JEE April 2019

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

Section : **Physics**

Q.1

A shell is fired from a fixed artillery gun with an initial speed u such that it hits the target on the ground at a distance R from it. If t_1 and t_2 are the values of the time taken by it to hit the target in two possible ways, the product t_1t_2 is :

Options

1. $R/4g$
2. R/g
3. $R/2g$
4. $2R/g$

Question Type : **MCQ**
Question ID : **41652914862**
Option 1 ID : **41652958229**
Option 2 ID : **41652958227**
Option 3 ID : **41652958226**
Option 4 ID : **41652958228**
Status : **Answered**
Chosen Option : **3**

Q.2

The trajectory of a projectile near the surface of the earth is given as $y = 2x - 9x^2$. If it were launched at an angle θ_0 with speed v_0 then ($g = 10\ ms^{-2}$) :

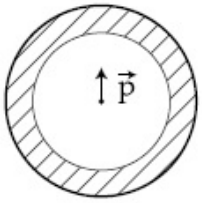
Options

1. $\theta_0 = \sin^{-1}\left(\frac{1}{\sqrt{5}}\right)$ and $v_0 = \frac{5}{3}\ ms^{-1}$
2. $\theta_0 = \cos^{-1}\left(\frac{2}{\sqrt{5}}\right)$ and $v_0 = \frac{3}{5}\ ms^{-1}$
3. $\theta_0 = \cos^{-1}\left(\frac{1}{\sqrt{5}}\right)$ and $v_0 = \frac{5}{3}\ ms^{-1}$
4. $\theta_0 = \sin^{-1}\left(\frac{2}{\sqrt{5}}\right)$ and $v_0 = \frac{3}{5}\ ms^{-1}$

Question Type : **MCQ**
Question ID : **41652914857**
Option 1 ID : **41652958206**
Option 2 ID : **41652958209**
Option 3 ID : **41652958207**
Option 4 ID : **41652958208**
Status : **Answered**

Chosen Option : **2**

Q.3 Shown in the figure is a shell made of a conductor. It has inner radius a and outer radius b, and carries charge Q. At its centre is a dipole $\vec{P}$ as shown. In this case :



Options

1. surface charge density on the inner surface is uniform and equal to $\frac{(Q/2)}{4\pi a^2}$
2. electric field outside the shell is the same as that of a point charge at the centre of the shell
3. surface charge density on the outer surface depends on $\left|\vec{P}\right|$
4. surface charge density on the inner surface of the shell is zero everywhere

Question Type : **MCQ**
Question ID : **41652914870**
Option 1 ID : **41652958260**
Option 2 ID : **41652958261**
Option 3 ID : **41652958259**
Option 4 ID : **41652958258**
Status : **Answered**
Chosen Option : **2**

Q.4 When M_1 gram of ice at $-10°C$ (specific heat = 0.5 cal $g^{-1}°C^{-1}$) is added to M_2 gram of water at 50°C, finally no ice is left and the water is at 0°C. The value of latent heat of ice, in cal g^{-1} is :

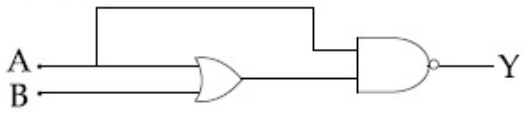
Options

1. $\frac{50M_2}{M_1} - 5$
2. $\frac{5M_1}{M_2} - 50$
3. $\frac{50M_2}{M_1}$
4. $\frac{5M_2}{M_1} - 5$

Question Type : **MCQ**
Question ID : **41652914864**
Option 1 ID : **41652958237**

Option 2 ID : **41652958234**
Option 3 ID : **41652958235**
Option 4 ID : **41652958236**
Status : **Not Answered**
Chosen Option : **--**

Q.5 The truth table for the circuit given in the fig. is :



Options

1.

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	1

2.

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

3.

A	B	Y
0	0	1
0	1	1
1	0	0
1	1	0

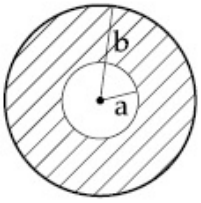
4.

A	B	Y
0	0	0
0	1	0
1	0	1
1	1	1

Question Type : **MCQ**
Question ID : **41652914884**
Option 1 ID : **41652958317**
Option 2 ID : **41652958316**
Option 3 ID : **41652958314**
Option 4 ID : **41652958315**
Status : **Answered**
Chosen Option : **3**

Q.6

A circular disc of radius b has a hole of radius a at its centre (see figure). If the mass per unit area of the disc varies as $\left(\frac{\sigma_0}{r}\right)$, then the radius of gyration of the disc about its axis passing through the centre is :



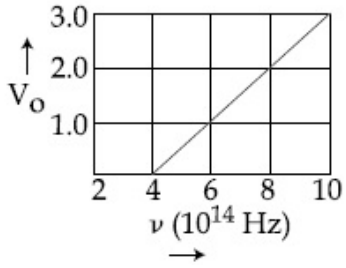
Options

1. $\sqrt{\frac{a^2 + b^2 + ab}{2}}$
2. $\frac{a + b}{2}$
3. $\sqrt{\frac{a^2 + b^2 + ab}{3}}$
4. $\frac{a + b}{3}$

Question Type : **MCQ**
Question ID : **41652914860**
Option 1 ID : **41652958219**
Option 2 ID : **41652958218**
Option 3 ID : **41652958221**
Option 4 ID : **41652958220**
Status : **Not Answered**
Chosen Option : **--**

Q.7

The stopping potential V_o (in volt) as a function of frequency (ν) for a sodium emitter, is shown in the figure. The work function of sodium, from the data plotted in the figure, will be :
(Given : Planck's constant $(h) = 6.63 \times 10^{-34}$ Js, electron charge $e = 1.6 \times 10^{-19}$ C)



Options

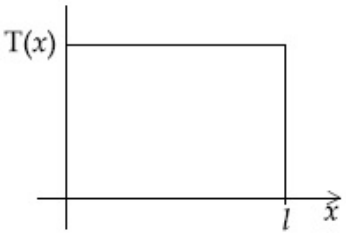
1. 1.82 eV
2. 1.66 eV
3. 1.95 eV
4. 2.12 eV

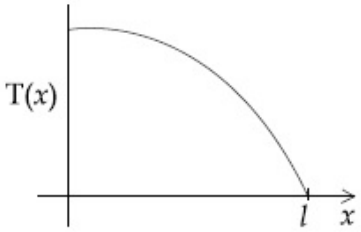
Question Type : **MCQ**
Question ID : **41652914882**

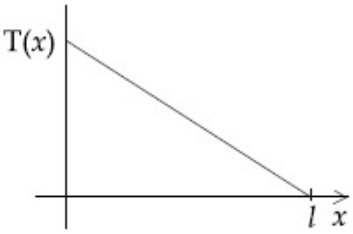
Option 1 ID : **41652958307**
Option 2 ID : **41652958306**
Option 3 ID : **41652958308**
Option 4 ID : **41652958309**
Status : **Not Answered**
Chosen Option : **--**

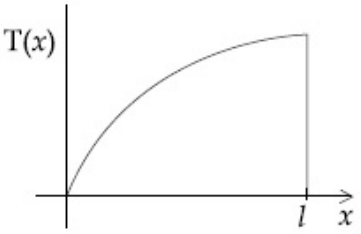
Q.8 A uniform rod of length l is being rotated in a horizontal plane with a constant angular speed about an axis passing through one of its ends. If the tension generated in the rod due to rotation is $T(x)$ at a distance x from the axis, then which of the following graphs depicts it most closely ?

Options

1.


2.


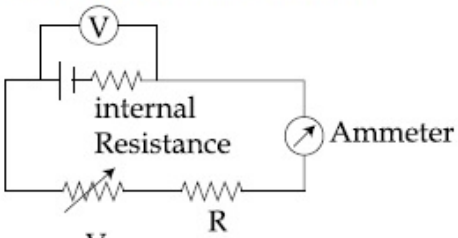
3.


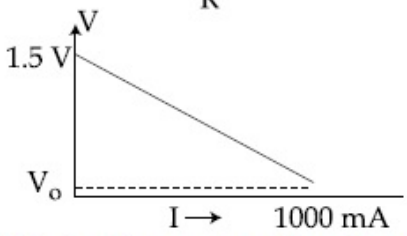
4.


Question Type : **MCQ**
Question ID : **41652914861**
Option 1 ID : **41652958222**
Option 2 ID : **41652958225**
Option 3 ID : **41652958223**
Option 4 ID : **41652958224**
Status : **Answered**
Chosen Option : **3**

Q.9

To verify Ohm's law, a student connects the voltmeter across the battery as, shown in the figure. The measured voltage is plotted as a function of the current, and the following graph is obtained :





If V_o is almost zero, identify the correct statement :

Options

1. The emf of the battery is 1.5 V and its internal resistance is 1.5 Ω
2. The value of the resistance R is 1.5 Ω
3. The potential difference across the battery is 1.5 V when it sends a current of 1000 mA
4. The emf of the battery is 1.5 V and the value of R is 1.5 Ω

Question Type : **MCQ**
Question ID : **41652914872**
Option 1 ID : **41652958267**
Option 2 ID : **41652958266**
Option 3 ID : **41652958268**
Option 4 ID : **41652958269**
Status : **Answered**
Chosen Option : **2**

Q.10 A thin ring of 10 cm radius carries a uniformly distributed charge. The ring rotates at a constant angular speed of $40\ \pi$ rad s^{-1} about its axis, perpendicular to its plane. If the magnetic field at its centre is 3.8×10^{-9} T, then the charge carried by the ring is close to ($\mu_0 = 4\pi\times10^{-7}$ N/A^2).

Options

1. 2×10^{-6}C
2. 3×10^{-5}C
3. 4×10^{-5}C
4. 7×10^{-6}C

Question Type : **MCQ**
Question ID : **41652914874**
Option 1 ID : **41652958275**
Option 2 ID : **41652958277**

Option 3 ID : **41652958274**
Option 4 ID : **41652958276**
Status : **Not Answered**
Chosen Option : **--**

Q.11 An electromagnetic wave is represented by the electric field $\vec{E} = E_0 \hat{n} \sin[\omega t + (6y - 8z)]$. Taking unit vectors in x, y and z directions to be $\hat{i}$, $\hat{j}$, $\hat{k}$, the direction of propogation $\hat{s}$, is :

Options

1. $\hat{s} = \frac{3\hat{i} - 4\hat{j}}{5}$
2. $\hat{s} = \frac{-4\hat{k} + 3\hat{j}}{5}$
3. $\hat{s} = \left(\frac{-3\hat{j} + 4\hat{k}}{5}\right)$
4. $\hat{s} = \frac{4\hat{j} - 3\hat{k}}{5}$

Question Type : **MCQ**
Question ID : **41652914878**
Option 1 ID : **41652958290**
Option 2 ID : **41652958292**
Option 3 ID : **41652958291**
Option 4 ID : **41652958293**
Status : **Not Answered**
Chosen Option : **--**

Q.12 A magnetic compass needle oscillates 30 times per minute at a place where the dip is 45°, and 40 times per minute where the dip is 30°. If B_1 and B_2 are respectively the total magnetic field due to the earth at the two places, then the ratio B_1/B_2 is best given by :

Options

1. 1.8
2. 0.7
3. 3.6
4. 2.2

Question Type : **MCQ**
Question ID : **41652914876**
Option 1 ID : **41652958283**
Option 2 ID : **41652958282**
Option 3 ID : **41652958285**
Option 4 ID : **41652958284**
Status : **Answered**
Chosen Option : **3**

Q.13 At 40°C, a brass wire of 1 mm radius is hung from the ceiling. A small mass, M is hung from the free end of the wire. When the wire is cooled down from 40°C to 20°C it regains its original length of 0.2 m. The value of M is close to :

(Coefficient of linear expansion and Young's modulus of brass are 10^{-5}/°C and 10^{11} N/m^2, respectively ; g = 10 ms^{-2})

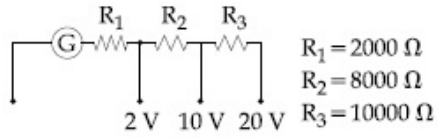
Options

1. 9 kg
2. 0.5 kg
3. 1.5 kg
4. 0.9 kg

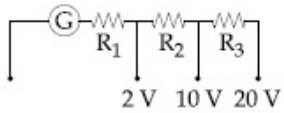
Question Type : **MCQ**
Question ID : **41652914863**
Option 1 ID : **41652958230**
Option 2 ID : **41652958233**
Option 3 ID : **41652958231**
Option 4 ID : **41652958232**
Status : **Answered**
Chosen Option : **3**

Q.14 A galvanometer of resistance 100 Ω has 50 divisions on its scale and has sensitivity of 20 μA/division. It is to be converted to a voltmeter with three ranges, of 0-2V, 0-10 V and 0-20 V. The appropriate circuit to do so is :

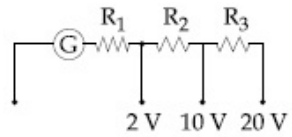
Options

1. 

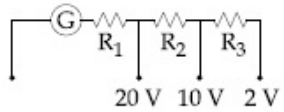
$R_1 = 2000\ \Omega$
$R_2 = 8000\ \Omega$
$R_3 = 10000\ \Omega$

2. 

$R_1 = 1900\ \Omega$
$R_2 = 9900\ \Omega$
$R_3 = 19900\ \Omega$

3. 

$R_1 = 1900\ \Omega$
$R_2 = 8000\ \Omega$
$R_3 = 10000\ \Omega$

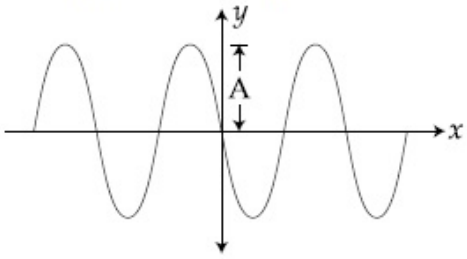
4. 

$R_1 = 19900\ \Omega$
$R_2 = 9900\ \Omega$
$R_3 = 1900\ \Omega$

Question Type : **MCQ**
Question ID : **41652914875**
Option 1 ID : **41652958281**
Option 2 ID : **41652958278**
Option 3 ID : **41652958280**
Option 4 ID : **41652958279**
Status : **Not Answered**
Chosen Option : **--**

Q.15

A progressive wave travelling along the positive x-direction is represented by $y(x,t) = A\sin(kx - \omega t + \phi)$. Its snapshot at $t = 0$ is given in the figure.



For this wave, the phase ϕ is :

Options

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

Question Type : **MCQ**
Question ID : **41652914867**
Option 1 ID : **41652958247**
Option 2 ID : **41652958249**
Option 3 ID : **41652958246**
Option 4 ID : **41652958248**
Status : **Not Answered**
Chosen Option : **--**

Q.16

The value of numerical aperature of the objective lens of a microscope is 1.25. If light of wavelength 5000 Å is used, the minimum separation between two points, to be seen as distinct, will be :

Options

1. $0.24\ \mu m$
2. $0.38\ \mu m$
3. $0.12\ \mu m$
4. $0.48\ \mu m$

Question Type : **MCQ**
Question ID : **41652914881**
Option 1 ID : **41652958305**
Option 2 ID : **41652958304**
Option 3 ID : **41652958303**
Option 4 ID : **41652958302**
Status : **Not Answered**
Chosen Option : **--**

Q.17

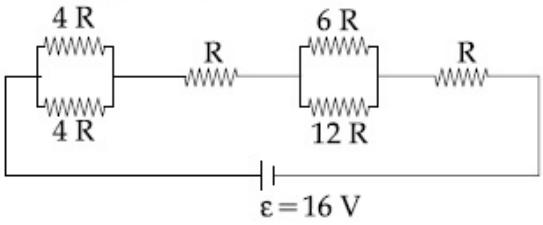
A point dipole $\vec{p} = -p_0\hat{x}$ is kept at the origin. The potential and electric field due to this dipole on the y-axis at a distance d are, respectively : (Take $V = 0$ at infinity)

Options

1. $\frac{|\vec{p}|}{4\pi\epsilon_0 d^2}, \frac{\vec{p}}{4\pi\epsilon_0 d^3}$
2. $0, \frac{-\vec{p}}{4\pi\epsilon_0 d^3}$
3. $0, \frac{\vec{p}}{4\pi\epsilon_0 d^3}$
4. $\frac{|\vec{p}|}{4\pi\epsilon_0 d^2}, \frac{-\vec{p}}{4\pi\epsilon_0 d^3}$

Question Type : **MCQ**
Question ID : **41652914869**
Option 1 ID : **41652958257**
Option 2 ID : **41652958256**
Option 3 ID : **41652958254**
Option 4 ID : **41652958255**
Status : **Answered**
Chosen Option : **2**

Q.18 The resistive network shown below is connected to a D.C. source of 16 V. The power consumed by the network is 4 Watt. The value of R is :

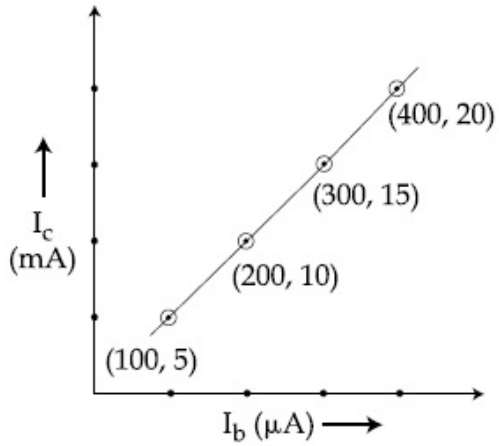


Options
1. $6\,\Omega$
2. $8\,\Omega$
3. $1\,\Omega$
4. $16\,\Omega$

Question Type : **MCQ**
Question ID : **41652914873**
Option 1 ID : **41652958270**
Option 2 ID : **41652958271**
Option 3 ID : **41652958272**
Option 4 ID : **41652958273**
Status : **Not Answered**
Chosen Option : **--**

Q.19

The transfer characteristic curve of a transistor, having input and output resistance 100 Ω and 100 kΩ respectively, is shown in the figure. The Voltage and Power gain, are respectively :



Options

1. $2.5\times10^4,\ 2.5\times10^6$
2. $5\times10^4,\ 5\times10^6$
3. $5\times10^4,\ 5\times10^5$
4. $5\times10^4,\ 2.5\times10^6$

Question Type : **MCQ**
Question ID : **41652914885**
Option 1 ID : **41652958321**
Option 2 ID : **41652958318**
Option 3 ID : **41652958320**
Option 4 ID : **41652958319**
Status : **Answered**
Chosen Option : **4**

Q.20

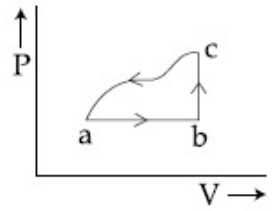
Which of the following combinations has the dimension of electrical resistance (ϵ_0 is the permittivity of vacuum and μ_0 is the permeability of vacuum) ?

Options

1. $\sqrt{\frac{\mu_0}{\epsilon_0}}$
2. $\frac{\mu_0}{\epsilon_0}$
3. $\sqrt{\frac{\epsilon_0}{\mu_0}}$
4. $\frac{\epsilon_0}{\mu_0}$

Question Type : **MCQ**
Question ID : **41652914856**
Option 1 ID : **41652958204**
Option 2 ID : **41652958202**
Option 3 ID : **41652958205**
Option 4 ID : **41652958203**
Status : **Not Answered**
Chosen Option : **--**

Q.21 A sample of an ideal gas is taken through the cyclic process abca as shown in the figure. The change in the internal energy of the gas along the path ca is -180 J. The gas absorbs 250 J of heat along the path ab and 60 J along the path bc. The work done by the gas along the path abc is :

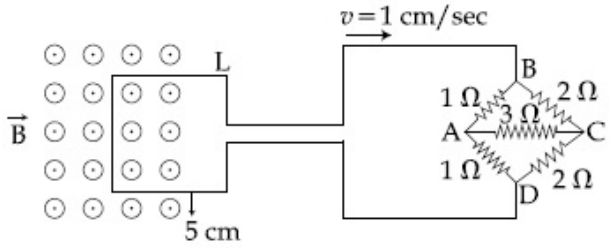


Options

1. 120 J
2. 130 J
3. 100 J
4. 140 J

Question Type : **MCQ**
Question ID : **41652914865**
Option 1 ID : **41652958239**
Option 2 ID : **41652958240**
Option 3 ID : **41652958238**
Option 4 ID : **41652958241**
Status : **Answered**
Chosen Option : **2**

Q.22 The figure shows a square loop L of side 5 cm which is connected to a network of resistances. The whole setup is moving towards right with a constant speed of $1\,\text{cm}\,\text{s}^{-1}$. At some instant, a part of L is in a uniform magnetic field of 1 T, perpendicular to the plane of the loop. If the resistance of L is 1.7 Ω, the current in the loop at that instant will be close to :



Options

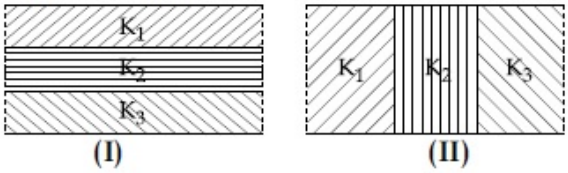
1. 60 μA
2. 170 μA
3. 150 μA
4. 115 μA

Question Type : **MCQ**
Question ID : **41652914877**
Option 1 ID : **41652958286**
Option 2 ID : **41652958289**
Option 3 ID : **41652958288**
Option 4 ID : **41652958287**

Status : **Not Answered**
Chosen Option : **--**

Q.23 Two identical parallel plate capacitors, of capacitance C each, have plates of area A, separated by a distance d. The space between the plates of the two capacitors, is filled with three dielectrics, of equal thickness and dielectric constants K_1, K_2 and K_3. The first capacitor is filled as shown in fig. I, and the second one is filled as shown in fig II.

If these two modified capacitors are charged by the same potential V, the ratio of the energy stored in the two, would be (E_1 refers to capacitor (I) and E_2 to capacitor (II)) :



Options

1. $\frac{E_1}{E_2}=\frac{K_1K_2K_3}{(K_1+K_2+K_3)(K_2K_3+K_3K_1+K_1K_2)}$

2. $\frac{E_1}{E_2}=\frac{(K_1+K_2+K_3)(K_2K_3+K_3K_1+K_1K_2)}{K_1K_2K_3}$

3. $\frac{E_1}{E_2}=\frac{9K_1K_2K_3}{(K_1+K_2+K_3)(K_2K_3+K_3K_1+K_1K_2)}$

4. $\frac{E_1}{E_2}=\frac{(K_1+K_2+K_3)(K_2K_3+K_3K_1+K_1K_2)}{9K_1K_2K_3}$

Question Type : **MCQ**
Question ID : **41652914871**
Option 1 ID : **41652958264**
Option 2 ID : **41652958265**
Option 3 ID : **41652958262**
Option 4 ID : **41652958263**
Status : **Not Answered**
Chosen Option : **--**

Q.24 A person of mass M is, sitting on a swing of length L and swinging with an angular amplitude θ_0. If the person stands up when the swing passes through its lowest point, the work done by him, assuming that his centre of mass moves by a distance l (l<<L), is close to :

Options

1. $Mgl\ (1-\theta_0^2)$

2. $Mgl\ (1+\theta_0^2)$

3. Mgl

4. $Mgl\left(1+\frac{\theta_0^2}{2}\right)$

Question Type : **MCQ**
Question ID : **41652914859**
Option 1 ID : **41652958215**
Option 2 ID : **41652958217**
Option 3 ID : **41652958214**
Option 4 ID : **41652958216**
Status : **Answered**
Chosen Option : **1**

Q.25 Two moles of helium gas is mixed with three moles of hydrogen molecules (taken to be rigid). What is the molar specific heat of mixture at constant volume ?
(R = 8.3 J/mol K)

Options
1. 19.7 J/mol K
2. 15.7 J/mol K
3. 17.4 J/mol K
4. 21.6 J/mol K

Question Type : **MCQ**
Question ID : **41652914866**
Option 1 ID : **41652958244**
Option 2 ID : **41652958242**
Option 3 ID : **41652958243**
Option 4 ID : **41652958245**
Status : **Answered**
Chosen Option : **3**

Q.26 A submarine (A) travelling at 18 km/hr is being chased along the line of its velocity by another submarine (B) travelling at 27 km/hr. B sends a sonar signal of 500 Hz to detect A and receives a reflected sound of frequency ν. The value of ν is close to :
(Speed of sound in water = 1500 ms^{-1})

Options
1. 504 Hz
2. 507 Hz
3. 499 Hz
4. 502 Hz

Question Type : **MCQ**
Question ID : **41652914868**
Option 1 ID : **41652958252**
Option 2 ID : **41652958253**
Option 3 ID : **41652958251**
Option 4 ID : **41652958250**
Status : **Answered**
Chosen Option : **4**

Q.27

A man (mass = 50 kg) and his son (mass = 20 kg) are standing on a frictionless surface facing each other. The man pushes his son so that he starts moving at a speed of 0.70 ms^{-1} with respect to the man. The speed of the man with respect to the surface is :

Options

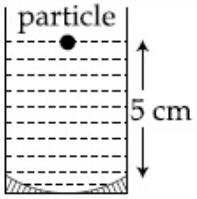
1. 0.28 ms^{-1}
2. 0.20 ms^{-1}
3. 0.47 ms^{-1}
4. 0.14 ms^{-1}

Question Type : **MCQ**
Question ID : **41652914858**
Option 1 ID : **41652958211**
Option 2 ID : **41652958210**
Option 3 ID : **41652958212**
Option 4 ID : **41652958213**
Status : **Not Answered**
Chosen Option : **--**

Q.28

A concave mirror has radius of curvature of 40 cm. It is at the bottom of a glass that has water filled up to 5 cm (see figure). If a small particle is floating on the surface of water, its image as seen, from directly above the glass, is at a distance d from the surface of water. The value of d is close to :

(Refractive index of water = 1.33)



Options

1. 6.7 cm
2. 13.4 cm
3. 8.8 cm
4. 11.7 cm

Question Type : **MCQ**
Question ID : **41652914879**
Option 1 ID : **41652958296**
Option 2 ID : **41652958297**
Option 3 ID : **41652958295**
Option 4 ID : **41652958294**
Status : **Answered**
Chosen Option : **3**

Q.29

An excited He^+ ion emits two photons in succession, with wavelengths 108.5 nm and 30.4 nm, in making a transition to ground state. The quantum number n, corresponding to its initial excited state is (for photon of wavelength λ, energy $E = \frac{1240\ eV}{\lambda(in\ nm)}$) :

Options

1. $n = 4$
2. $n = 5$
3. $n = 7$
4. $n = 6$

Question Type : **MCQ**
Question ID : **41652914883**
Option 1 ID : **41652958313**
Option 2 ID : **41652958312**
Option 3 ID : **41652958310**
Option 4 ID : **41652958311**
Status : **Not Answered**
Chosen Option : **--**

Q.30 In a double slit experiment, when a thin film of thickness t having refractive index μ is introduced in front of one of the slits, the maximum at the centre of the fringe pattern shifts by one fringe width. The value of t is (λ is the wavelength of the light used) :

Options

1. $\frac{2\lambda}{(\mu - 1)}$
2. $\frac{\lambda}{2(\mu - 1)}$
3. $\frac{\lambda}{(\mu - 1)}$
4. $\frac{\lambda}{(2\mu - 1)}$

Question Type : **MCQ**
Question ID : **41652914880**
Option 1 ID : **41652958299**
Option 2 ID : **41652958298**
Option 3 ID : **41652958300**
Option 4 ID : **41652958301**
Status : **Not Answered**
Chosen Option : **--**

Section : **Chemistry**

Q.1 An example of a disproportionation reaction is :

Options

1. $2\,MnO_4^- + 10\,I^- + 16\,H^+ \rightarrow 2\,Mn^{2+} + 5\,I_2 + 8\,H_2O$

2. $2\ NaBr + Cl_2 \rightarrow 2\ NaCl + Br_2$

3. $2\ KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$

4. $2\ CuBr \rightarrow CuBr_2 + Cu$

Question Type : **MCQ**
Question ID : **41652914902**
Option 1 ID : **41652958386**
Option 2 ID : **41652958389**
Option 3 ID : **41652958387**
Option 4 ID : **41652958388**
Status : **Answered**
Chosen Option : **1**

Q.2 The mole fraction of a solvent in aqueous solution of a solute is 0.8. The molality (in mol kg^{-1}) of the aqueous solution is :

Options

1. 13.88×10^{-2}

2. 13.88×10^{-1}

3. 13.88

4. 13.88×10^{-3}

Question Type : **MCQ**
Question ID : **41652914911**
Option 1 ID : **41652958424**
Option 2 ID : **41652958423**
Option 3 ID : **41652958422**
Option 4 ID : **41652958425**
Status : **Not Answered**
Chosen Option : **--**

Q.3 An ideal gas is allowed to expand from 1 L to 10 L against a constant external pressure of 1 bar. The work done in kJ is :

Options

1. -9.0

2. $+10.0$

3. -0.9

4. -2.0

Question Type : **MCQ**
Question ID : **41652914910**
Option 1 ID : **41652958421**
Option 2 ID : **41652958420**
Option 3 ID : **41652958418**
Option 4 ID : **41652958419**
Status : **Answered**
Chosen Option : **2**

Q.4 Which of the following is a thermosetting polymer ?

Options

1. Bakelite

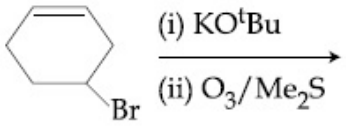
2. Buna-N

3. Nylon 6

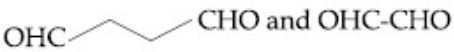
4. PVC

Question Type : **MCQ**
Question ID : **41652914892**
Option 1 ID : **41652958347**
Option 2 ID : **41652958349**
Option 3 ID : **41652958348**
Option 4 ID : **41652958346**
Status : **Answered**
Chosen Option : **1**

Q.5 The major product(s) obtained in the following reaction is/are :

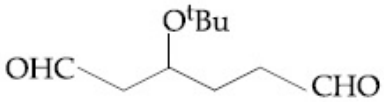


Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **41652914894**
Option 1 ID : **41652958354**
Option 2 ID : **41652958355**
Option 3 ID : **41652958356**
Option 4 ID : **41652958357**
Status : **Not Answered**
Chosen Option : **--**

Q.6 The metal that gives hydrogen gas upon treatment with both acid as well as base is :

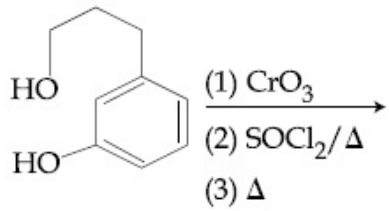
Options

1. magnesium
2. mercury
3. zinc
4. iron

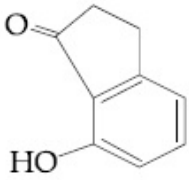
Question Type : **MCQ**
Question ID : **41652914898**
Option 1 ID : **41652958370**
Option 2 ID : **41652958373**
Option 3 ID : **41652958372**
Option 4 ID : **41652958371**
Status : **Answered**
Chosen Option : **3**

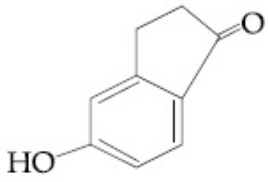
Q.7

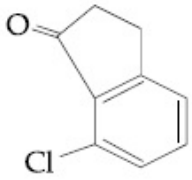
The major product of the following reaction is :

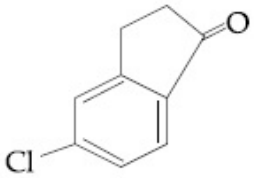


Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **41652914888**
Option 1 ID : **41652958331**
Option 2 ID : **41652958330**
Option 3 ID : **41652958332**
Option 4 ID : **41652958333**
Status : **Not Answered**
Chosen Option : **--**

Q.8 Glucose and Galactose are having identical configuration in all the positions except position.

Options

1. C−3
2. C−4
3. C−2
4. C−5

Question Type : **MCQ**
Question ID : **41652914889**
Option 1 ID : **41652958335**
Option 2 ID : **41652958336**
Option 3 ID : **41652958334**
Option 4 ID : **41652958337**
Status : **Answered**
Chosen Option : **1**

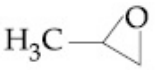
Q.9 The major product of the following addition reaction is

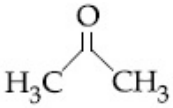
$$H_3C - CH = CH_2 \xrightarrow{Cl_2/H_2O}$$

Options

1. $CH_3-\underset{Cl}{\underset{|}{CH}}-\underset{OH}{\underset{|}{CH_2}}$

2. $H_3C-\underset{OH}{\underset{|}{CH}}-\underset{Cl}{\underset{|}{CH_2}}$

3. 

4. 

Question Type : **MCQ**
Question ID : **41652914890**
Option 1 ID : **41652958338**
Option 2 ID : **41652958339**
Option 3 ID : **41652958340**
Option 4 ID : **41652958341**
Status : **Answered**
Chosen Option : **2**

Q.10 Given :

$Co^{3+} + e^- \rightarrow Co^{2+}$; $E^\circ = +1.81$ V

$Pb^{4+} + 2e^- \rightarrow Pb^{2+}$; $E^\circ = +1.67$ V

$Ce^{4+} + e^- \rightarrow Ce^{3+}$; $E^\circ = +1.61$ V

$Bi^{3+} + 3e^- \rightarrow Bi$; $E^\circ = +0.20$ V

Oxidizing power of the species will increase in the order :

Options

1. $Ce^{4+} < Pb^{4+} < Bi^{3+} < Co^{3+}$

2. $Bi^{3+} < Ce^{4+} < Pb^{4+} < Co^{3+}$

3. $Co^{3+} < Ce^{4+} < Bi^{3+} < Pb^{4+}$

4. $Co^{3+} < Pb^{4+} < Ce^{4+} < Bi^{3+}$

Question Type : **MCQ**
Question ID : **41652914913**
Option 1 ID : **41652958433**
Option 2 ID : **41652958432**
Option 3 ID : **41652958430**
Option 4 ID : **41652958431**
Status : **Answered**
Chosen Option : **2**

Q.11 Which of the following statements is not true about RNA ?

Options

1. It controls the synthesis of protein

2. It has always double stranded α-helix structure

3. It usually does not replicate

4. It is present in the nucleus of the cell

Question Type : **MCQ**
Question ID : **41652914886**
Option 1 ID : **41652958324**
Option 2 ID : **41652958323**
Option 3 ID : **41652958325**
Option 4 ID : **41652958322**
Status : **Answered**
Chosen Option : **2**

Q.12 The group number, number of valence electrons, and valency of an element with atomic number 15, respectively, are :

Options
1. 16, 5 and 2
2. 15, 5 and 3
3. 16, 6 and 3
4. 15, 6 and 2

Question Type : **MCQ**
Question ID : **41652914896**
Option 1 ID : **41652958365**
Option 2 ID : **41652958364**
Option 3 ID : **41652958363**
Option 4 ID : **41652958362**
Status : **Answered**
Chosen Option : **2**

Q.13 The basic structural unit of feldspar, zeolites, mica, and asbestos is :

Options
1. $(SiO_3)^{2-}$
2. SiO_2
3. $(SiO_4)^{4-}$
4. $-\left(\begin{matrix}R\\|\\Si-O\\|\\R\end{matrix}\right)_n$ (R = Me)

Question Type : **MCQ**
Question ID : **41652914901**
Option 1 ID : **41652958384**
Option 2 ID : **41652958382**
Option 3 ID : **41652958385**
Option 4 ID : **41652958383**
Status : **Not Answered**
Chosen Option : **--**

Q.14 In the following reaction; $xA \rightarrow yB$

$$\log_{10}\left[-\frac{d[A]}{dt}\right] = \log_{10}\left[\frac{d[B]}{dt}\right] + 0.3010$$

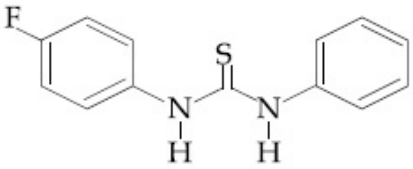
'A' and 'B' respectively can be :

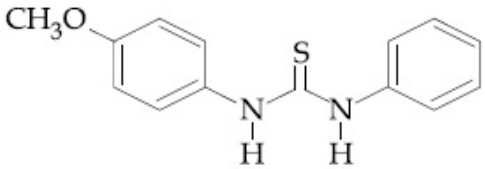
Options
1. n-Butane and Iso-butane
2. C_2H_2 and C_6H_6
3. C_2H_4 and C_4H_8

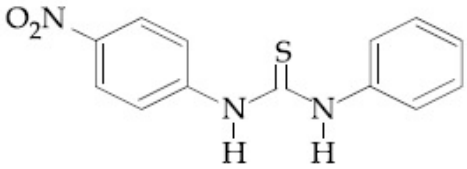
4. N_2O_4 and NO_2

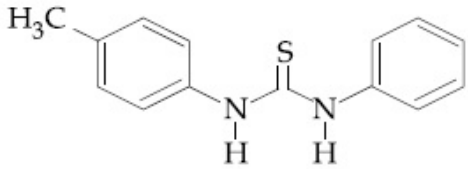
Question Type : **MCQ**
Question ID : **41652914914**
Option 1 ID : **41652958435**
Option 2 ID : **41652958434**
Option 3 ID : **41652958436**
Option 4 ID : **41652958437**
Status : **Not Answered**
Chosen Option : **--**

Q.15 The increasing order of the pK_b of the following compound is :

(A) 

(B) 

(C) 

(D) 

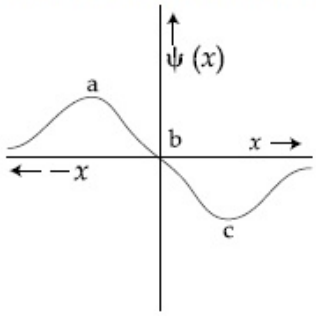
Options

1. (A) < (C) < (D) < (B)
2. (C) < (A) < (D) < (B)
3. (B) < (D) < (A) < (C)
4. (B) < (D) < (C) < (A)

Question Type : **MCQ**
Question ID : **41652914887**
Option 1 ID : **41652958326**
Option 2 ID : **41652958329**
Option 3 ID : **41652958328**
Option 4 ID : **41652958327**
Status : **Answered**
Chosen Option : **3**

Q.16

The electrons are more likely to be found :



Options
1. in the region a and c
2. in the region a and b
3. only in the region a
4. only in the region c

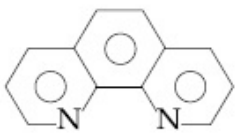
Question Type : **MCQ**
Question ID : **41652914908**
Option 1 ID : **41652958413**
Option 2 ID : **41652958411**
Option 3 ID : **41652958410**
Option 4 ID : **41652958412**
Status : **Not Answered**
Chosen Option : **--**

Q.17 The correct sequence of thermal stability of the following carbonates is :

Options
1. $BaCO_3 < CaCO_3 < SrCO_3 < MgCO_3$
2. $MgCO_3 < CaCO_3 < SrCO_3 < BaCO_3$
3. $MgCO_3 < SrCO_3 < CaCO_3 < BaCO_3$
4. $BaCO_3 < SrCO_3 < CaCO_3 < MgCO_3$

Question Type : **MCQ**
Question ID : **41652914899**
Option 1 ID : **41652958376**
Option 2 ID : **41652958374**
Option 3 ID : **41652958375**
Option 4 ID : **41652958377**
Status : **Answered**
Chosen Option : **2**

Q.18 The complex ion that will lose its crystal field stabilization energy upon oxidation of its metal to +3 state is :

(Phen = 

and
ignore pairing energy)

Options
1. $[Co(phen)_3]^{2+}$
2. $[Ni(phen)_3]^{2+}$

3. $[Zn(phen)_3]^{2+}$

4. $[Fe(phen)_3]^{2+}$

Question Type : **MCQ**
Question ID : **41652914903**
Option 1 ID : **41652958390**
Option 2 ID : **41652958391**
Option 3 ID : **41652958393**
Option 4 ID : **41652958392**
Status : **Not Answered**
Chosen Option : **--**

Q.19 But-2-ene on reaction with alkaline $KMnO_4$ at elevated temperature followed by acidification will give :

Options

1. $CH_3-\underset{\underset{OH}{|}}{CH}-\underset{\underset{OH}{|}}{CH}-CH_3$

2. one molecule of CH_3CHO and one molecule of CH_3COOH

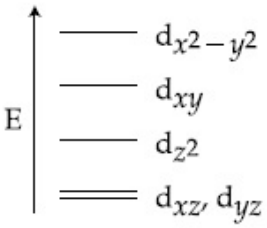
3. 2 molecules of CH_3COOH

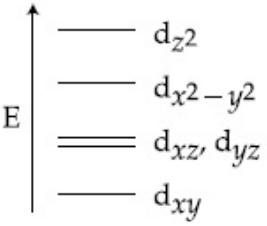
4. 2 molecules of CH_3CHO

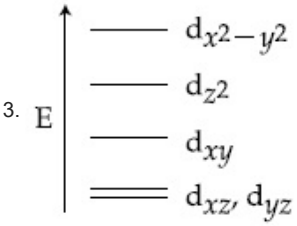
Question Type : **MCQ**
Question ID : **41652914893**
Option 1 ID : **41652958350**
Option 2 ID : **41652958352**
Option 3 ID : **41652958353**
Option 4 ID : **41652958351**
Status : **Not Answered**
Chosen Option : **--**

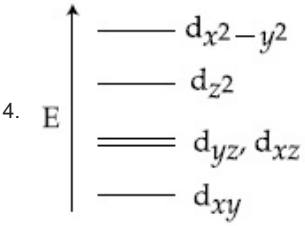
Q.20 Complete removal of both the axial ligands (along the z-axis) from an octahedral complex leads to which of the following splitting patterns? (relative orbital energies not on scale).

Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **41652914904**
Option 1 ID : **41652958396**
Option 2 ID : **41652958395**
Option 3 ID : **41652958394**
Option 4 ID : **41652958397**
Status : **Answered**
Chosen Option : **1**

Q.21 An organic compound 'A' is oxidized with Na_2O_2 followed by boiling with HNO_3. The resultant solution is then treated with ammonium molybdate to yield a yellow precipitate.
Based on above observation, the element present in the given compound is :

Options
1. Nitrogen
2. Phosphorus
3. Fluorine
4. Sulphur

Question Type : **MCQ**
Question ID : **41652914895**
Option 1 ID : **41652958359**
Option 2 ID : **41652958361**
Option 3 ID : **41652958360**
Option 4 ID : **41652958358**
Status : **Not Answered**
Chosen Option : **--**

Q.22 The correct set of species responsible for the photochemical smog is :

Options
1. N_2, NO_2 and hydrocarbons
2. CO_2, NO_2, SO_2 and hydrocarbons
3. NO, NO_2, O_3 and hydrocarbons
4. N_2, O_2, O_3 and hydrocarbons

Question Type : **MCQ**
Question ID : **41652914905**
Option 1 ID : **41652958399**

Option 2 ID : **41652958401**
Option 3 ID : **41652958400**
Option 4 ID : **41652958398**
Status : **Answered**
Chosen Option : **2**

Q.23 Peptization is a :

Options

1. process of bringing colloidal molecule into solution
2. process of converting precipitate into colloidal solution
3. process of converting a colloidal solution into precipitate
4. process of converting soluble particles to form colloidal solution

Question Type : **MCQ**
Question ID : **41652914915**
Option 1 ID : **41652958441**
Option 2 ID : **41652958439**
Option 3 ID : **41652958438**
Option 4 ID : **41652958440**
Status : **Answered**
Chosen Option : **2**

Q.24 The correct statement among the following is :

Options

1. $(SiH_3)_3N$ is planar and less basic than $(CH_3)_3N$.
2. $(SiH_3)_3N$ is pyramidal and more basic than $(CH_3)_3N$.
3. $(SiH_3)_3N$ is pyramidal and less basic than $(CH_3)_3N$.
4. $(SiH_3)_3N$ is planar and more basic than $(CH_3)_3N$.

Question Type : **MCQ**
Question ID : **41652914900**
Option 1 ID : **41652958381**
Option 2 ID : **41652958378**
Option 3 ID : **41652958379**
Option 4 ID : **41652958380**
Status : **Answered**
Chosen Option : **2**

Q.25 Enthalpy of sublimation of iodine is 24 cal g^{-1} at 200 °C. If specific heat of $I_2(s)$ and $I_2(vap)$ are 0.055 and 0.031 cal $g^{-1}K^{-1}$ respectively, then enthalpy of sublimation of iodine at 250 °C in cal g^{-1} is :

Options

1. 2.85
2. 5.7
3. 22.8

4. 11.4

Question Type : **MCQ**
Question ID : **41652914909**
Option 1 ID : **41652958417**
Option 2 ID : **41652958416**
Option 3 ID : **41652958414**
Option 4 ID : **41652958415**
Status : **Not Answered**
Chosen Option : **--**

Q.26 An element has a face-centred cubic (fcc) structure with a cell edge of a. The distance between the centres of two nearest tetrahedral voids in the lattice is :

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

Question Type : **MCQ**
Question ID : **41652914907**
Option 1 ID : **41652958409**
Option 2 ID : **41652958406**
Option 3 ID : **41652958408**
Option 4 ID : **41652958407**
Status : **Answered**
Chosen Option : **1**

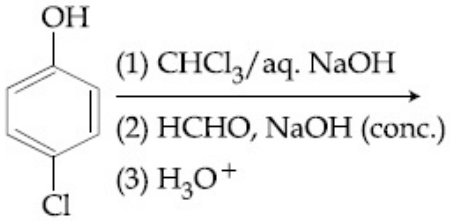
Q.27 What is the molar solubility of $Al(OH)_3$ in 0.2 M NaOH solution ? Given that, solubility product of $Al(OH)_3 = 2.4 \times 10^{-24}$:

Options
1. 3×10^{-19}
2. 12×10^{-21}
3. 3×10^{-22}
4. 12×10^{-23}

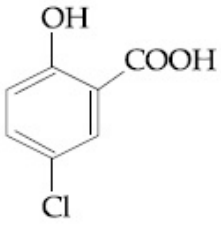
Question Type : **MCQ**
Question ID : **41652914912**
Option 1 ID : **41652958427**
Option 2 ID : **41652958429**
Option 3 ID : **41652958426**
Option 4 ID : **41652958428**
Status : **Not Attempted and Marked For Review**
Chosen Option : **--**

Q.28

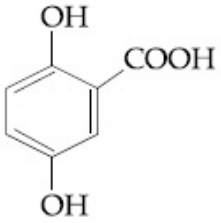
The major products of the following reaction are :



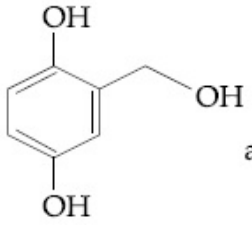
Options

1. 

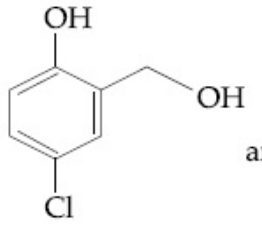
and Methanol

2. 

and Methanol

3. 

and Formic acid

4. 

and Formic acid

Question Type : **MCQ**
Question ID : **41652914891**
Option 1 ID : **41652958342**
Option 2 ID : **41652958344**
Option 3 ID : **41652958345**
Option 4 ID : **41652958343**
Status : **Answered**
Chosen Option : **2**

Q.29 5 moles of AB_2 weigh 125×10^{-3} kg and 10 moles of A_2B_2 weigh 300×10^{-3} kg. The molar mass of A (M_A) and molar mass of B (M_B) in kg mol^{-1} are :

Options

1. $M_A=10\times10^{-3}$ and $M_B=5\times10^{-3}$
2. $M_A=50\times10^{-3}$ and $M_B=25\times10^{-3}$
3. $M_A=25\times10^{-3}$ and $M_B=50\times10^{-3}$
4. $M_A=5\times10^{-3}$ and $M_B=10\times10^{-3}$

Question Type : **MCQ**
Question ID : **41652914906**

Option 1 ID : **41652958403**
Option 2 ID : **41652958405**
Option 3 ID : **41652958404**
Option 4 ID : **41652958402**
Status : **Answered**
Chosen Option : **4**

Q.30 The idea of froth floatation method came from a person X and this method is related to the process Y of ores. X and Y, respectively, are :

Options

1. fisher woman and concentration
2. washer woman and concentration
3. fisher man and reduction
4. washer man and reduction

Question Type : **MCQ**
Question ID : **41652914897**
Option 1 ID : **41652958368**
Option 2 ID : **41652958367**
Option 3 ID : **41652958369**
Option 4 ID : **41652958366**
Status : **Answered**
Chosen Option : **2**

Section : **Mathematics**

Q.1 If A is a symmetric matrix and B is a skew-symmetrix matrix such that

$A + B = \begin{bmatrix} 2 & 3 \\ 5 & -1 \end{bmatrix}$, then AB is equal to :

Options

1. $\begin{bmatrix} -4 & -2 \\ -1 & 4 \end{bmatrix}$
2. $\begin{bmatrix} 4 & -2 \\ -1 & -4 \end{bmatrix}$
3. $\begin{bmatrix} 4 & -2 \\ 1 & -4 \end{bmatrix}$
4. $\begin{bmatrix} -4 & 2 \\ 1 & 4 \end{bmatrix}$

Question Type : **MCQ**
Question ID : **41652914920**
Option 1 ID : **41652958461**
Option 2 ID : **41652958460**
Option 3 ID : **41652958459**
Option 4 ID : **41652958458**
Status : **Marked For Review**
Chosen Option : **2**

Q.2

If $e^y + xy = e$, the ordered pair $\left(\frac{dy}{dx}, \frac{d^2y}{dx^2}\right)$ at $x = 0$ is equal to :

Options

1. $\left(\frac{1}{e}, -\frac{1}{e^2}\right)$
2. $\left(-\frac{1}{e}, \frac{1}{e^2}\right)$
3. $\left(\frac{1}{e}, \frac{1}{e^2}\right)$
4. $\left(-\frac{1}{e}, -\frac{1}{e^2}\right)$

Question Type : **MCQ**
Question ID : **41652914926**
Option 1 ID : **41652958483**
Option 2 ID : **41652958482**
Option 3 ID : **41652958484**
Option 4 ID : **41652958485**
Status : **Answered**
Chosen Option : **2**

Q.3

If the angle of intersection at a point where the two circles with radii 5 cm and 12 cm intersect is 90°, then the length (in cm) of their common chord is :

Options

1. $\frac{13}{5}$
2. $\frac{120}{13}$
3. $\frac{60}{13}$
4. $\frac{13}{2}$

Question Type : **MCQ**
Question ID : **41652914934**
Option 1 ID : **41652958517**
Option 2 ID : **41652958514**
Option 3 ID : **41652958516**
Option 4 ID : **41652958515**
Status : **Answered**
Chosen Option : **4**

Q.4

If the area (in sq. units) of the region $\{(x, y) : y^2 \le 4x, x + y \le 1, x \ge 0, y \ge 0\}$ is $a\sqrt{2} + b$, then $a - b$ is equal to :

Options

1. $\frac{10}{3}$

2. 6

3. $\frac{8}{3}$

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

Question Type : **MCQ**
Question ID : **41652914931**
Option 1 ID : **41652958504**
Option 2 ID : **41652958503**
Option 3 ID : **41652958502**
Option 4 ID : **41652958505**
Status : **Answered**
Chosen Option : **3**

Q.5 For $x \in \mathbf{R}$, let $[x]$ denote the greatest integer $\leq x$, then the sum of the series

$$\left[-\frac{1}{3}\right]+\left[-\frac{1}{3}-\frac{1}{100}\right]+\left[-\frac{1}{3}-\frac{2}{100}\right]+\cdots\cdots+\left[-\frac{1}{3}-\frac{99}{100}\right]$$

is :

Options

1. -153

2. -133

3. -131

4. -135

Question Type : **MCQ**
Question ID : **41652914924**
Option 1 ID : **41652958475**
Option 2 ID : **41652958477**
Option 3 ID : **41652958476**
Option 4 ID : **41652958474**
Status : **Answered**
Chosen Option : **1**

Q.6 The number of ways of choosing 10 objects out of 31 objects of which 10 are identical and the remaining 21 are distinct, is :

Options

1. $2^{20}-1$

2. 2^{21}

3. 2^{20}

4. $2^{20}+1$

Question Type : **MCQ**
Question ID : **41652914921**
Option 1 ID : **41652958462**
Option 2 ID : **41652958465**
Option 3 ID : **41652958463**
Option 4 ID : **41652958464**
Status : **Answered**
Chosen Option : **4**

Q.7

The integral $\int \frac{2x^3 - 1}{x^4 + x} dx$ is equal to :

(Here C is a constant of integration)

Options

1. $\frac{1}{2}\log_e \frac{|x^3 + 1|}{x^2} + C$

2. $\frac{1}{2}\log_e \frac{(x^3 + 1)^2}{|x^3|} + C$

3. $\log_e \left|\frac{x^3 + 1}{x}\right| + C$

4. $\log_e \frac{|x^3 + 1|}{x^2} + C$

Question Type : **MCQ**
Question ID : **41652914929**
Option 1 ID : **41652958497**
Option 2 ID : **41652958495**
Option 3 ID : **41652958494**
Option 4 ID : **41652958496**
Status : **Answered**
Chosen Option : **3**

Q.8 The equation $y = \sin x \sin(x+2) - \sin^2(x+1)$ represents a straight line lying in :

Options

1. second and third quadrants only

2. first, second and fourth quadrants

3. first, third and fourth quadrants

4. third and fourth quadrants only

Question Type : **MCQ**
Question ID : **41652914933**
Option 1 ID : **41652958511**
Option 2 ID : **41652958510**
Option 3 ID : **41652958513**
Option 4 ID : **41652958512**
Status : **Not Answered**
Chosen Option : **--**

Q.9 Let $f : \mathbf{R} \to \mathbf{R}$ be a continuously differentiable function such that $f(2) = 6$ and $f'(2) = \frac{1}{48}$. If $\int_6^{f(x)} 4t^3 dt = (x - 2)g(x)$, then $\lim_{x \to 2} g(x)$ is equal to :

Options

1. 18

2. 24

3. 12

4. 36

Question Type : **MCQ**
Question ID : **41652914925**
Option 1 ID : **41652958479**
Option 2 ID : **41652958480**
Option 3 ID : **41652958478**
Option 4 ID : **41652958481**
Status : **Answered**
Chosen Option : **2**

Q.10 The coefficient of x^{18} in the product $(1+x)(1-x)^{10}(1+x+x^2)^9$ is :

Options

1. 84
2. -126
3. -84
4. 126

Question Type : **MCQ**
Question ID : **41652914922**
Option 1 ID : **41652958466**
Option 2 ID : **41652958468**
Option 3 ID : **41652958469**
Option 4 ID : **41652958467**
Status : **Not Answered**
Chosen Option : **--**

Q.11 If three of the six vertices of a regular hexagon are chosen at random, then the probability that the triangle formed with these chosen vertices is equilateral is :

Options

1. $\frac{1}{10}$
2. $\frac{1}{5}$
3. $\frac{3}{10}$
4. $\frac{3}{20}$

Question Type : **MCQ**
Question ID : **41652914941**
Option 1 ID : **41652958542**
Option 2 ID : **41652958543**
Option 3 ID : **41652958544**
Option 4 ID : **41652958545**
Status : **Answered**
Chosen Option : **2**

Q.12 Consider the differential equation, $y^2dx+\left(x-\frac{1}{y}\right)dy=0$. If value of y is 1 when $x=1$, then the value of x for which $y=2$, is :

Options

1. $\frac{5}{2}+\frac{1}{\sqrt{e}}$
2. $\frac{3}{2}-\frac{1}{\sqrt{e}}$
3. $\frac{1}{2}+\frac{1}{\sqrt{e}}$
4. $\frac{3}{2}-\sqrt{e}$

Question Type : **MCQ**
Question ID : **41652914932**
Option 1 ID : **41652958507**
Option 2 ID : **41652958508**
Option 3 ID : **41652958509**
Option 4 ID : **41652958506**
Status : **Not Answered**
Chosen Option : **--**

Q.13

Let $\vec{a}=3\hat{i}+2\hat{j}+2\hat{k}$ and $\vec{b}=\hat{i}+2\hat{j}-2\hat{k}$ be two vectors. If a vector perpendicular to both the vectors $\vec{a}+\vec{b}$ and $\vec{a}-\vec{b}$ has the magnitude 12 then one such vector is :

Options

1. $4\left(2\hat{i}+2\hat{j}+\hat{k}\right)$
2. $4\left(2\hat{i}-2\hat{j}-\hat{k}\right)$
3. $4\left(2\hat{i}+2\hat{j}-\hat{k}\right)$
4. $4\left(-2\hat{i}-2\hat{j}+\hat{k}\right)$

Question Type : **MCQ**
Question ID : **41652914939**
Option 1 ID : **41652958534**
Option 2 ID : **41652958536**
Option 3 ID : **41652958535**
Option 4 ID : **41652958537**
Status : **Answered**
Chosen Option : **3**

Q.14

Let a random variable X have a binomial distribution with mean 8 and variance 4.

If $P(X\le 2)=\frac{k}{2^{16}}$, then k is equal to :

Options

1. 17
2. 121
3. 1
4. 137

Question Type : **MCQ**
Question ID : **41652914940**
Option 1 ID : **41652958539**
Option 2 ID : **41652958540**
Option 3 ID : **41652958538**
Option 4 ID : **41652958541**
Status : **Not Answered**
Chosen Option : **--**

Q.15 The number of solutions of the equation $1+\sin^4 x=\cos^2 3x,\ x \in \left[-\frac{5\pi}{2}, \frac{5\pi}{2}\right]$ is :

Options

1. 3
2. 5
3. 7
4. 4

Question Type : **MCQ**
Question ID : **41652914943**
Option 1 ID : **41652958551**
Option 2 ID : **41652958553**
Option 3 ID : **41652958550**
Option 4 ID : **41652958552**
Status : **Not Answered**
Chosen Option : **--**

Q.16 The equation $|z-i|=|z-1|,\ i=\sqrt{-1}$, represents :

Options

1. a circle of radius $\frac{1}{2}$.
2. the line through the origin with slope 1.
3. a circle of radius 1.
4. the line through the origin with slope -1.

Question Type : **MCQ**
Question ID : **41652914918**
Option 1 ID : **41652958451**
Option 2 ID : **41652958453**
Option 3 ID : **41652958450**
Option 4 ID : **41652958452**
Status : **Answered**
Chosen Option : **2**

Q.17 If the truth value of the statement $p \rightarrow (\sim q \vee r)$ is false(F), then the truth values of the statements p, q, r are respectively :

Options

1. T, T, F
2. T, F, F

3. T, F, T
4. F, T, T

Question Type : **MCQ**
Question ID : **41652914945**
Option 1 ID : **41652958558**
Option 2 ID : **41652958560**
Option 3 ID : **41652958559**
Option 4 ID : **41652958561**
Status : **Answered**
Chosen Option : **2**

Q.18

If $\int_0^{\frac{\pi}{2}} \frac{\cot x}{\cot x + \operatorname{cosec} x}\, dx = m(\pi + n)$, then

$m \cdot n$ is equal to :

Options

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

Question Type : **MCQ**
Question ID : **41652914930**
Option 1 ID : **41652958501**
Option 2 ID : **41652958498**
Option 3 ID : **41652958500**
Option 4 ID : **41652958499**
Status : **Answered**
Chosen Option : **2**

Q.19

For $x \in \left(0, \frac{3}{2}\right)$, let $f(x) = \sqrt{x}$, $g(x) = \tan x$

and $h(x) = \frac{1 - x^2}{1 + x^2}$. If $\phi(x) = ((hof)og)(x)$,

then $\phi\left(\frac{\pi}{3}\right)$ is equal to :

Options

1. $\tan\frac{\pi}{12}$
2. $\tan\frac{11\pi}{12}$
3. $\tan\frac{7\pi}{12}$
4. $\tan\frac{5\pi}{12}$

Question Type : **MCQ**
Question ID : **41652914916**
Option 1 ID : **41652958442**
Option 2 ID : **41652958445**
Option 3 ID : **41652958444**
Option 4 ID : **41652958443**

Status : **Not Answered**
Chosen Option : **--**

Q.20

The value of $\sin^{-1}\left(\frac{12}{13}\right) - \sin^{-1}\left(\frac{3}{5}\right)$ is equal to :

Options

1. $\pi - \sin^{-1}\left(\frac{63}{65}\right)$
2. $\frac{\pi}{2} - \sin^{-1}\left(\frac{56}{65}\right)$
3. $\frac{\pi}{2} - \cos^{-1}\left(\frac{9}{65}\right)$
4. $\pi - \cos^{-1}\left(\frac{33}{65}\right)$

Question Type : **MCQ**
Question ID : **41652914944**
Option 1 ID : **41652958555**
Option 2 ID : **41652958557**
Option 3 ID : **41652958554**
Option 4 ID : **41652958556**
Status : **Answered**
Chosen Option : **1**

Q.21

A 2 m ladder leans against a vertical wall. If the top of the ladder begins to slide down the wall at the rate 25 cm/sec., then the rate (in cm/sec.) at which the bottom of the ladder slides away from the wall on the horizontal ground when the top of the ladder is 1 m above the ground is :

Options

1. $25\sqrt{3}$
2. $\frac{25}{\sqrt{3}}$
3. $\frac{25}{3}$
4. 25

Question Type : **MCQ**
Question ID : **41652914927**
Option 1 ID : **41652958489**
Option 2 ID : **41652958487**
Option 3 ID : **41652958486**
Option 4 ID : **41652958488**
Status : **Answered**
Chosen Option : **2**

Q.22

If α and β are the roots of the equation $375x^2 - 25x - 2 = 0$, then

$\lim\limits_{n\to\infty} \sum\limits_{r=1}^{n} \alpha^r + \lim\limits_{n\to\infty} \sum\limits_{r=1}^{n} \beta^r$ is equal to :

Options

1. $\frac{21}{346}$
2. $\frac{29}{358}$
3. $\frac{1}{12}$
4. $\frac{7}{116}$

Question Type : **MCQ**
Question ID : **41652914917**
Option 1 ID : **41652958449**
Option 2 ID : **41652958448**
Option 3 ID : **41652958447**
Option 4 ID : **41652958446**
Status : **Answered**
Chosen Option : **1**

Q.23

If the normal to the ellipse $3x^2 + 4y^2 = 12$ at a point P on it is parallel to the line, $2x + y = 4$ and the tangent to the ellipse at P passes through Q(4, 4) then PQ is equal to :

Options

1. $\frac{5\sqrt{5}}{2}$
2. $\frac{\sqrt{61}}{2}$
3. $\frac{\sqrt{221}}{2}$
4. $\frac{\sqrt{157}}{2}$

Question Type : **MCQ**
Question ID : **41652914935**
Option 1 ID : **41652958518**
Option 2 ID : **41652958520**
Option 3 ID : **41652958521**
Option 4 ID : **41652958519**
Status : **Not Answered**
Chosen Option : **--**

Q.24

If m is the minimum value of k for which the function $f(x) = x\sqrt{kx - x^2}$ is increasing in the interval $[0, 3]$ and M is the maximum value of f in $[0, 3]$ when $k = m$, then the ordered pair (m, M) is equal to :

Options

1. $(4, 3\sqrt{2})$
2. $(4, 3\sqrt{3})$
3. $(3, 3\sqrt{3})$

4. $(5, 3\sqrt{6})$

Question Type : **MCQ**
Question ID : **41652914928**
Option 1 ID : **41652958490**
Option 2 ID : **41652958492**
Option 3 ID : **41652958493**
Option 4 ID : **41652958491**
Status : **Answered**
Chosen Option : **3**

Q.25 Let S_n denote the sum of the first n terms of an A.P.. If $S_4 = 16$ and $S_6 = -48$, then S_{10} is equal to :

Options
1. -260
2. -410
3. -320
4. -380

Question Type : **MCQ**
Question ID : **41652914923**
Option 1 ID : **41652958470**
Option 2 ID : **41652958473**
Option 3 ID : **41652958471**
Option 4 ID : **41652958472**
Status : **Answered**
Chosen Option : **3**

Q.26 If the data $x_1, x_2, \ldots, x_{10}$ is such that the mean of first four of these is 11, the mean of the remaining six is 16 and the sum of squares of all of these is 2,000 ; then the standard deviation of this data is :

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

Question Type : **MCQ**
Question ID : **41652914942**
Option 1 ID : **41652958548**
Option 2 ID : **41652958547**
Option 3 ID : **41652958546**
Option 4 ID : **41652958549**
Status : **Not Answered**
Chosen Option : **--**

Q.27 Let P be the point of intersection of the common tangents to the parabola $y^2 = 12x$ and the hyperbola $8x^2 - y^2 = 8$. If S and S' denote the foci of the hyperbola where S lies on the positive x-axis then P divides SS' in a ratio :

Options
1. 13 : 11

2. $14:13$

3. $5:4$

4. $2:1$

Question Type : **MCQ**
Question ID : **41652914936**
Option 1 ID : **41652958523**
Option 2 ID : **41652958522**
Option 3 ID : **41652958524**
Option 4 ID : **41652958525**
Status : **Not Answered**
Chosen Option : **--**

Q.28

If $B=\begin{bmatrix}5 & 2\alpha & 1\\ 0 & 2 & 1\\ \alpha & 3 & -1\end{bmatrix}$ is the inverse of a 3×3 matrix A, then the sum of all values of α for which $\det(A)+1=0$, is :

Options

1. 0

2. -1

3. 1

4. 2

Question Type : **MCQ**
Question ID : **41652914919**
Option 1 ID : **41652958456**
Option 2 ID : **41652958457**
Option 3 ID : **41652958455**
Option 4 ID : **41652958454**
Status : **Answered**
Chosen Option : **4**

Q.29

If the volume of parallelopiped formed by the vectors $\hat{i}+\lambda\hat{j}+\hat{k}$, $\hat{j}+\lambda\hat{k}$ and $\lambda\hat{i}+\hat{k}$ is minimum, then λ is equal to :

Options

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

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

3. $\sqrt{3}$

4. $-\sqrt{3}$

Question Type : **MCQ**
Question ID : **41652914938**
Option 1 ID : **41652958530**
Option 2 ID : **41652958532**
Option 3 ID : **41652958533**
Option 4 ID : **41652958531**

Status : **Not Answered**
Chosen Option : **--**

Q.30

If the line $\frac{x-2}{3}=\frac{y+1}{2}=\frac{z-1}{-1}$ intersects the plane $2x+3y-z+13=0$ at a point P and the plane $3x+y+4z=16$ at a point Q, then PQ is equal to :

Options

1. 14
2. $\sqrt{14}$
3. $2\sqrt{7}$
4. $2\sqrt{14}$

Question Type : **MCQ**
Question ID : **41652914937**
Option 1 ID : **41652958528**
Option 2 ID : **41652958526**
Option 3 ID : **41652958529**
Option 4 ID : **41652958527**
Status : **Answered**
Chosen Option : **3**