. $\frac{\rho_0}{3}$
 2. $\frac{\rho_0}{5}$
 3. $\frac{2\rho_0}{5}$
 4. $\frac{2\rho_0}{3}$

Question Type : **MCQ**

Question ID : **4050361474**

Option 1 ID : **4050365387**

Option 2 ID : **4050365386**

Option 3 ID : **4050365388**

Option 4 ID : **4050365389**

Status : **Answered**

Chosen Option : **2**

- Q.21** A particle is moving along the x -axis with its coordinate with time ' t ' given by $x(t) = 10 + 8t - 3t^2$. Another particle is moving along the y -axis with its coordinate as a function of time given by $y(t) = 5 - 8t^3$. At $t = 1$ s, the speed of the second particle as measured in the frame of the first particle is given as \sqrt{v} . Then v (in m/s) is _____.

Given **9**

Answer :

Question Type : **SA**

Question ID : **4050361489**

Status : **Answered**

- Q.22** Four resistances of $15\ \Omega$, $12\ \Omega$, $4\ \Omega$ and $10\ \Omega$ respectively in cyclic order to form Wheatstone's network. The resistance that is to be connected in parallel with the resistance of $10\ \Omega$ to balance the network is _____ Ω .

Given **7.76**

Answer :

Question Type : **SA**

Question ID : **4050361492**

Status : **Answered**

- Q.23** A point object in air is in front of the curved surface of a *plano-convex* lens. The radius of curvature of the curved surface is 30 cm and the refractive index of the lens material is 1.5, then the focal length of the lens (in cm) is _____.

Given **60**

Answer :

Question Type : **SA**

Question ID : **4050361493**

Status : **Answered**

- Q.24** A body A, of mass $m = 0.1 \text{ kg}$ has an initial velocity of $3\hat{i} \text{ ms}^{-1}$. It collides elastically with another body, B of the same mass which has an initial velocity of $5\hat{j} \text{ ms}^{-1}$. After collision, A moves with a velocity $\vec{v} = 4(\hat{i} + \hat{j})$. The energy of B after collision is written as $\frac{x}{10} \text{ J}$. The value of x is _____.

Given 1
Answer :

Question Type : SA
Question ID : 4050361490
Status : Answered

- Q.25** A one metre long (both ends open) organ pipe is kept in a gas that has double the density of air at STP. Assuming the speed of sound in air at STP is 300 m/s , the frequency difference between the fundamental and second harmonic of this pipe is _____ Hz.

Given 50
Answer :

Question Type : SA
Question ID : 4050361491
Status : Answered

Section : Chemistry

Q.1 Among the gases (a) - (e), the gases that cause greenhouse effect are :

- (a) CO_2
- (b) H_2O
- (c) CFCs
- (d) O_2
- (e) O_3

- Options
1. (a), (b), (c) and (d)
 2. (a), (b), (c) and (e)
 3. (a) and (d)
 4. (a), (c), (d) and (e)

Question Type : MCQ

Question ID : 4050361506

Option 1 ID : 4050365502

Option 2 ID : 4050365501

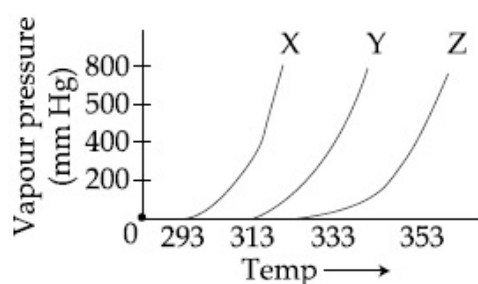
Option 3 ID : 4050365499

Option 4 ID : 4050365500

Status : Answered

Chosen Option : 1

- Q.2 A graph of vapour pressure and temperature for three different liquids X, Y, and Z is shown below :



The following inferences are made :

- (A) X has higher intermolecular interactions compared to Y.
- (B) X has lower intermolecular interactions compared to Y.
- (C) Z has lower intermolecular interactions compared to Y.

The correct inference(s) is/are :

- Options
1. (A) and (C)
 2. (A)
 3. (B)
 4. (C)

Question Type : MCQ

Question ID : 4050361499

Option 1 ID : 4050365474

Option 2 ID : 4050365471

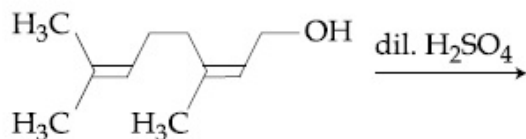
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Option 4 ID : 4050365473

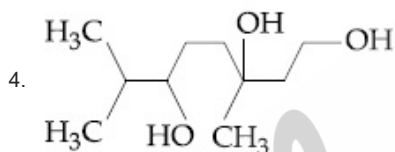
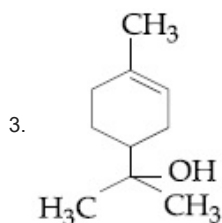
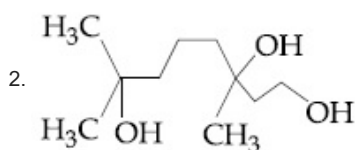
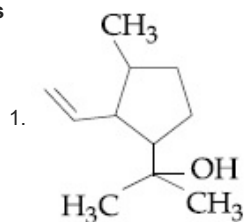
Status : Answered

Chosen Option : 3

Q.3 The major product of the following reaction is :



Options



Question Type : MCQ

Question ID : 4050361513

Option 1 ID : 4050365529

Option 2 ID : 4050365530

Option 3 ID : 4050365528

Option 4 ID : 4050365527

Status : Answered

Chosen Option : 4

Q.4 The strength of an aqueous NaOH solution is *most accurately* determined by titrating :
(Note : consider that an appropriate indicator is used)

Options

1. Aq. NaOH in a pipette and aqueous oxalic acid in a burette
2. Aq. NaOH in a burette and aqueous oxalic acid in a conical flask
3. Aq. NaOH in a burette and concentrated H_2SO_4 in a conical flask
4. Aq. NaOH in a volumetric flask and concentrated H_2SO_4 in a conical flask

Question Type : **MCQ**

Question ID : **4050361501**

Option 1 ID : **4050365482**

Option 2 ID : **4050365481**

Option 3 ID : **4050365480**

Option 4 ID : **4050365479**

Status : **Answered**

Chosen Option : **4**

Q.5 The rate of a certain biochemical reaction at physiological temperature (T) occurs 10^6 times faster with enzyme than without. The change in the activation energy upon adding enzyme is :

Options

1. $-6(2.303)RT$
2. $-6RT$
3. $+6(2.303)RT$
4. $+6RT$

Question Type : **MCQ**

Question ID : **4050361495**

Option 1 ID : **4050365456**

Option 2 ID : **4050365455**

Option 3 ID : **4050365458**

Option 4 ID : **4050365457**

Status : **Answered**

Chosen Option : **3**

Q.6 The first ionization energy (in kJ/mol) of Na, Mg, Al and Si respectively, are :

- Options
1. 496, 737, 577, 786
 2. 496, 577, 737, 786
 3. 786, 737, 577, 496
 4. 496, 577, 786, 737

Question Type : MCQ

Question ID : 4050361500

Option 1 ID : 4050365477

Option 2 ID : 4050365475

Option 3 ID : 4050365476

Option 4 ID : 4050365478

Status : Answered

Chosen Option : 2

Q.7 The complex that can show *fac*- and *mer*- isomers is :

- Options
1. $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$
 2. $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
 3. $[\text{CoCl}_2(\text{en})_2]$
 4. $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$

Question Type : MCQ

Question ID : 4050361505

Option 1 ID : 4050365497

Option 2 ID : 4050365498

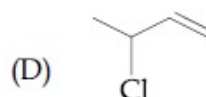
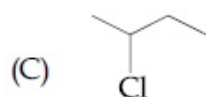
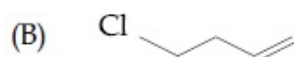
Option 3 ID : 4050365496

Option 4 ID : 4050365495

Status : Answered

Chosen Option : 4

Q.8 The decreasing order of reactivity towards dehydrohalogenation (E_1) reaction of the following compounds is :



- Options
1. $D > B > C > A$
 2. $B > D > A > C$
 3. $B > D > C > A$
 4. $B > A > D > C$

Question Type : MCQ

Question ID : 4050361512

Option 1 ID : 4050365524

Option 2 ID : 4050365526

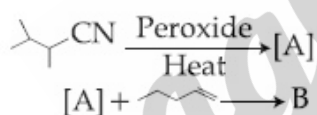
Option 3 ID : 4050365523

Option 4 ID : 4050365525

Status : Answered

Chosen Option : 1

Q.9 The major products A and B in the following reactions are :



- Options
1. $\text{A} = \text{Isobutyl-CN}$ and $\text{B} = \text{2-methyl-2-pentyl-CN}$
 2. $\text{A} = \text{Isobutyl-CN}$ and $\text{B} = \text{2-methyl-3-pentyl-CN}$
 3. $\text{A} = \text{Isobutyl-CN}$ and $\text{B} = \text{2-methyl-4-pentyl-CN}$
 4. $\text{A} = \text{Isobutyl-CN}$ and $\text{B} = \text{2-methyl-5-pentyl-CN}$

Question Type : MCQ

Question ID : 4050361511

Option 1 ID : 4050365520

Option 2 ID : 4050365519

Option 3 ID : 4050365522

Option 4 ID : 4050365521

Status : Answered

Chosen Option : 2

Q.10 The predominant intermolecular forces present in ethyl acetate, a liquid, are :

- Options**
1. London dispersion and dipole-dipole
 2. hydrogen bonding and London dispersion
 3. Dipole-dipole and hydrogen bonding
 4. London dispersion, dipole-dipole and hydrogen bonding

Question Type : **MCQ**

Question ID : **4050361497**

Option 1 ID : **4050365466**

Option 2 ID : **4050365463**

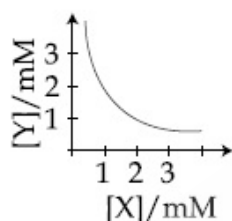
Option 3 ID : **4050365465**

Option 4 ID : **4050365464**

Status : **Answered**

Chosen Option : **3**

Q.11 The stoichiometry and solubility product of a salt with the solubility curve given below is, respectively :



- Options**
1. X_2Y , $2 \times 10^{-9} M^3$
 2. XY_2 , $4 \times 10^{-9} M^3$
 3. XY_2 , $1 \times 10^{-9} M^3$
 4. XY , $2 \times 10^{-6} M^3$

Question Type : **MCQ**

Question ID : **4050361494**

Option 1 ID : **4050365453**

Option 2 ID : **4050365452**

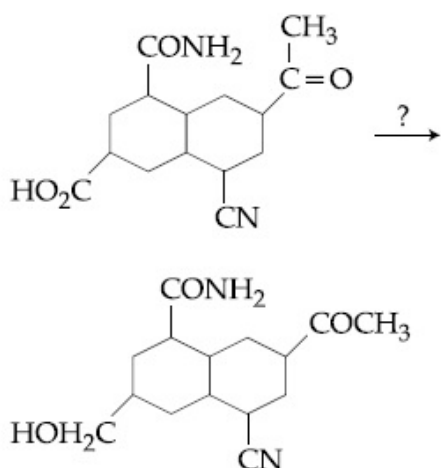
Option 3 ID : **4050365454**

Option 4 ID : **4050365451**

Status : **Answered**

Chosen Option : **1**

Q.12 The most suitable reagent for the given conversion is :



- Options
1. B_2H_6
 2. NaBH_4
 3. LiAlH_4
 4. H_2/Pd

Question Type : MCQ

Question ID : 4050361507

Option 1 ID : 4050365504

Option 2 ID : 4050365506

Option 3 ID : 4050365503

Option 4 ID : 4050365505

Status : Answered

Chosen Option : 4

Q.13 Arrange the following compounds in increasing order of C – OH bond length :
methanol, phenol, p-ethoxyphenol

- Options
1. methanol < p-ethoxyphenol < phenol
 2. phenol < methanol < p-ethoxyphenol
 3. phenol < p-ethoxyphenol < methanol
 4. methanol < phenol < p-ethoxyphenol

Question Type : MCQ

Question ID : 4050361509

Option 1 ID : 4050365514

Option 2 ID : 4050365513

Option 3 ID : 4050365512

Option 4 ID : 4050365511

Status : Answered

Chosen Option : 4

Q.14 When gypsum is heated to 393 K, it forms :

- Options
1. Anhydrous CaSO_4
 2. $\text{CaSO}_4 \cdot 5 \text{H}_2\text{O}$
 3. $\text{CaSO}_4 \cdot 0.5 \text{H}_2\text{O}$
 4. Dead burnt plaster

Question Type : MCQ

Question ID : 4050361502

Option 1 ID : 4050365483

Option 2 ID : 4050365486

Option 3 ID : 4050365485

Option 4 ID : 4050365484

Status : Answered

Chosen Option : 2

Q.15 A flask contains a mixture of isohexane and 3-methylpentane. One of the liquids boils at 63 °C while the other boils at 60 °C. What is the best way to separate the two liquids and which one will be distilled out first ?

- Options
1. fractional distillation, isohexane
 2. simple distillation, 3-methylpentane
 3. simple distillation, isohexane
 4. fractional distillation, 3-methylpentane

Question Type : MCQ

Question ID : 4050361508

Option 1 ID : 4050365507

Option 2 ID : 4050365510

Option 3 ID : 4050365509

Option 4 ID : 4050365508

Status : Answered

Chosen Option : 4

Q.16 Which of the following statement is not true for glucose ?

Options

1. Glucose exists in two crystalline forms α and β
2. Glucose gives Schiff's test for aldehyde
3. Glucose reacts with hydroxylamine to form oxime
4. The pentaacetate of glucose does not react with hydroxylamine to give oxime

Question Type : MCQ

Question ID : 4050361510

Option 1 ID : 4050365518

Option 2 ID : 4050365517

Option 3 ID : 4050365516

Option 4 ID : 4050365515

Status : Answered

Chosen Option : 3

Q.17 The number of bonds between sulphur and oxygen atoms in $S_2O_8^{2-}$ and the number of bonds between sulphur and sulphur atoms in rhombic sulphur, respectively, are :

Options

1. 4 and 6
2. 8 and 8
3. 8 and 6
4. 4 and 8

Question Type : MCQ

Question ID : 4050361503

Option 1 ID : 4050365487

Option 2 ID : 4050365490

Option 3 ID : 4050365489

Option 4 ID : 4050365488

Status : Answered

Chosen Option : 3

Q.18 The third ionization enthalpy is minimum for :

- Options
1. Co
 2. Fe
 3. Ni
 4. Mn

Question Type : MCQ

Question ID : 4050361504

Option 1 ID : 4050365494

Option 2 ID : 4050365493

Option 3 ID : 4050365491

Option 4 ID : 4050365492

Status : Answered

Chosen Option : 4

Q.19 For the Balmer series in the spectrum of H

atom, $\bar{\nu} = R_H \left\{ \frac{1}{n_1^2} - \frac{1}{n_2^2} \right\}$, the correct

statements among (I) to (IV) are :

- (I) As wavelength decreases, the lines in the series converge
- (II) The integer n_1 is equal to 2
- (III) The lines of longest wavelength corresponds to $n_2=3$
- (IV) The ionization energy of hydrogen can be calculated from wave number of these lines

- Options
1. (I), (III), (IV)
 2. (I), (II), (III)
 3. (I), (II), (IV)
 4. (II), (III), (IV)

Question Type : MCQ

Question ID : 4050361498

Option 1 ID : 4050365469

Option 2 ID : 4050365467

Option 3 ID : 4050365470

Option 4 ID : 4050365468

Status : Answered

Chosen Option : 2

Q.20 As per Hardy-Schulze formulation, the flocculation values of the following for ferric hydroxide sol are in the order :

- Options**
1. $K_3[Fe(CN)_6] < K_2CrO_4 < KBr = KNO_3 = AlCl_3$
 2. $K_3[Fe(CN)_6] < K_2CrO_4 < AlCl_3 < KBr < KNO_3$
 3. $AlCl_3 > K_3[Fe(CN)_6] > K_2CrO_4 > KBr = KNO_3$
 4. $K_3[Fe(CN)_6] > AlCl_3 > K_2CrO_4 > KBr > KNO_3$

Question Type : **MCQ**

Question ID : **4050361496**

Option 1 ID : **4050365462**

Option 2 ID : **4050365461**

Option 3 ID : **4050365460**

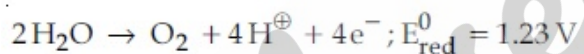
Option 4 ID : **4050365459**

Status : **Answered**

Chosen Option : **3**

Q.21 What would be the electrode potential for the given half cell reaction at pH=5 ?

_____.



($R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$; Temp = 298 K; oxygen under std. atm. pressure of 1 bar)

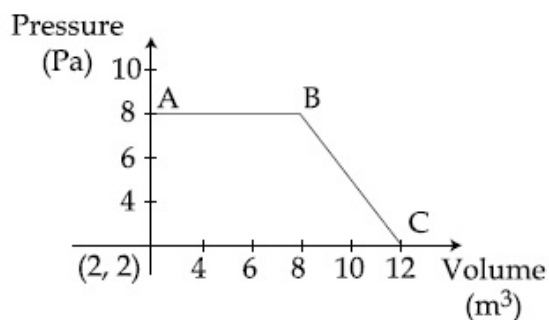
Given 10
Answer :

Question Type : **SA**

Question ID : **4050361516**

Status : **Answered**

- Q.22** The magnitude of work done by a gas that undergoes a reversible expansion along the path ABC shown in the figure is _____.



Given 10
Answer :

Question Type : SA
Question ID : 4050361515
Status : Answered

- Q.23** Ferrous sulphate heptahydrate is used to fortify foods with iron. The amount (in grams) of the salt required to achieve 10 ppm of iron in 100 kg of wheat is _____.

Atomic weight : Fe = 55.85; S = 32.00;
O = 16.00

Given 10
Answer :

Question Type : SA
Question ID : 4050361514
Status : Answered

- Q.24** The volume (in mL) of 0.125 M AgNO_3 required to quantitatively precipitate chloride ions in 0.3 g of $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ is _____.

$M_{[\text{Co}(\text{NH}_3)_6]\text{Cl}_3} = 267.46 \text{ g/mol}$

$M_{\text{AgNO}_3} = 169.87 \text{ g/mol}$

Given 10
Answer :

Question Type : SA
Question ID : 4050361517
Status : Answered

Q.25 The number of chiral centres in penicillin is _____.

Given 3
Answer :

Question Type : **SA**
Question ID : **4050361518**
Status : **Answered**

Section : **Mathematics**

Q.1 The shortest distance between the lines

$$\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1} \text{ and}$$

$$\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4} \text{ is :}$$

Options

1. $2\sqrt{30}$
2. $\frac{7}{2}\sqrt{30}$
3. $3\sqrt{30}$
4. 3

Question Type : **MCQ**
Question ID : **4050361533**
Option 1 ID : **4050365592**
Option 2 ID : **4050365595**
Option 3 ID : **4050365593**
Option 4 ID : **4050365594**
Status : **Answered**
Chosen Option : **4**

Q.2 The mean and the standard deviation (s.d.) of 10 observations are 20 and 2 respectively. Each of these 10 observations is multiplied by p and then reduced by q , where $p \neq 0$ and $q \neq 0$. If the new mean and new s.d. become half of their original values, then q is equal to :

- Options**
1. -5
 2. 10
 3. -20
 4. -10

Question Type : **MCQ**

Question ID : **4050361535**

Option 1 ID : **4050365600**

Option 2 ID : **4050365601**

Option 3 ID : **4050365603**

Option 4 ID : **4050365602**

Status : **Not Answered**

Chosen Option : --

Q.3

$\lim_{x \rightarrow 0} \left(\frac{3x^2 + 2}{7x^2 + 2} \right)^{\frac{1}{x^2}}$ is equal to :

- Options**
1. $\frac{1}{e}$
 2. $\frac{1}{e^2}$
 3. e^2
 4. e

Question Type : **MCQ**

Question ID : **4050361525**

Option 1 ID : **4050365562**

Option 2 ID : **4050365563**

Option 3 ID : **4050365561**

Option 4 ID : **4050365560**

Status : **Answered**

Chosen Option : **3**

Q.4 Let two points be A(1, -1) and B(0, 2). If a point P(x', y') be such that the area of $\Delta PAB = 5$ sq. units and it lies on the line, $3x + y - 4\lambda = 0$, then a value of λ is :

- Options
1. 4
 2. 3
 3. 1
 4. -3

Question Type : **MCQ**

Question ID : **4050361522**

Option 1 ID : **4050365549**

Option 2 ID : **4050365551**

Option 3 ID : **4050365548**

Option 4 ID : **4050365550**

Status : **Answered**

Chosen Option : 2

Q.5 If c is a point at which Rolle's theorem holds for the function,

$$f(x) = \log_e \left(\frac{x^2 + \alpha}{7x} \right) \text{ in the interval}$$

$[3, 4]$, where $\alpha \in \mathbb{R}$, then $f''(c)$ is equal to :

- Options
1. $-\frac{1}{12}$
 2. $\frac{1}{12}$
 3. $-\frac{1}{24}$
 4. $\frac{\sqrt{3}}{7}$

Question Type : **MCQ**

Question ID : **4050361527**

Option 1 ID : **4050365571**

Option 2 ID : **4050365569**

Option 3 ID : **4050365570**

Option 4 ID : **4050365568**

Status : **Answered**

Chosen Option : 1

Q.6

Let $f(x) = x \cos^{-1}(-\sin|x|)$, $x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$,

then which of the following is true ?

Options

- f' is increasing in $\left(-\frac{\pi}{2}, 0\right)$ and
1. decreasing in $\left(0, \frac{\pi}{2}\right)$
 2. $f'(0) = -\frac{\pi}{2}$
 3. f is not differentiable at $x=0$
 4. f' is decreasing in $\left(-\frac{\pi}{2}, 0\right)$ and increasing in $\left(0, \frac{\pi}{2}\right)$

Question Type : MCQ

Question ID : 4050361526

Option 1 ID : 4050365567

Option 2 ID : 4050365565

Option 3 ID : 4050365564

Option 4 ID : 4050365566

Status : Answered

Chosen Option : 1

Q.7

Which one of the following is a tautology ?

Options

1. $(P \wedge (P \rightarrow Q)) \rightarrow Q$
2. $Q \rightarrow (P \wedge (P \rightarrow Q))$
3. $P \wedge (P \vee Q)$
4. $P \vee (P \wedge Q)$

Question Type : MCQ

Question ID : 4050361538

Option 1 ID : 4050365614

Option 2 ID : 4050365615

Option 3 ID : 4050365612

Option 4 ID : 4050365613

Status : Answered

Chosen Option : 3

- Q.8 Let the line $y = mx$ and the ellipse $2x^2 + y^2 = 1$ intersect at a point P in the first quadrant. If the normal to this ellipse at P meets the co-ordinate axes at $\left(-\frac{1}{3\sqrt{2}}, 0\right)$ and $(0, \beta)$, then β is equal to :

Options

1. $\frac{2\sqrt{2}}{3}$
2. $\frac{2}{\sqrt{3}}$
3. $\frac{2}{3}$
4. $\frac{\sqrt{2}}{3}$

Question Type : MCQ

Question ID : 4050361532

Option 1 ID : 4050365591

Option 2 ID : 4050365590

Option 3 ID : 4050365589

Option 4 ID : 4050365588

Status : Answered

Chosen Option : 2

- Q.9 The locus of a point which divides the line segment joining the point $(0, -1)$ and a point on the parabola, $x^2 = 4y$, internally in the ratio 1 : 2, is :

Options

1. $9x^2 - 12y = 8$
2. $9x^2 - 3y = 2$
3. $x^2 - 3y = 2$
4. $4x^2 - 3y = 2$

Question Type : MCQ

Question ID : 4050361531

Option 1 ID : 4050365586

Option 2 ID : 4050365587

Option 3 ID : 4050365585

Option 4 ID : 4050365584

Status : Not Answered

Chosen Option : --

Q.10 Let A and B be two independent events such that $P(A) = \frac{1}{3}$ and $P(B) = \frac{1}{6}$. Then, which of the following is TRUE ?

Options

1. $P(A/B) = \frac{2}{3}$
2. $P(A/B') = \frac{1}{3}$
3. $P(A'/B') = \frac{1}{3}$
4. $P(A/(A \cup B)) = \frac{1}{4}$

Question Type : MCQ

Question ID : 4050361536

Option 1 ID : 4050365605

Option 2 ID : 4050365606

Option 3 ID : 4050365607

Option 4 ID : 4050365604

Status : Answered

Chosen Option : 1

Q.11 Let the volume of a parallelopiped whose coterminous edges are given by

$$\vec{u} = \hat{i} + \hat{j} + \lambda\hat{k}, \vec{v} = \hat{i} + \hat{j} + 3\hat{k} \text{ and}$$

$$\vec{w} = 2\hat{i} + \hat{j} + \hat{k} \text{ be 1 cu. unit. If } \theta \text{ be the}$$

angle between the edges \vec{u} and \vec{w} , then $\cos\theta$ can be :

Options

1. $\frac{7}{6\sqrt{6}}$
2. $\frac{7}{6\sqrt{3}}$
3. $\frac{5}{7}$
4. $\frac{5}{3\sqrt{3}}$

Question Type : MCQ

Question ID : 4050361534

Option 1 ID : 4050365597

Option 2 ID : 4050365598

Option 3 ID : 4050365596

Option 4 ID : 4050365599

Status : Answered

Chosen Option : 2

Q.12

If

$$\int \frac{\cos x \, dx}{\sin^3 x (1 + \sin^6 x)^{2/3}} = f(x) (1 + \sin^6 x)^{1/\lambda} + c$$

where c is a constant of integration, then

$\lambda f\left(\frac{\pi}{3}\right)$ is equal to :

Options

1. $-\frac{9}{8}$
2. 2
3. $\frac{9}{8}$
4. -2

Question Type : MCQ

Question ID : 4050361528

Option 1 ID : 4050365573

Option 2 ID : 4050365574

Option 3 ID : 4050365572

Option 4 ID : 4050365575

Status : Answered

Chosen Option : 3

Q.13

If the equation, $x^2 + bx + 45 = 0$ ($b \in \mathbb{R}$) has conjugate complex roots and they satisfy

$$|z + 1| = 2\sqrt{10}, \text{ then :}$$

Options

1. $b^2 - b = 30$
2. $b^2 + b = 72$
3. $b^2 - b = 42$
4. $b^2 + b = 12$

Question Type : MCQ

Question ID : 4050361520

Option 1 ID : 4050365542

Option 2 ID : 4050365543

Option 3 ID : 4050365541

Option 4 ID : 4050365540

Status : Not Answered

Chosen Option : --

Q.14

Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be such that for all $x \in \mathbb{R}$ $(2^{1+x} + 2^{1-x}), f(x)$ and $(3^x + 3^{-x})$ are in A.P., then the minimum value of $f(x)$ is :

- Options
1. 2
 2. 3
 3. 0
 4. 4

Question Type : MCQ

Question ID : 4050361524

Option 1 ID : 4050365557

Option 2 ID : 4050365558

Option 3 ID : 4050365556

Option 4 ID : 4050365559

Status : Answered

Chosen Option : 1

Q.15

For $a > 0$, let the curves $C_1 : y^2 = ax$ and $C_2 : x^2 = ay$ intersect at origin O and a point P. Let the line $x = b$ ($0 < b < a$) intersect the chord OP and the x -axis at points Q and R, respectively. If the line $x = b$ bisects the area bounded by the curves, C_1 and C_2 , and the area of $\Delta OQR = \frac{1}{2}$, then 'a' satisfies the equation :

- Options
1. $x^6 - 6x^3 + 4 = 0$
 2. $x^6 - 12x^3 + 4 = 0$
 3. $x^6 + 6x^3 - 4 = 0$
 4. $x^6 - 12x^3 - 4 = 0$

Question Type : MCQ

Question ID : 4050361529

Option 1 ID : 4050365579

Option 2 ID : 4050365577

Option 3 ID : 4050365576

Option 4 ID : 4050365578

Status : Not Answered

Chosen Option : --

Q.16 The inverse function of

$$f(x) = \frac{8^{2x} - 8^{-2x}}{8^{2x} + 8^{-2x}}, x \in (-1, 1), \text{ is}$$

_____.

Options

1. $\frac{1}{4} \log_e \left(\frac{1+x}{1-x} \right)$
2. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1-x}{1+x} \right)$
3. $\frac{1}{4} \log_e \left(\frac{1-x}{1+x} \right)$
4. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1+x}{1-x} \right)$

Question Type : MCQ

Question ID : 4050361519

Option 1 ID : 4050365536

Option 2 ID : 4050365537

Option 3 ID : 4050365538

Option 4 ID : 4050365539

Status : Not Answered

Chosen Option : --

Q.17 For which of the following ordered pairs (μ, δ) , the system of linear equations

$$x + 2y + 3z = 1$$

$$3x + 4y + 5z = \mu$$

$$4x + 4y + 4z = \delta$$

is inconsistent ?

Options

1. (4, 3)
2. (4, 6)
3. (1, 0)
4. (3, 4)

Question Type : MCQ

Question ID : 4050361521

Option 1 ID : 4050365546

Option 2 ID : 4050365547

Option 3 ID : 4050365544

Option 4 ID : 4050365545

Status : Not Answered

Chosen Option : --

Q.18 If a, b and c are the greatest values of ${}^{19}C_p$, ${}^{20}C_q$ and ${}^{21}C_r$ respectively, then :

Options

1. $\frac{a}{11} = \frac{b}{22} = \frac{c}{21}$

2. $\frac{a}{10} = \frac{b}{11} = \frac{c}{21}$

3. $\frac{a}{11} = \frac{b}{22} = \frac{c}{42}$

4. $\frac{a}{10} = \frac{b}{11} = \frac{c}{42}$

Question Type : MCQ

Question ID : 4050361523

Option 1 ID : 4050365552

Option 2 ID : 4050365554

Option 3 ID : 4050365555

Option 4 ID : 4050365553

Status : Answered

Chosen Option : 1

Q.19 Let

$$f(x) = (\sin(\tan^{-1}x) + \sin(\cot^{-1}x))^2 - 1, \quad |x| > 1.$$

If $\frac{dy}{dx} = \frac{1}{2} \frac{d}{dx} (\sin^{-1}(f(x)))$ and

$y(\sqrt{3}) = \frac{\pi}{6}$, then $y(-\sqrt{3})$ is equal to :

Options

1. $\frac{2\pi}{3}$

2. $-\frac{\pi}{6}$

3. $\frac{5\pi}{6}$

4. $\frac{\pi}{3}$

Question Type : MCQ

Question ID : 4050361537

Option 1 ID : 4050365609

Option 2 ID : 4050365608

Option 3 ID : 4050365610

Option 4 ID : 4050365611

Status : Answered

Chosen Option : 4

Q.20 Let $y = y(x)$ be a solution of the differential equation,

$$\sqrt{1-x^2} \frac{dy}{dx} + \sqrt{1-y^2} = 0, |x| < 1.$$

If $y\left(\frac{1}{2}\right) = \frac{\sqrt{3}}{2}$, then $y\left(\frac{-1}{\sqrt{2}}\right)$ is equal to :

Options

1. $\frac{\sqrt{3}}{2}$
2. $-\frac{1}{\sqrt{2}}$
3. $\frac{1}{\sqrt{2}}$
4. $-\frac{\sqrt{3}}{2}$

Question Type : **MCQ**

Question ID : **4050361530**

Option 1 ID : **4050365582**

Option 2 ID : **4050365580**

Option 3 ID : **4050365581**

Option 4 ID : **4050365583**

Status : **Answered**

Chosen Option : **4**

Q.21

The sum $\sum_{k=1}^{20} (1 + 2 + 3 + \dots + k)$ is

_____.

Given 1
Answer :

Question Type : **SA**

Question ID : **4050361541**

Status : **Answered**

Q.22

The number of all 3×3 matrices A , with entries from the set $\{-1, 0, 1\}$ such that the sum of the diagonal elements of AA^T is 3, is _____.

Given 3
Answer :

Question Type : **SA**

Question ID : **4050361540**

Status : **Answered**

Q.23 Let the normal at a point P on the curve $y^2 - 3x^2 + y + 10 = 0$ intersect the y-axis at $\left(0, \frac{3}{2}\right)$. If m is the slope of the tangent at P to the curve, then |m| is equal to _____.

Given 1
Answer :

Question Type : **SA**
Question ID : **4050361542**
Status : **Answered**

Q.24 An urn contains 5 red marbles, 4 black marbles and 3 white marbles. Then the number of ways in which 4 marbles can be drawn so that at the most three of them are red is _____.

Given .01
Answer :

Question Type : **SA**
Question ID : **4050361543**
Status : **Answered**

Q.25 The least positive value of 'a' for which the equation, $2x^2 + (a - 10)x + \frac{33}{2} = 2a$ has real roots is _____.

Given 3
Answer :

Question Type : **SA**
Question ID : **4050361539**
Status : **Answered**