

JEE April 2019

Roll No.	
Candidate Name	
Application No	
Test Date	08/04/2019
Test Time	9:30 AM - 12:30 PM
Subject	Paper I EH

Section : Physics

Q.1 A steel wire having a radius of 2.0 mm, carrying a load of 4 kg, is hanging from a ceiling. Given that $g = 3.1 \pi \text{ ms}^{-2}$, what will be the tensile stress that would be developed in the wire ?

- Options
1. $6.2 \times 10^6 \text{ Nm}^{-2}$
 2. $5.2 \times 10^6 \text{ Nm}^{-2}$
 3. $3.1 \times 10^6 \text{ Nm}^{-2}$
 4. $4.8 \times 10^6 \text{ Nm}^{-2}$

Question Type : **MCQ**
 Question ID : **41652912707**
 Option 1 ID : **41652949608**
 Option 2 ID : **41652949606**
 Option 3 ID : **41652949607**
 Option 4 ID : **41652949609**
 Status : **Answered**
 Chosen Option : **2**

Q.2 If 10^{22} gas molecules each of mass 10^{-26} kg collide with a surface (perpendicular to it) elastically per second over an area 1 m^2 with a speed 10^4 m/s , the pressure exerted by the gas molecules will be of the order of :

- Options
1. 10^4 N/m^2
 2. 10^8 N/m^2
 3. 10^3 N/m^2
 4. 10^{16} N/m^2

Question Type : **MCQ**
 Question ID : **41652912706**
 Option 1 ID : **41652949603**
 Option 2 ID : **41652949604**
 Option 3 ID : **41652949602**

Option 4 ID : **41652949605**
 Status : **Answered**
 Chosen Option : **2**

Q.3 The bob of a simple pendulum has mass 2 g and a charge of $5.0 \mu\text{C}$. It is at rest in a uniform horizontal electric field of intensity 2000 V/m. At equilibrium, the angle that the pendulum makes with the vertical is :
 (take $g = 10 \text{ m/s}^2$)

- Options**
1. $\tan^{-1}(2.0)$
 2. $\tan^{-1}(0.2)$
 3. $\tan^{-1}(5.0)$
 4. $\tan^{-1}(0.5)$

Question Type : **MCQ**
 Question ID : **41652912709**
 Option 1 ID : **41652949616**
 Option 2 ID : **41652949617**
 Option 3 ID : **41652949615**
 Option 4 ID : **41652949614**
 Status : **Answered**
 Chosen Option : **2**

Q.4 A boy's catapult is made of rubber cord which is 42 cm long, with 6 mm diameter of cross-section and of negligible mass. The boy keeps a stone weighing 0.02 kg on it and stretches the cord by 20 cm by applying a constant force. When released, the stone flies off with a velocity of 20 ms^{-1} . Neglect the change in the area of cross-section of the cord while stretched. The Young's modulus of rubber is closest to :

- Options**
1. 10^6 Nm^{-2}
 2. 10^4 Nm^{-2}
 3. 10^8 Nm^{-2}
 4. 10^3 Nm^{-2}

Question Type : **MCQ**
 Question ID : **41652912702**
 Option 1 ID : **41652949586**
 Option 2 ID : **41652949588**
 Option 3 ID : **41652949587**
 Option 4 ID : **41652949589**
 Status : **Answered**

Chosen Option : 2

Q.5 A plane electromagnetic wave travels in free space along the x -direction. The electric field component of the wave at a particular point of space and time is $E = 6 \text{ Vm}^{-1}$ along y -direction. Its corresponding magnetic field component, B would be :

- Options**
1. $2 \times 10^{-8} \text{ T}$ along z -direction
 2. $6 \times 10^{-8} \text{ T}$ along x -direction
 3. $6 \times 10^{-8} \text{ T}$ along z -direction
 4. $2 \times 10^{-8} \text{ T}$ along y -direction

Question Type : MCQ

Question ID : 41652912717

Option 1 ID : 41652949646

Option 2 ID : 41652949647

Option 3 ID : 41652949649

Option 4 ID : 41652949648

Status : Answered

Chosen Option : 2

Q.6 Ship A is sailing towards north-east with velocity $\vec{v} = 30\hat{i} + 50\hat{j} \text{ km/hr}$ where \hat{i} points east and \hat{j} , north. Ship B is at a distance of 80 km east and 150 km north of Ship A and is sailing towards west at 10 km/hr. A will be at minimum distance from B in :

- Options**
1. 4.2 hrs.
 2. 2.6 hrs.
 3. 3.2 hrs.
 4. 2.2 hrs.

Question Type : MCQ

Question ID : 41652912697

Option 1 ID : 41652949566

Option 2 ID : 41652949568

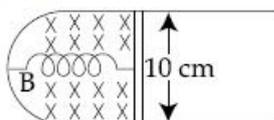
Option 3 ID : 41652949569

Option 4 ID : 41652949567

Status : Answered

Chosen Option : 3

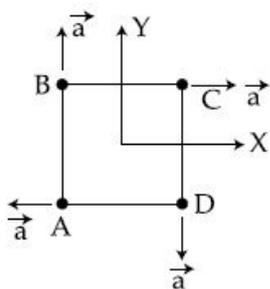
Q.7 A thin strip 10 cm long is on a U shaped wire of negligible resistance and it is connected to a spring of spring constant 0.5 Nm^{-1} (see figure). The assembly is kept in a uniform magnetic field of 0.1 T. If the strip is pulled from its equilibrium position and released, the number of oscillations it performs before its amplitude decreases by a factor of e is N. If the mass of the strip is 50 grams, its resistance 10Ω and air drag negligible, N will be close to :



- Options**
1. 1000
 2. 50000
 3. 5000
 4. 10000

Question Type : **MCQ**
 Question ID : **41652912715**
 Option 1 ID : **41652949638**
 Option 2 ID : **41652949641**
 Option 3 ID : **41652949639**
 Option 4 ID : **41652949640**
 Status : **Answered**
 Chosen Option : **3**

Q.8 Four particles A, B, C and D with masses $m_A = m$, $m_B = 2m$, $m_C = 3m$ and $m_D = 4m$ are at the corners of a square. They have accelerations of equal magnitude with directions as shown. The acceleration of the centre of mass of the particles is :



- Options**
1. $\frac{a}{5}(\hat{i} - \hat{j})$

2. $a(\hat{i} + \hat{j})$
3. Zero
4. $\frac{a}{5}(\hat{i} + \hat{j})$

Question Type : MCQ

Question ID : 41652912698

Option 1 ID : 41652949573

Option 2 ID : 41652949571

Option 3 ID : 41652949570

Option 4 ID : 41652949572

Status : Answered

Chosen Option : 1

Q.9 A solid conducting sphere, having a charge Q , is surrounded by an uncharged conducting hollow spherical shell. Let the potential difference between the surface of the solid sphere and that of the outer surface of the hollow shell be V . If the shell is now given a charge of $-4Q$, the new potential difference between the same two surfaces is :

- Options
1. $-2V$
 2. $2V$
 3. $4V$
 4. V

Question Type : MCQ

Question ID : 41652912710

Option 1 ID : 41652949620

Option 2 ID : 41652949619

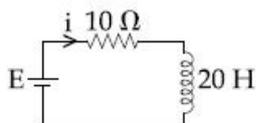
Option 3 ID : 41652949621

Option 4 ID : 41652949618

Status : Answered

Chosen Option : 3

Q.10 A 20 Henry inductor coil is connected to a 10 ohm resistance in series as shown in figure. The time at which rate of dissipation of energy (Joule's heat) across resistance is equal to the rate at which magnetic energy is stored in the inductor, is :



Options

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

Question Type : MCQ

Question ID : 41652912716

Option 1 ID : 41652949644

Option 2 ID : 41652949642

Option 3 ID : 41652949643

Option 4 ID : 41652949645

Status : Answered

Chosen Option : 2

Q.11

A thin circular plate of mass M and radius R has its density varying as $\rho(r) = \rho_0 r$ with ρ_0 as constant and r is the distance from its center. The moment of Inertia of the circular plate about an axis perpendicular to the plate and passing through its edge is $I = a MR^2$. The value of the coefficient a is :

Options

1. $\frac{1}{2}$
2. $\frac{3}{5}$
3. $\frac{8}{5}$
4. $\frac{3}{2}$

Question Type : MCQ

Question ID : 41652912700

Option 1 ID : 41652949581

Option 2 ID : 41652949580

Option 3 ID : 41652949578

Option 4 ID : 41652949579

Status : Answered

Chosen Option : 3

Q.12

In SI units, the dimensions of $\sqrt{\frac{\epsilon_0}{\mu_0}}$ is :

Options

1. $A^{-1}TML^3$
2. $AT^2M^{-1}L^{-1}$
3. $AT^{-3}ML^{\frac{3}{2}}$
4. $A^2T^3M^{-1}L^{-2}$

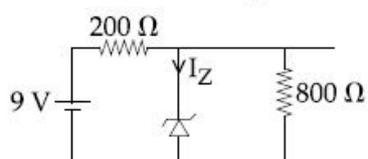
Question Type : **MCQ**Question ID : **41652912696**Option 1 ID : **41652949564**Option 2 ID : **41652949562**Option 3 ID : **41652949565**Option 4 ID : **41652949563**Status : **Answered**Chosen Option : **3**

Q.13 A thermally insulated vessel contains 150 g of water at 0°C . Then the air from the vessel is pumped out adiabatically. A fraction of water turns into ice and the rest evaporates at 0°C itself. The mass of evaporated water will be closest to :
(Latent heat of vaporization of water = $2.10 \times 10^6 \text{ J kg}^{-1}$ and Latent heat of Fusion of water = $3.36 \times 10^5 \text{ J kg}^{-1}$)

- Options
1. 150 g
 2. 20 g
 3. 130 g
 4. 35 g

Question Type : **MCQ**Question ID : **41652912705**Option 1 ID : **41652949598**Option 2 ID : **41652949599**Option 3 ID : **41652949601**Option 4 ID : **41652949600**Status : **Answered**Chosen Option : **2**

Q.14 The reverse breakdown voltage of a Zener diode is 5.6 V in the given circuit.



The current I_Z through the Zener is :

- Options
1. 10 mA
 2. 17 mA
 3. 15 mA
 4. 7 mA

Question Type : **MCQ**

Question ID : **41652912723**
 Option 1 ID : **41652949671**
 Option 2 ID : **41652949673**
 Option 3 ID : **41652949670**
 Option 4 ID : **41652949672**
 Status : **Answered**
 Chosen Option : 1

Q.15 In an interference experiment the ratio of amplitudes of coherent waves is $\frac{a_1}{a_2} = \frac{1}{3}$. The ratio of maximum and minimum intensities of fringes will be :

- Options
1. 2
 2. 18
 3. 4
 4. 9

Question Type : **MCQ**
 Question ID : **41652912719**
 Option 1 ID : **41652949654**
 Option 2 ID : **41652949657**
 Option 3 ID : **41652949655**
 Option 4 ID : **41652949656**
 Status : **Answered**
 Chosen Option : 2

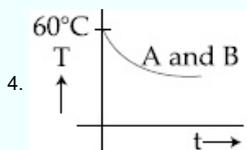
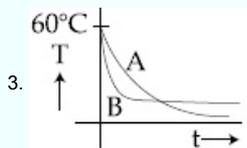
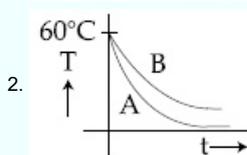
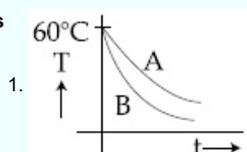
Q.16 Water from a pipe is coming at a rate of 100 liters per minute. If the radius of the pipe is 5 cm, the Reynolds number for the flow is of the order of : (density of water = 1000 kg/m³, coefficient of viscosity of water = 1 mPa s)

- Options
1. 10³
 2. 10⁴
 3. 10²
 4. 10⁶

Question Type : **MCQ**
 Question ID : **41652912703**
 Option 1 ID : **41652949591**
 Option 2 ID : **41652949590**
 Option 3 ID : **41652949593**
 Option 4 ID : **41652949592**
 Status : **Answered**
 Chosen Option : 4

Q.17 Two identical beakers A and B contain equal volumes of two different liquids at 60°C each and left to cool down. Liquid in A has density of $8 \times 10^2 \text{ kg/m}^3$ and specific heat of $2000 \text{ J kg}^{-1} \text{ K}^{-1}$ while liquid in B has density of 10^3 kg m^{-3} and specific heat of $4000 \text{ J kg}^{-1} \text{ K}^{-1}$. Which of the following best describes their temperature versus time graph schematically ? (assume the emissivity of both the beakers to be the same)

Options



Question Type : **MCQ**

Question ID : **41652912704**

Option 1 ID : **41652949594**

Option 2 ID : **41652949595**

Option 3 ID : **41652949597**

Option 4 ID : **41652949596**

Status : **Answered**

Chosen Option : **2**

Q.18 Voltage rating of a parallel plate capacitor is 500 V . Its dielectric can withstand a maximum electric field of 10^6 V/m . The plate area is 10^{-4} m^2 . What is the dielectric constant if the capacitance is 15 pF ?
(given $\epsilon_0 = 8.86 \times 10^{-12} \text{ C}^2/\text{Nm}^2$)

Options 1. 3.8

2. 8.5
3. 4.5
4. 6.2

Question Type : **MCQ**
 Question ID : **41652912711**
 Option 1 ID : **41652949623**
 Option 2 ID : **41652949625**
 Option 3 ID : **41652949624**
 Option 4 ID : **41652949622**
 Status : **Answered**
 Chosen Option : **4**

Q.19 Two particles move at right angle to each other. Their de Broglie wavelengths are λ_1 and λ_2 respectively. The particles suffer perfectly *inelastic* collision. The de Broglie wavelength λ , of the final particle, is given by :

- Options
1. $\frac{1}{\lambda^2} = \frac{1}{\lambda_1^2} + \frac{1}{\lambda_2^2}$
 2. $\lambda = \sqrt{\lambda_1 \lambda_2}$
 3. $\lambda = \frac{\lambda_1 + \lambda_2}{2}$
 4. $\frac{2}{\lambda} = \frac{1}{\lambda_1} + \frac{1}{\lambda_2}$

Question Type : **MCQ**
 Question ID : **41652912721**
 Option 1 ID : **41652949665**
 Option 2 ID : **41652949663**
 Option 3 ID : **41652949662**
 Option 4 ID : **41652949664**
 Status : **Answered**
 Chosen Option : **1**

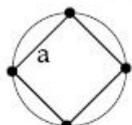
Q.20 A 200Ω resistor has a certain color code. If one replaces the red color by green in the code, the new resistance will be :

- Options
1. 100Ω
 2. 400Ω
 3. 300Ω
 4. 500Ω

Question Type : **MCQ**
 Question ID : **41652912725**

Option 1 ID : 41652949678
 Option 2 ID : 41652949680
 Option 3 ID : 41652949679
 Option 4 ID : 41652949681
 Status : Answered
 Chosen Option : 3

Q.21 Four identical particles of mass M are located at the corners of a square of side 'a'. What should be their speed if each of them revolves under the influence of others' gravitational field in a circular orbit circumscribing the square ?



Options

1. $1.35 \sqrt{\frac{GM}{a}}$
2. $1.16 \sqrt{\frac{GM}{a}}$
3. $1.21 \sqrt{\frac{GM}{a}}$
4. $1.41 \sqrt{\frac{GM}{a}}$

Question Type : MCQ
 Question ID : 41652912701
 Option 1 ID : 41652949583
 Option 2 ID : 41652949585
 Option 3 ID : 41652949582
 Option 4 ID : 41652949584
 Status : Answered
 Chosen Option : 2

Q.22 The wavelength of the carrier waves in a modern optical fiber communication network is close to :

- Options
1. 2400 nm
 2. 1500 nm
 3. 600 nm
 4. 900 nm

Question Type : MCQ
 Question ID : 41652912724
 Option 1 ID : 41652949676

Option 2 ID : **41652949674**
 Option 3 ID : **41652949677**
 Option 4 ID : **41652949675**
 Status : **Answered**
 Chosen Option : **3**

Q.23 An upright object is placed at a distance of 40 cm in front of a convergent lens of focal length 20 cm. A convergent mirror of focal length 10 cm is placed at a distance of 60 cm on the other side of the lens. The position and size of the final image will be :

- Options
1. 20 cm from the convergent mirror, same size as the object
 2. 40 cm from the convergent mirror, same size as the object
 3. 40 cm from the convergent lens, twice the size of the object
 4. 20 cm from the convergent mirror, twice the size of the object

Question Type : **MCQ**
 Question ID : **41652912718**
 Option 1 ID : **41652949651**
 Option 2 ID : **41652949650**
 Option 3 ID : **41652949653**
 Option 4 ID : **41652949652**
 Status : **Answered**
 Chosen Option : **3**

Q.24 A circular coil having N turns and radius r carries a current I . It is held in the XZ plane in a magnetic field $\hat{B} \hat{i}$. The torque on the coil due to the magnetic field is :

- Options
1. $\frac{Br^2 I}{\pi N}$
 2. $B\pi r^2 I N$
 3. $\frac{B\pi r^2 I}{N}$
 4. Zero

Question Type : **MCQ**
 Question ID : **41652912713**
 Option 1 ID : **41652949633**

Option 2 ID : **41652949630**
 Option 3 ID : **41652949631**
 Option 4 ID : **41652949632**
 Status : **Answered**
 Chosen Option : **2**

Q.25 An alternating voltage $v(t) = 220 \sin 100\pi t$ volt is applied to a purely resistive load of 50Ω . The time taken for the current to rise from half of the peak value to the peak value is :

- Options**
1. 5 ms
 2. 2.2 ms
 3. 7.2 ms
 4. 3.3 ms

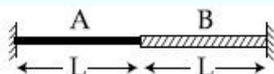
Question Type : **MCQ**
 Question ID : **41652912714**
 Option 1 ID : **41652949636**
 Option 2 ID : **41652949634**
 Option 3 ID : **41652949637**
 Option 4 ID : **41652949635**
 Status : **Answered**
 Chosen Option : **3**

Q.26 Radiation coming from transitions $n=2$ to $n=1$ of hydrogen atoms fall on He^+ ions in $n=1$ and $n=2$ states. The possible transition of helium ions as they absorb energy from the radiation is :

- Options**
1. $n=2 \rightarrow n=3$
 2. $n=1 \rightarrow n=4$
 3. $n=2 \rightarrow n=5$
 4. $n=2 \rightarrow n=4$

Question Type : **MCQ**
 Question ID : **41652912722**
 Option 1 ID : **41652949668**
 Option 2 ID : **41652949667**
 Option 3 ID : **41652949666**
 Option 4 ID : **41652949669**
 Status : **Answered**
 Chosen Option : **3**

Q.27



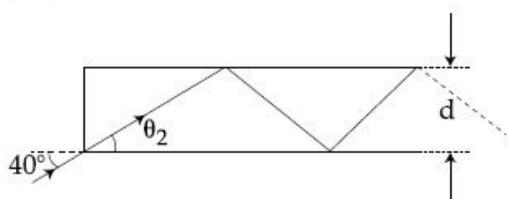
A wire of length $2L$, is made by joining two wires A and B of same length but different radii r and $2r$ and made of the same material. It is vibrating at a frequency such that the joint of the two wires forms a node. If the number of antinodes in wire A is p and that in B is q then the ratio $p : q$ is :

- Options
1. 3 : 5
 2. 4 : 9
 3. 1 : 2
 4. 1 : 4

Question Type : MCQ
 Question ID : 41652912708
 Option 1 ID : 41652949611
 Option 2 ID : 41652949612
 Option 3 ID : 41652949610
 Option 4 ID : 41652949613
 Status : Answered
 Chosen Option : 3

Q.28

In figure, the optical fiber is $l = 2$ m long and has a diameter of $d = 20 \mu\text{m}$. If a ray of light is incident on one end of the fiber at angle $\theta_1 = 40^\circ$, the number of reflections it makes before emerging from the other end is close to :
 (refractive index of fiber is 1.31 and $\sin 40^\circ = 0.64$)



- Options
1. 55000
 2. 66000
 3. 45000
 4. 57000

Question Type : MCQ
 Question ID : 41652912720
 Option 1 ID : 41652949660
 Option 2 ID : 41652949659

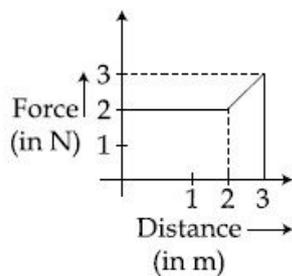
Option 3 ID : 41652949661

Option 4 ID : 41652949658

Status : Answered

Chosen Option : 2

Q.29 A particle moves in one dimension from rest under the influence of a force that varies with the distance travelled by the particle as shown in the figure. The kinetic energy of the particle after it has travelled 3 m is :



Options 1. 4 J

2. 2.5 J

3. 6.5 J

4. 5 J

Question Type : MCQ

Question ID : 41652912699

Option 1 ID : 41652949576

Option 2 ID : 41652949577

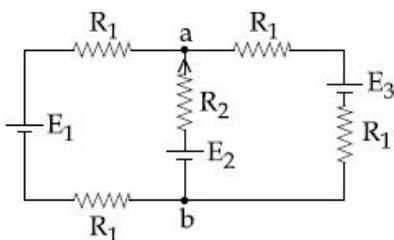
Option 3 ID : 41652949575

Option 4 ID : 41652949574

Status : Answered

Chosen Option : 3

Q.30 For the circuit shown, with $R_1 = 1.0 \Omega$, $R_2 = 2.0 \Omega$, $E_1 = 2 \text{ V}$ and $E_2 = E_3 = 4 \text{ V}$, the potential difference between the points 'a' and 'b' is approximately (in V) :



Options 1. 2.7

2. 2.3

3. 3.7

4. 3.3

Question Type : MCQ

Question ID : 41652912712

Option 1 ID : 41652949628

Option 2 ID : 41652949629

Option 3 ID : 41652949626

Option 4 ID : 41652949627

Status : Answered

Chosen Option : 3

Section : Chemistry

Q.1 An organic compound 'X' showing the following solubility profile is :

'X'	water	→ insoluble
	5% HCl	→ insoluble
	10% NaOH	→ soluble
	10% NaHCO ₃	→ insoluble

- Options
1. o-Toluidine
 2. Oleic acid
 3. m-Cresol
 4. Benzamide

Question Type : MCQ

Question ID : 41652912734

Option 1 ID : 41652949716

Option 2 ID : 41652949714

Option 3 ID : 41652949715

Option 4 ID : 41652949717

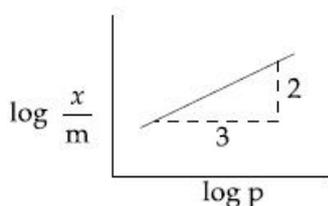
Status : Answered

Chosen Option : 3

Q.2 Adsorption of a gas follows Freundlich adsorption isotherm. x is the mass of the gas adsorbed on mass m of the adsorbent.

The plot of $\log \frac{x}{m}$ versus $\log p$ is shown in

the given graph. $\frac{x}{m}$ is proportional to :



- Options**
1. $p^{2/3}$
 2. $p^{3/2}$
 3. p^3
 4. p^2

Question Type : **MCQ**

Question ID : **41652912755**

Option 1 ID : **41652949800**

Option 2 ID : **41652949799**

Option 3 ID : **41652949801**

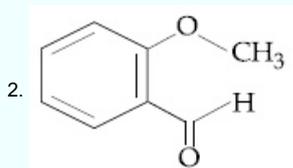
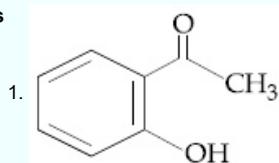
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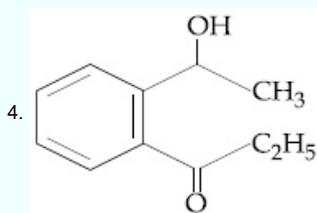
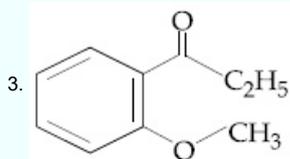
Status : **Answered**

Chosen Option : **2**

Q.3 An organic compound neither reacts with neutral ferric chloride solution nor with Fehling solution. It however, reacts with Grignard reagent and gives positive iodoform test. The compound is :

Options





Question Type : **MCQ**
 Question ID : **41652912726**
 Option 1 ID : **41652949682**
 Option 2 ID : **41652949683**
 Option 3 ID : **41652949684**
 Option 4 ID : **41652949685**
 Status : **Answered**
 Chosen Option : **2**

Q.4 The size of the iso-electronic species Cl^- , Ar and Ca^{2+} is affected by :

- Options
1. azimuthal quantum number of valence shell
 2. electron-electron interaction in the outer orbitals
 3. Principal quantum number of valence shell
 4. nuclear charge

Question Type : **MCQ**
 Question ID : **41652912736**
 Option 1 ID : **41652949724**
 Option 2 ID : **41652949725**
 Option 3 ID : **41652949722**
 Option 4 ID : **41652949723**
 Status : **Answered**
 Chosen Option : **2**

Q.5 In order to oxidise a mixture of one mole of each of FeC_2O_4 , $\text{Fe}_2(\text{C}_2\text{O}_4)_3$, FeSO_4 and $\text{Fe}_2(\text{SO}_4)_3$ in acidic medium, the number of moles of KMnO_4 required is :

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

Question Type : MCQ

Question ID : 41652912746

Option 1 ID : 41652949764

Option 2 ID : 41652949762

Option 3 ID : 41652949765

Option 4 ID : 41652949763

Status : Answered

Chosen Option : 2

Q.6 In the following compounds, the decreasing order of basic strength will be :

- Options
1. $C_2H_5NH_2 > NH_3 > (C_2H_5)_2NH$
 2. $(C_2H_5)_2NH > NH_3 > C_2H_5NH_2$
 3. $(C_2H_5)_2NH > C_2H_5NH_2 > NH_3$
 4. $NH_3 > C_2H_5NH_2 > (C_2H_5)_2NH$

Question Type : MCQ

Question ID : 41652912735

Option 1 ID : 41652949721

Option 2 ID : 41652949720

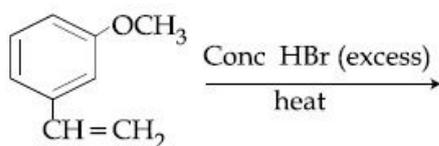
Option 3 ID : 41652949718

Option 4 ID : 41652949719

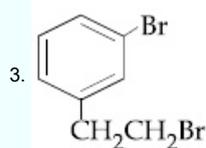
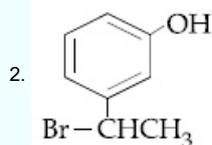
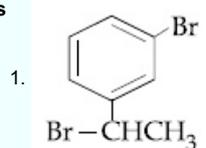
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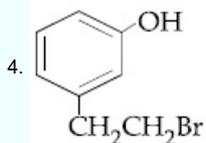
Chosen Option : 2

Q.7 The major product of the following reaction is :



Options





Question Type : MCQ

Question ID : 41652912730

Option 1 ID : 41652949701

Option 2 ID : 41652949699

Option 3 ID : 41652949700

Option 4 ID : 41652949698

Status : Answered

Chosen Option : 2

Q.8 The correct order of the spin-only magnetic moment of metal ions in the following low-spin complexes, $[\text{V}(\text{CN})_6]^{4-}$, $[\text{Fe}(\text{CN})_6]^{4-}$, $[\text{Ru}(\text{NH}_3)_6]^{3+}$, and $[\text{Cr}(\text{NH}_3)_6]^{2+}$, is :

- Options
1. $\text{Cr}^{2+} > \text{Ru}^{3+} > \text{Fe}^{2+} > \text{V}^{2+}$
 2. $\text{V}^{2+} > \text{Cr}^{2+} > \text{Ru}^{3+} > \text{Fe}^{2+}$
 3. $\text{V}^{2+} > \text{Ru}^{3+} > \text{Cr}^{2+} > \text{Fe}^{2+}$
 4. $\text{Cr}^{2+} > \text{V}^{2+} > \text{Ru}^{3+} > \text{Fe}^{2+}$

Question Type : MCQ

Question ID : 41652912743

Option 1 ID : 41652949752

Option 2 ID : 41652949750

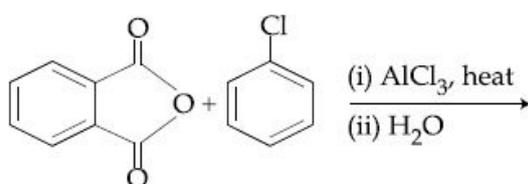
Option 3 ID : 41652949751

Option 4 ID : 41652949753

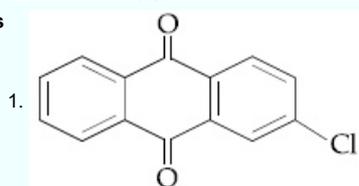
Status : Answered

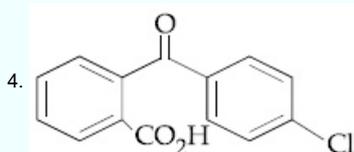
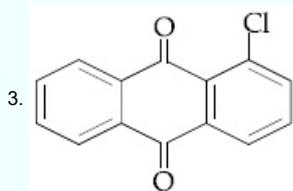
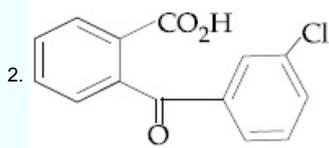
Chosen Option : 3

Q.9 The major product of the following reaction is :



Options





Question Type : **MCQ**

Question ID : **41652912729**

Option 1 ID : **41652949694**

Option 2 ID : **41652949696**

Option 3 ID : **41652949697**

Option 4 ID : **41652949695**

Status : **Answered**

Chosen Option : **1**

Q.10 For silver, $C_p(\text{J K}^{-1} \text{mol}^{-1}) = 23 + 0.01T$. If the temperature (T) of 3 moles of silver is raised from 300 K to 1000 K at 1 atm pressure, the value of ΔH will be close to :

- Options**
1. 62 kJ
 2. 16 kJ
 3. 21 kJ
 4. 13 kJ

Question Type : **MCQ**

Question ID : **41652912749**

Option 1 ID : **41652949777**

Option 2 ID : **41652949776**

Option 3 ID : **41652949775**

Option 4 ID : **41652949774**

Status : **Answered**

Chosen Option : **2**

Q.11 Which is wrong with respect to our responsibility as a human being to protect our environment ?

- Options**
1. Restricting the use of vehicles

2. Avoiding the use of floodlighted facilities.
3. Setting up compost tin in gardens.
4. Using plastic bags.

Question Type : MCQ

Question ID : 41652912744

Option 1 ID : 41652949756

Option 2 ID : 41652949757

Option 3 ID : 41652949754

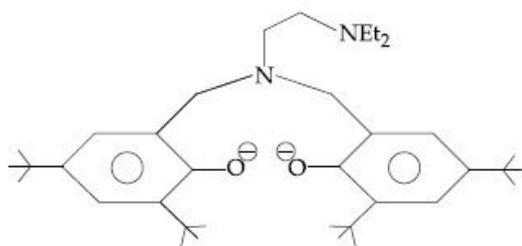
Option 4 ID : 41652949755

Status : Answered

Chosen Option : 2

Q.12

The following ligand is :



- Options
1. hexadentate
 2. tetradentate
 3. bidentate
 4. tridentate

Question Type : MCQ

Question ID : 41652912742

Option 1 ID : 41652949749

Option 2 ID : 41652949748

Option 3 ID : 41652949746

Option 4 ID : 41652949747

Status : Answered

Chosen Option : 3

Q.13

If solubility product of $Zr_3(PO_4)_4$ is denoted by K_{sp} and its molar solubility is denoted by S , then which of the following relation between S and K_{sp} is correct ?

Options

1. $S = \left(\frac{K_{sp}}{144} \right)^{1/6}$

2. $S = \left(\frac{K_{sp}}{6912} \right)^{1/7}$

$$3. S = \left(\frac{K_{sp}}{929} \right)^{\frac{1}{9}}$$

$$4. S = \left(\frac{K_{sp}}{216} \right)^{\frac{1}{7}}$$

Question Type : MCQ

Question ID : 41652912752

Option 1 ID : 41652949786

Option 2 ID : 41652949788

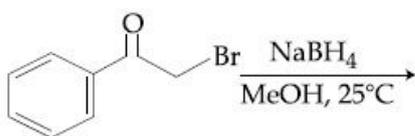
Option 3 ID : 41652949787

Option 4 ID : 41652949789

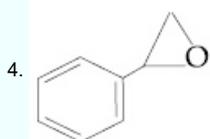
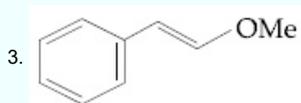
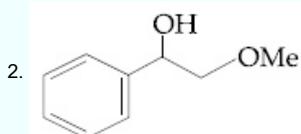
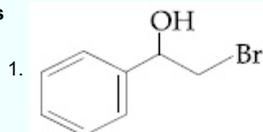
Status : Answered

Chosen Option : 2

Q.14 The major product of the following reaction is :



Options



Question Type : MCQ

Question ID : 41652912731

Option 1 ID : 41652949703

Option 2 ID : 41652949704

Option 3 ID : 41652949705

Option 4 ID : 41652949702

Status : Answered

Chosen Option : 1

Q.15 Diborane (B_2H_6) reacts independently with O_2 and H_2O to produce, respectively :

- Options
1. B_2O_3 and H_3BO_3
 2. B_2O_3 and $[BH_4]^-$
 3. H_3BO_3 and B_2O_3
 4. HBO_2 and H_3BO_3

Question Type : **MCQ**
 Question ID : **41652912740**
 Option 1 ID : **41652949740**
 Option 2 ID : **41652949741**
 Option 3 ID : **41652949738**
 Option 4 ID : **41652949739**
 Status : **Answered**
 Chosen Option : 4

Q.16 Which one of the following equations does not correctly represent the first law of thermodynamics for the given processes involving an ideal gas ? (Assume non-expansion work is zero)

- Options
1. Cyclic process : $q = -w$
 2. Adiabatic process : $\Delta U = -w$
 3. Isochoric process : $\Delta U = q$
 4. Isothermal process : $q = -w$

Question Type : **MCQ**
 Question ID : **41652912750**
 Option 1 ID : **41652949779**
 Option 2 ID : **41652949781**
 Option 3 ID : **41652949780**
 Option 4 ID : **41652949778**
 Status : **Answered**
 Chosen Option : 3

Q.17 With respect to an ore, Ellingham diagram helps to predict the feasibility of its

- Options
1. Electrolysis
 2. Zone refining
 3. Vapour phase refining
 4. Thermal reduction

Question Type : **MCQ**
 Question ID : **41652912737**
 Option 1 ID : **41652949727**
 Option 2 ID : **41652949728**
 Option 3 ID : **41652949729**

Option 4 ID : 41652949726
 Status : Answered
 Chosen Option : 3

Q.18 100 mL of a water sample contains 0.81 g of calcium bicarbonate and 0.73 g of magnesium bicarbonate. The hardness of this water sample expressed in terms of equivalents of CaCO_3 is :
 (molar mass of calcium bicarbonate is 162 g mol^{-1} and magnesium bicarbonate is 146 g mol^{-1})

- Options
1. 5,000 ppm
 2. 1,000 ppm
 3. 100 ppm
 4. 10,000 ppm

Question Type : MCQ
 Question ID : 41652912738
 Option 1 ID : 41652949733
 Option 2 ID : 41652949730
 Option 3 ID : 41652949732
 Option 4 ID : 41652949731
 Status : Answered
 Chosen Option : 2

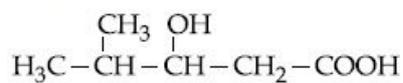
Q.19 Given that $E_{\text{O}_2/\text{H}_2\text{O}}^\ominus = +1.23 \text{ V}$;
 $E_{\text{S}_2\text{O}_8^{2-}/\text{SO}_4^{2-}}^\ominus = 2.05 \text{ V}$
 $E_{\text{Br}_2/\text{Br}^-}^\ominus = +1.09 \text{ V}$;
 $E_{\text{Au}^{3+}/\text{Au}}^\ominus = +1.4 \text{ V}$
 The strongest oxidizing agent is :

- Options
1. Au^{3+}
 2. O_2
 3. $\text{S}_2\text{O}_8^{2-}$
 4. Br_2

Question Type : MCQ
 Question ID : 41652912753
 Option 1 ID : 41652949791
 Option 2 ID : 41652949793
 Option 3 ID : 41652949790

Option 4 ID : **41652949792**
 Status : **Answered**
 Chosen Option : **3**

Q.20 The IUPAC name of the following compound is :



- Options**
1. 4,4-Dimethyl-3-hydroxybutanoic acid
 2. 2-Methyl-3-hydroxypentan-5-oic acid
 3. 3-Hydroxy-4-methylpentanoic acid
 4. 4-Methyl-3-hydroxypentanoic acid

Question Type : **MCQ**
 Question ID : **41652912733**
 Option 1 ID : **41652949712**
 Option 2 ID : **41652949713**
 Option 3 ID : **41652949710**
 Option 4 ID : **41652949711**
 Status : **Answered**
 Chosen Option : **2**

Q.21 Element 'B' forms ccp structure and 'A' occupies half of the octahedral voids, while oxygen atoms occupy all the tetrahedral voids. The structure of bimetallic oxide is :

- Options**
1. A_2BO_4
 2. AB_2O_4
 3. $\text{A}_2\text{B}_2\text{O}$
 4. $\text{A}_4\text{B}_2\text{O}$

Question Type : **MCQ**
 Question ID : **41652912747**
 Option 1 ID : **41652949766**
 Option 2 ID : **41652949767**
 Option 3 ID : **41652949769**
 Option 4 ID : **41652949768**
 Status : **Answered**
 Chosen Option : **3**

Q.22

For the reaction $2A + B \rightarrow C$, the values of initial rate at different reactant concentrations are given in the table below. The rate law for the reaction is :

[A] (mol L ⁻¹)	[B] (mol L ⁻¹)	Initial Rate (mol L ⁻¹ s ⁻¹)
0.05	0.05	0.045
0.10	0.05	0.090
0.20	0.10	0.72

- Options
1. Rate = $k[A][B]^2$
 2. Rate = $k[A]^2[B]^2$
 3. Rate = $k[A][B]$
 4. Rate = $k[A]^2[B]$

Question Type : MCQ

Question ID : 41652912754

Option 1 ID : 41652949796

Option 2 ID : 41652949797

Option 3 ID : 41652949794

Option 4 ID : 41652949795

Status : Answered

Chosen Option : 2

Q.23 The lanthanide ion that would show colour is :

- Options
1. Gd³⁺
 2. Sm³⁺
 3. La³⁺
 4. Lu³⁺

Question Type : MCQ

Question ID : 41652912741

Option 1 ID : 41652949742

Option 2 ID : 41652949743

Option 3 ID : 41652949744

Option 4 ID : 41652949745

Status : Answered

Chosen Option : 2

Q.24 Maltose on treatment with dilute HCl gives :

Options 1. D-Glucose and D-Fructose

2. D-Fructose
3. D-Galactose
4. D-Glucose

Question Type : **MCQ**

Question ID : **41652912727**

Option 1 ID : **41652949687**

Option 2 ID : **41652949688**

Option 3 ID : **41652949686**

Option 4 ID : **41652949689**

Status : **Answered**

Chosen Option : **3**

Q.25 The vapour pressures of pure liquids A and B are 400 and 600 mmHg, respectively at 298 K. On mixing the two liquids, the sum of their initial volumes is equal to the volume of the final mixture. The mole fraction of liquid B is 0.5 in the mixture. The vapour pressure of the final solution, the mole fractions of components A and B in vapour phase, respectively are :

Options 1. 450 mmHg, 0.4, 0.6

2. 500 mmHg, 0.5, 0.5

3. 450 mmHg, 0.5, 0.5

4. 500 mmHg, 0.4, 0.6

Question Type : **MCQ**

Question ID : **41652912751**

Option 1 ID : **41652949785**

Option 2 ID : **41652949784**

Option 3 ID : **41652949783**

Option 4 ID : **41652949782**

Status : **Answered**

Chosen Option : **3**

Q.26 Which of the following amines can be prepared by Gabriel phthalimide reaction ?

Options 1. n-butylamine

2. triethylamine

3. t-butylamine

4. neo-pentylamine

Question Type : MCQ

Question ID : 41652912732

Option 1 ID : 41652949707

Option 2 ID : 41652949709

Option 3 ID : 41652949708

Option 4 ID : 41652949706

Status : Answered

Chosen Option : 3

Q.27 The quantum number of four electrons are given below :

I. $n=4, l=2, m_l = -2, m_s = -\frac{1}{2}$

II. $n=3, l=2, m_l = 1, m_s = +\frac{1}{2}$

III. $n=4, l=1, m_l = 0, m_s = +\frac{1}{2}$

IV. $n=3, l=1, m_l = 1, m_s = -\frac{1}{2}$

The correct order of their increasing energies will be :

Options 1. IV < III < II < I

2. I < II < III < IV

3. IV < II < III < I

4. I < III < II < IV

Question Type : MCQ

Question ID : 41652912748

Option 1 ID : 41652949772

Option 2 ID : 41652949770

Option 3 ID : 41652949773

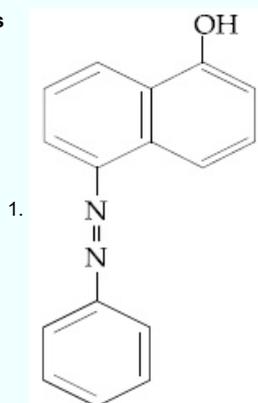
Option 4 ID : 41652949771

Status : Answered

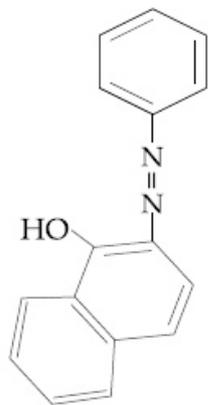
Chosen Option : 3

Q.28 Coupling of benzene diazonium chloride with 1-naphthol in alkaline medium will give :

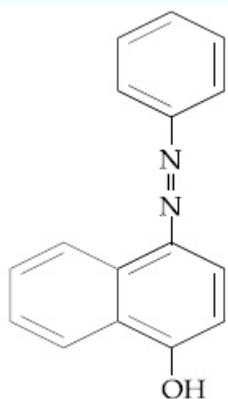
Options



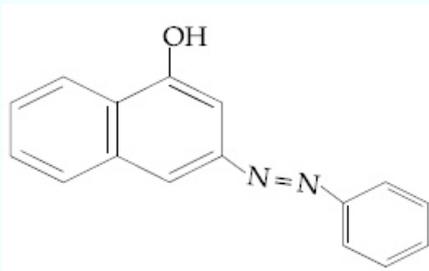
2.



3.



4.



Question Type : MCQ

Question ID : 41652912728

Option 1 ID : 41652949693

Option 2 ID : 41652949691

Option 3 ID : 41652949690

Option 4 ID : 41652949692

Status : Answered

Chosen Option : 3

Q.29 Assertion : Ozone is destroyed by CFCs in the upper stratosphere.

Reason : Ozone holes increase the amount of UV radiation reaching the earth.

Options 1. Assertion and reason are incorrect.

Assertion and reason are both correct,
2. and the reason is the correct explanation for the assertion.

Assertion and reason are correct, but
3. the reason is not the explanation for the assertion.

Assertion is false, but the reason is
4. correct.

Question Type : **MCQ**
Question ID : **41652912745**
Option 1 ID : **41652949761**
Option 2 ID : **41652949760**
Option 3 ID : **41652949758**
Option 4 ID : **41652949759**
Status : **Answered**
Chosen Option : **3**

Q.30 The correct order of hydration enthalpies of alkali metal ions is :

- Options
1. $\text{Li}^+ > \text{Na}^+ > \text{K}^+ > \text{Cs}^+ > \text{Rb}^+$
 2. $\text{Na}^+ > \text{Li}^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$
 3. $\text{Na}^+ > \text{Li}^+ > \text{K}^+ > \text{Cs}^+ > \text{Rb}^+$
 4. $\text{Li}^+ > \text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$

Question Type : **MCQ**
Question ID : **41652912739**
Option 1 ID : **41652949735**
Option 2 ID : **41652949736**
Option 3 ID : **41652949737**
Option 4 ID : **41652949734**
Status : **Answered**
Chosen Option : **3**

Section : **Mathematics**

Q.1 The shortest distance between the line $y = x$ and the curve $y^2 = x - 2$ is :

- Options
1. 2
 2. $\frac{7}{8}$
 3. $\frac{7}{4\sqrt{2}}$
 4. $\frac{11}{4\sqrt{2}}$

Question Type : **MCQ**

Question ID : 41652912776
 Option 1 ID : 41652949885
 Option 2 ID : 41652949884
 Option 3 ID : 41652949883
 Option 4 ID : 41652949882
 Status : Answered
 Chosen Option : 2

Q.2

$$\lim_{x \rightarrow 0} \frac{\sin^2 x}{\sqrt{2} - \sqrt{1 + \cos x}} \text{ equals :}$$

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

Question Type : MCQ
 Question ID : 41652912765
 Option 1 ID : 41652949838
 Option 2 ID : 41652949840
 Option 3 ID : 41652949841
 Option 4 ID : 41652949839
 Status : Answered
 Chosen Option : 3

Q.3

The greatest value of $c \in \mathbf{R}$ for which the system of linear equations

$$x - cy - cz = 0$$

$$cx - y + cz = 0$$

$$cx + cy - z = 0$$

has a non-trivial solution, is :

- Options
1. -1
 2. $\frac{1}{2}$
 3. 2
 4. 0

Question Type : MCQ
 Question ID : 41652912760
 Option 1 ID : 41652949818
 Option 2 ID : 41652949820
 Option 3 ID : 41652949821
 Option 4 ID : 41652949819
 Status : Answered
 Chosen Option : 2

Q.4

The contrapositive of the statement "If you are born in India, then you are a citizen of India", is :

- Options**
1. If you are not a citizen of India, then you are not born in India.
 2. If you are a citizen of India, then you are born in India.
 3. If you are born in India, then you are not a citizen of India.
 4. If you are not born in India, then you are not a citizen of India.

Question Type : **MCQ**
 Question ID : **41652912785**
 Option 1 ID : **41652949921**
 Option 2 ID : **41652949919**
 Option 3 ID : **41652949918**
 Option 4 ID : **41652949920**
 Status : **Answered**
 Chosen Option : **2**

Q.5 All possible numbers are formed using the digits 1, 1, 2, 2, 2, 2, 3, 4, 4 taken all at a time. The number of such numbers in which the odd digits occupy even places is :

- Options**
1. 180
 2. 175
 3. 160
 4. 162

Question Type : **MCQ**
 Question ID : **41652912761**
 Option 1 ID : **41652949825**
 Option 2 ID : **41652949824**
 Option 3 ID : **41652949822**
 Option 4 ID : **41652949823**
 Status : **Answered**
 Chosen Option : **2**

Q.6 Let $A = \begin{pmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{pmatrix}$, ($\alpha \in \mathbb{R}$) such that

$$A^{32} = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}. \text{ Then a value of } \alpha \text{ is :}$$

- Options**
1. $\frac{\pi}{32}$
 2. 0
 3. $\frac{\pi}{64}$

4. $\frac{\pi}{16}$

Question Type : **MCQ**Question ID : **41652912759**Option 1 ID : **41652949816**Option 2 ID : **41652949814**Option 3 ID : **41652949815**Option 4 ID : **41652949817**Status : **Answered**Chosen Option : **3**

Q.7

If $\cos(\alpha + \beta) = \frac{3}{5}$, $\sin(\alpha - \beta) = \frac{5}{13}$ and

$0 < \alpha, \beta < \frac{\pi}{4}$, then $\tan(2\alpha)$ is equal to :

Options

1. $\frac{63}{52}$

2. $\frac{63}{16}$

3. $\frac{21}{16}$

4. $\frac{33}{52}$

Question Type : **MCQ**Question ID : **41652912783**Option 1 ID : **41652949912**Option 2 ID : **41652949911**Option 3 ID : **41652949910**Option 4 ID : **41652949913**Status : **Answered**Chosen Option : **2**

Q.8

The sum of the co-efficients of all even degree terms in x in the expansion of

$(x + \sqrt{x^3 - 1})^6 + (x - \sqrt{x^3 - 1})^6$, ($x > 1$) is equal to :

Options

1. 29

2. 32

3. 26

4. 24

Question Type : **MCQ**Question ID : **41652912762**Option 1 ID : **41652949828**Option 2 ID : **41652949829**Option 3 ID : **41652949827**

Option 4 ID : 41652949826
 Status : Answered
 Chosen Option : 2

Q.9

$$\int \frac{\sin \frac{5x}{2}}{\sin \frac{x}{2}} dx \text{ is equal to :}$$

(where c is a constant of integration.)

- Options
1. $2x + \sin x + 2 \sin 2x + c$
 2. $x + 2 \sin x + 2 \sin 2x + c$
 3. $x + 2 \sin x + \sin 2x + c$
 4. $2x + \sin x + \sin 2x + c$

Question Type : MCQ
 Question ID : 41652912769
 Option 1 ID : 41652949857
 Option 2 ID : 41652949855
 Option 3 ID : 41652949854
 Option 4 ID : 41652949856
 Status : Answered
 Chosen Option : 3

Q.10 The mean and variance of seven observations are 8 and 16, respectively. If 5 of the observations are 2, 4, 10, 12, 14, then the product of the remaining two observations is :

- Options
1. 45
 2. 49
 3. 48
 4. 40

Question Type : MCQ
 Question ID : 41652912781
 Option 1 ID : 41652949904
 Option 2 ID : 41652949903
 Option 3 ID : 41652949905
 Option 4 ID : 41652949902
 Status : Answered
 Chosen Option : 3

Q.11 The equation of a plane containing the line of intersection of the planes $2x - y - 4 = 0$ and $y + 2z - 4 = 0$ and passing through the point (1, 1, 0) is :

- Options
1. $x - 3y - 2z = -2$
 2. $2x - z = 2$

3. $x - y - z = 0$
4. $x + 3y + z = 4$

Question Type : **MCQ**
 Question ID : **41652912779**
 Option 1 ID : **41652949896**
 Option 2 ID : **41652949897**
 Option 3 ID : **41652949894**
 Option 4 ID : **41652949895**
 Status : **Answered**
 Chosen Option : **4**

Q.12 The magnitude of the projection of the vector $2\hat{i} + 3\hat{j} + \hat{k}$ on the vector perpendicular to the plane containing the vectors $\hat{i} + \hat{j} + \hat{k}$ and $\hat{i} + 2\hat{j} + 3\hat{k}$, is :

- Options**
1. $\frac{\sqrt{3}}{2}$
 2. $\sqrt{6}$
 3. $3\sqrt{6}$
 4. $\sqrt{\frac{3}{2}}$

Question Type : **MCQ**
 Question ID : **41652912780**
 Option 1 ID : **41652949899**
 Option 2 ID : **41652949900**
 Option 3 ID : **41652949898**
 Option 4 ID : **41652949901**
 Status : **Answered**
 Chosen Option : **3**

Q.13 The sum of the squares of the lengths of the chords intercepted on the circle, $x^2 + y^2 = 16$, by the lines, $x + y = n$, $n \in \mathbb{N}$, where \mathbb{N} is the set of all natural numbers, is :

- Options**
1. 320
 2. 105
 3. 160
 4. 210

Question Type : **MCQ**
 Question ID : **41652912775**
 Option 1 ID : **41652949880**
 Option 2 ID : **41652949878**

Option 3 ID : **41652949881**
 Option 4 ID : **41652949879**
 Status : **Answered**
 Chosen Option : 4

Q.14 Let A and B be two non-null events such that $A \subset B$. Then, which of the following statements is always correct ?

- Options**
1. $P(A|B) = P(B) - P(A)$
 2. $P(A|B) \geq P(A)$
 3. $P(A|B) \leq P(A)$
 4. $P(A|B) = 1$

Question Type : **MCQ**
 Question ID : **41652912782**
 Option 1 ID : **41652949909**
 Option 2 ID : **41652949908**
 Option 3 ID : **41652949907**
 Option 4 ID : **41652949906**
 Status : **Answered**
 Chosen Option : 3

Q.15 If α and β be the roots of the equation $x^2 - 2x + 2 = 0$, then the least value of n for

which $\left(\frac{\alpha}{\beta}\right)^n = 1$ is :

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

Question Type : **MCQ**
 Question ID : **41652912757**
 Option 1 ID : **41652949809**
 Option 2 ID : **41652949806**
 Option 3 ID : **41652949807**
 Option 4 ID : **41652949808**
 Status : **Answered**
 Chosen Option : 3

Q.16 The area (in sq.units) of the region $A = \{(x, y) \in \mathbb{R} \times \mathbb{R} | 0 \leq x \leq 3, 0 \leq y \leq 4, y \leq x^2 + 3x\}$ is :

- Options**
1. $\frac{53}{6}$
 2. 8
 3. $\frac{59}{6}$

4. $\frac{26}{3}$

Question Type : MCQ

Question ID : 41652912771

Option 1 ID : 41652949865

Option 2 ID : 41652949862

Option 3 ID : 41652949864

Option 4 ID : 41652949863

Status : Answered

Chosen Option : 3

Q.17 If S_1 and S_2 are respectively the sets of local minimum and local maximum points of the function, $f(x) = 9x^4 + 12x^3 - 36x^2 + 25$, $x \in \mathbf{R}$, then :

- Options**
1. $S_1 = \{-2\}; S_2 = \{0, 1\}$
 2. $S_1 = \{-2, 0\}; S_2 = \{1\}$
 3. $S_1 = \{-2, 1\}; S_2 = \{0\}$
 4. $S_1 = \{-1\}; S_2 = \{0, 2\}$

Question Type : MCQ

Question ID : 41652912768

Option 1 ID : 41652949853

Option 2 ID : 41652949850

Option 3 ID : 41652949851

Option 4 ID : 41652949852

Status : Answered

Chosen Option : 3

Q.18 If $\alpha = \cos^{-1}\left(\frac{3}{5}\right)$, $\beta = \tan^{-1}\left(\frac{1}{3}\right)$, where

$0 < \alpha, \beta < \frac{\pi}{2}$, then $\alpha - \beta$ is equal to :

- Options**
1. $\tan^{-1}\left(\frac{9}{5\sqrt{10}}\right)$
 2. $\cos^{-1}\left(\frac{9}{5\sqrt{10}}\right)$
 3. $\tan^{-1}\left(\frac{9}{14}\right)$
 4. $\sin^{-1}\left(\frac{9}{5\sqrt{10}}\right)$

Question Type : MCQ

Question ID : 41652912784

Option 1 ID : 41652949917

Option 2 ID : 41652949916

Option 3 ID : 41652949914
 Option 4 ID : 41652949915
 Status : Answered
 Chosen Option : 2

Q.19 The sum of the series $2 \cdot {}^{20}C_0 + 5 \cdot {}^{20}C_1 + 8 \cdot {}^{20}C_2 + 11 \cdot {}^{20}C_3 + \dots + 62 \cdot {}^{20}C_{20}$ is equal to :

- Options
1. 2^{26}
 2. 2^{25}
 3. 2^{23}
 4. 2^{24}

Question Type : MCQ
 Question ID : 41652912764
 Option 1 ID : 41652949837
 Option 2 ID : 41652949835
 Option 3 ID : 41652949836
 Option 4 ID : 41652949834
 Status : Answered
 Chosen Option : 3

Q.20 The sum of the solutions of the equation $|\sqrt{x} - 2| + \sqrt{x}(\sqrt{x} - 4) + 2 = 0$, ($x > 0$) is equal to :

- Options
1. 9
 2. 12
 3. 4
 4. 10

Question Type : MCQ
 Question ID : 41652912758
 Option 1 ID : 41652949811
 Option 2 ID : 41652949813
 Option 3 ID : 41652949810
 Option 4 ID : 41652949812
 Status : Answered
 Chosen Option : 3

Q.21 If the tangents on the ellipse $4x^2 + y^2 = 8$ at the points (1, 2) and (a, b) are perpendicular to each other, then a^2 is equal to :

- Options
1. $\frac{128}{17}$
 2. $\frac{64}{17}$
 3. $\frac{4}{17}$

4. $\frac{2}{17}$

Question Type : **MCQ**

Question ID : **41652912777**

Option 1 ID : **41652949887**

Option 2 ID : **41652949889**

Option 3 ID : **41652949888**

Option 4 ID : **41652949886**

Status : **Answered**

Chosen Option : **3**

Q.22 Let $y = y(x)$ be the solution of the differential equation, $(x^2 + 1)^2 \frac{dy}{dx} + 2x(x^2 + 1)y = 1$ such

that $y(0) = 0$. If $\sqrt{a} y(1) = \frac{\pi}{32}$, then the value of 'a' is :

- Options**
1. $\frac{1}{4}$
 2. $\frac{1}{2}$
 3. 1
 4. $\frac{1}{16}$

Question Type : **MCQ**

Question ID : **41652912772**

Option 1 ID : **41652949869**

Option 2 ID : **41652949867**

Option 3 ID : **41652949868**

Option 4 ID : **41652949866**

Status : **Answered**

Chosen Option : **3**

Q.23 The sum of all natural numbers 'n' such that $100 < n < 200$ and H.C.F. $(91, n) > 1$ is :

- Options**
1. 3203
 2. 3303
 3. 3221
 4. 3121

Question Type : **MCQ**

Question ID : **41652912763**

Option 1 ID : **41652949830**

Option 2 ID : **41652949833**

Option 3 ID : **41652949831**

Option 4 ID : **41652949832**

Status : **Answered**

Chosen Option : 3

Q.24 The length of the perpendicular from the point $(2, -1, 4)$ on the straight line, $\frac{x+3}{10} = \frac{y-2}{-7} = \frac{z}{1}$ is :

- Options**
1. greater than 3 but less than 4
 2. less than 2
 3. greater than 2 but less than 3
 4. greater than 4

Question Type : MCQ

Question ID : 41652912778

Option 1 ID : 41652949892

Option 2 ID : 41652949890

Option 3 ID : 41652949891

Option 4 ID : 41652949893

Status : Answered

Chosen Option : 3

Q.25 A point on the straight line, $3x + 5y = 15$ which is equidistant from the coordinate axes will lie only in :

- Options**
1. 4th quadrant
 2. 1st quadrant
 3. 1st and 2nd quadrants
 4. 1st, 2nd and 4th quadrants

Question Type : MCQ

Question ID : 41652912774

Option 1 ID : 41652949877

Option 2 ID : 41652949875

Option 3 ID : 41652949876

Option 4 ID : 41652949874

Status : Answered

Chosen Option : 1

Q.26 Let $O(0, 0)$ and $A(0, 1)$ be two fixed points. Then the locus of a point P such that the perimeter of $\triangle AOP$ is 4, is :

- Options**
1. $8x^2 - 9y^2 + 9y = 18$
 2. $9x^2 - 8y^2 + 8y = 16$
 3. $9x^2 + 8y^2 - 8y = 16$
 4. $8x^2 + 9y^2 - 9y = 18$

Question Type : MCQ

Question ID : 41652912773

Option 1 ID : 41652949872
 Option 2 ID : 41652949870
 Option 3 ID : 41652949871
 Option 4 ID : 41652949873
 Status : Answered
 Chosen Option : 3

Q.27 If

$$2y = \left(\cot^{-1} \left(\frac{\sqrt{3} \cos x + \sin x}{\cos x - \sqrt{3} \sin x} \right) \right)^2, x \in \left(0, \frac{\pi}{2} \right)$$

then $\frac{dy}{dx}$ is equal to :

- Options**
1. $\frac{\pi}{6} - x$
 2. $x - \frac{\pi}{6}$
 3. $\frac{\pi}{3} - x$
 4. $2x - \frac{\pi}{3}$

Question Type : MCQ
 Question ID : 41652912766
 Option 1 ID : 41652949842
 Option 2 ID : 41652949844
 Option 3 ID : 41652949843
 Option 4 ID : 41652949845
 Status : Answered
 Chosen Option : 3

Q.28

If $f(x) = \log_e \left(\frac{1-x}{1+x} \right), |x| < 1$, then

$f\left(\frac{2x}{1+x^2}\right)$ is equal to :

- Options**
1. $2f(x)$
 2. $2f(x^2)$
 3. $(f(x))^2$
 4. $-2f(x)$

Question Type : MCQ
 Question ID : 41652912756
 Option 1 ID : 41652949804
 Option 2 ID : 41652949802
 Option 3 ID : 41652949805
 Option 4 ID : 41652949803
 Status : Answered
 Chosen Option : 3

Q.29 Let $f: [0, 2] \rightarrow \mathbb{R}$ be a twice differentiable function such that $f''(x) > 0$, for all $x \in (0, 2)$. If $\phi(x) = f(x) + f(2-x)$, then ϕ is :

- Options**
1. increasing on $(0, 1)$ and decreasing on $(1, 2)$.
 2. decreasing on $(0, 2)$
 3. decreasing on $(0, 1)$ and increasing on $(1, 2)$.
 4. increasing on $(0, 2)$

Question Type : **MCQ**
 Question ID : **41652912767**
 Option 1 ID : **41652949846**
 Option 2 ID : **41652949849**
 Option 3 ID : **41652949847**
 Option 4 ID : **41652949848**
 Status : **Answered**
 Chosen Option : **2**

Q.30 If $f(x) = \frac{2 - x \cos x}{2 + x \cos x}$ and $g(x) = \log_e x$, ($x > 0$) then the value of the integral

$$\int_{-\pi/4}^{\pi/4} g(f(x)) dx \text{ is :}$$

- Options**
1. $\log_e 3$
 2. $\log_e e$
 3. $\log_e 2$
 4. $\log_e 1$

Question Type : **MCQ**
 Question ID : **41652912770**
 Option 1 ID : **41652949859**
 Option 2 ID : **41652949861**
 Option 3 ID : **41652949858**
 Option 4 ID : **41652949860**
 Status : **Answered**
 Chosen Option : **3**