National Testing Agency

Question Paper Name :	B Tech 1st Sep 2021 Shift 2
Subject Name :	B TECH
Creation Date :	2021-09-01 20:31:56
Duration :	180
Total Marks :	300
Display Marks:	Yes

B TECH

Group Number :	1
Group Id :	864351261
Group Maximum Duration :	0
Group Minimum Duration :	180
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	300
Is this Group for Examiner? :	No

Physics Section A

Section Id :	8643511004
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory

Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	8643511231
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 86435121520 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The temperature of an ideal gas in 3-dimensions is 300 K. The corresponding de-Broglie wavelength of the electron approximately at 300 K, is :

[m_e = mass of electron = 9×10^{-31} kg

h = Planck constant = 6.6×10^{-34} J s

k_B = Boltzmann constant = 1.38×10^{-23} JK^{-1}]

Options :

86435171141. 2.26 nm

86435171142. 3.25 nm

86435171143. 6.26 nm

86435171144. 8.46 nm

Question Number : 2 Question Id : 86435121521 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The half life period of a radioactive element x is same as the mean life time of another radioactive element y. Initially they have the same number of atoms. Then :

Options :

86435171145. x-will decay faster than y.

86435171146. y-will decay faster than x.

86435171147. x and y have same decay rate initially and later on different decay rate.

86435171148. x and y decay at the same rate always.

Question Number : 3 Question Id : 86435121522 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In the given figure, each diode has a forward bias resistance of 30 Ω and infinite resistance in reverse bias. The current I_1 will be :
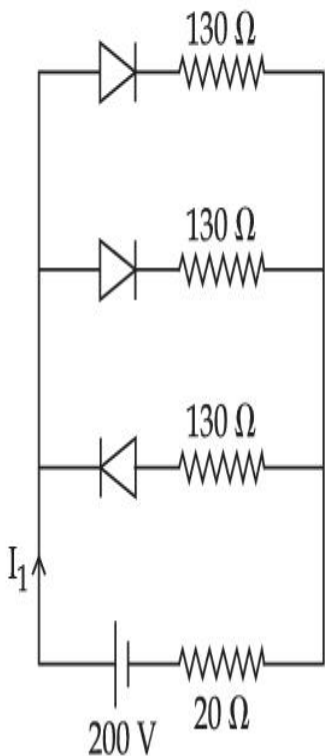
Options :
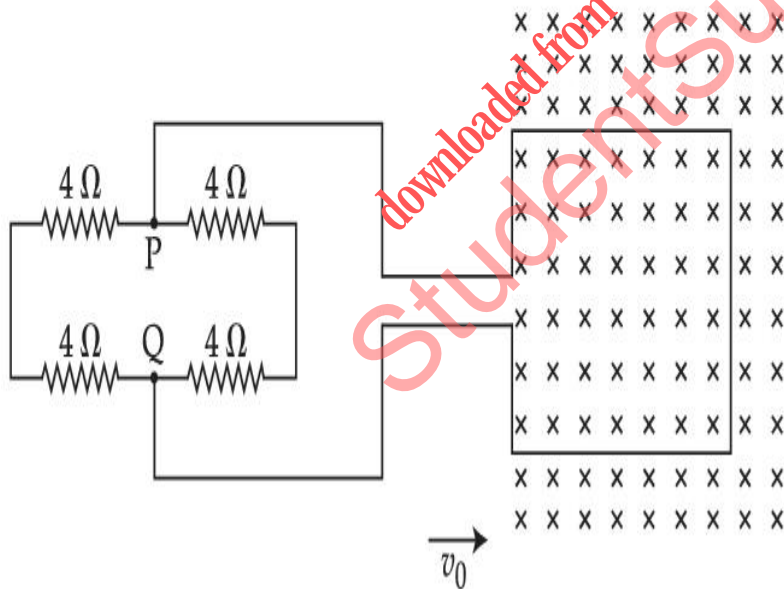
86435171149. 2 A

86435171150. 2.35 A

86435171151. 2.73 A

86435171152. 3.75 A

Question Number : 4 Question Id : 86435121523 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A square loop of side 20 cm and resistance $1\,\Omega$ is moved towards right with a constant speed v_0. The right arm of the loop is in a uniform magnetic field of 5 T. The field is perpendicular to the plane of the loop and is going into it. The loop is connected to a network of resistors each of value $4\,\Omega$. What should be the value of v_0 so that a steady current of 2 mA flows in the loop ?

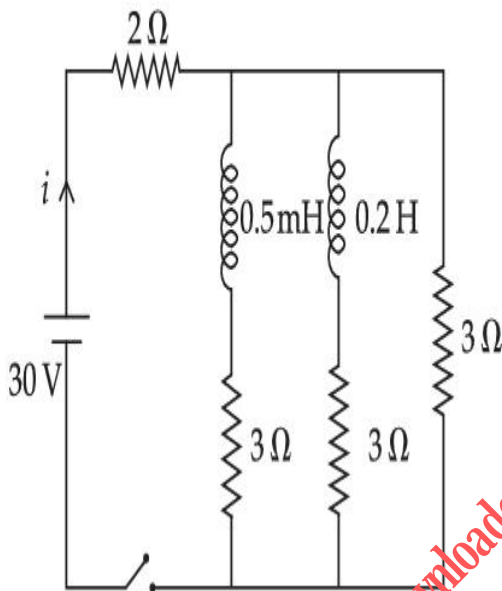**Options :**

86435171153. 1 cm/s

86435171154. 1 m/s

86435171155. 10^2 m/s

86435171156. 10^{-2} cm/s

Question Number : 5 Question Id : 86435121524 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

For the given circuit the current i through the battery when the key in closed and the steady state has been reached is _____.

Options :

86435171157. 0 A

86435171158. 6 A

86435171159. 10 A

86435171160. 25 A

Question Number : 6 Question Id : 86435121525 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Electric field of a plane electromagnetic wave propagating through a non-magnetic medium is given by $E = 20\cos(2 \times 10^{10}\, t - 200x)$ V/m. The dielectric constant of the medium is equal to :

(Take $\mu_r = 1$)

Options :

86435171161. 3

86435171162. 9

86435171163. $\dfrac{1}{3}$

86435171164. 2

Question Number : 7 Question Id : 86435121526 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A glass tumbler having inner depth of 17.5 cm is kept on a table. A student starts pouring water ($\mu = 4/3$) into it while looking at the surface of water from the above. When he feels that the tumbler is half filled, he stops pouring water. Up to what height, the tumbler is actually filled ?

Options :

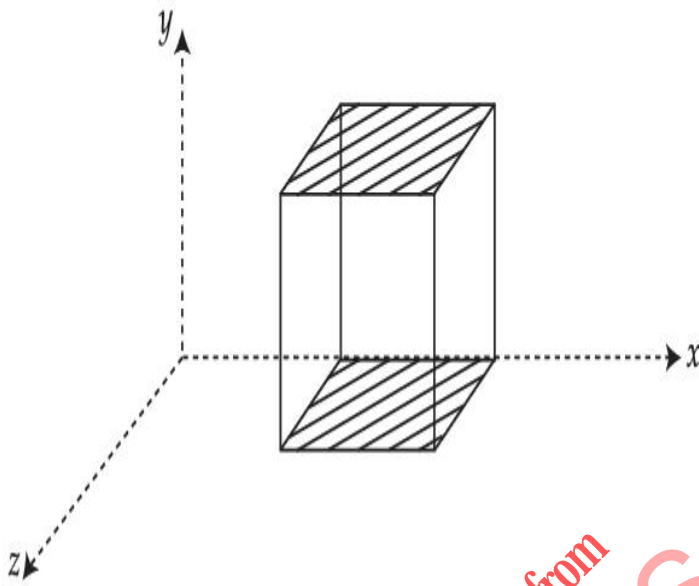86435171165. 8.75 cm

86435171166. 7.5 cm

86435171167. 11.7 cm

86435171168. $10\ cm$

Question Number : 8 Question Id : 86435121527 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A cube is placed inside an electric field, $\vec{E}=150y^2\hat{j}$. The side of the cube is 0.5 m and is placed in the field as shown in the given figure. The charge inside the cube is :

Options :

86435171169. $8.3\times10^{-11}\,C$

86435171170. $3.8\times10^{-11}\,C$

86435171171. $8.3\times10^{-12}\,C$

86435171172. $3.8\times10^{-12}\,C$

Question Number : 9 Question Id : 86435121528 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Due to cold weather a 1 m water pipe of cross-sectional area 1 cm^2 is filled with ice at $-10°C$. Resistive heating is used to melt the ice. Current of 0.5 A is passed through 4 kΩ resistance. Assuming that all the heat produced is used for melting, what is the minimum time required ?

(Given latent heat of fusion for water/ice $= 3.33 \times 10^5$ J kg^{-1},

specific heat of ice $= 2 \times 10^3$ J kg^{-1} and

density of ice $= 10^3$ kg/m^3)

Options :

86435171173. 0.353 s
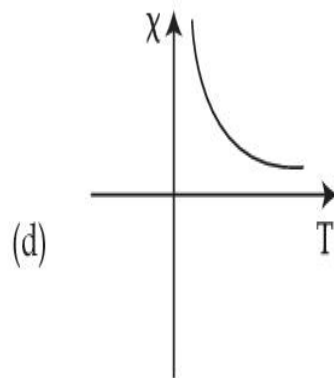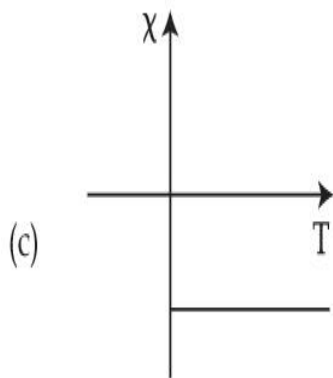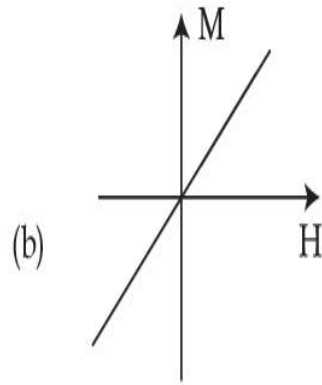
86435171174. 35.3 s

86435171175. 70.6 s

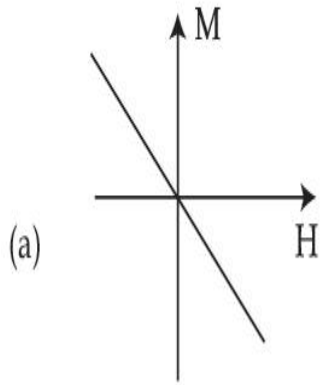86435171176. 3.53 s

Question Number : 10 Question Id : 86435121529 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Following plots show Magnetization (M) vs Magnetising field (H) and Magnetic susceptibility (χ) vs Temperature (T) graph :

(a)

(b)

(c)

(d)

Which of the following combination will be represented by a diamagnetic material ?

Options :

86435171177. (a), (c)

86435171178. (a), (d)
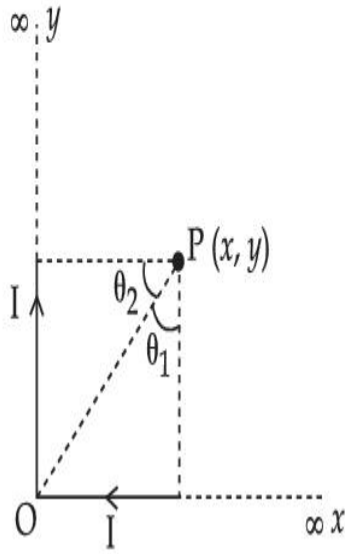
86435171179. (b), (c)

86435171180. (b), (d)

Question Number : 11 Question Id : 86435121530 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

There are two infinitely long straight current carrying conductors and they are held at right angles to each other so that their common ends meet at the origin as shown in the figure given below. The ratio of current in both conductors is 1 : 1. The magnetic field at point P is _____.

Options :

86435171181.
$$\frac{\mu_0 I}{4\pi xy}\left[\sqrt{x^2 + y^2} + (x + y)\right]$$

86435171182.
$$\frac{\mu_0 I\,xy}{4\pi}\left[\sqrt{x^2 + y^2} + (x + y)\right]$$

86435171183.
$$\frac{\mu_0 I\,xy}{4\pi}\left[\sqrt{x^2 + y^2} - (x + y)\right]$$

86435171184.
$$\frac{\mu_0 I}{4\pi xy}\left[\sqrt{x^2 + y^2} - (x + y)\right]$$

Question Number : 12 Question Id : 86435121531 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The ranges and heights for two projectiles projected with the same initial velocity at angles 42° and 48° with the horizontal are R_1, R_2 and H_1, H_2 respectively. Choose the correct option :

Options :

86435171185. $R_1 = R_2$ and $H_1 < H_2$

86435171186. $R_1 > R_2$ and $H_1 = H_2$

86435171187. $R_1 < R_2$ and $H_1 < H_2$

86435171188. $R_1 = R_2$ and $H_1 = H_2$

Question Number : 13 Question Id : 86435121532 Question Type : MCQ Option Shuffling : Yes
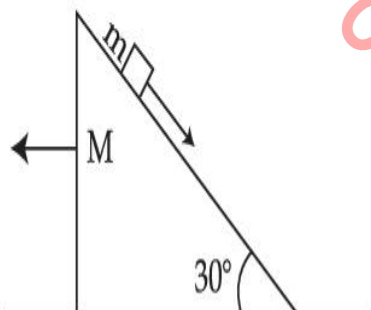
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A block of mass m slides on the wooden wedge, which in turn slides backward on the horizontal surface. The acceleration of the block with respect to the wedge is :

Given m = 8 kg, M = 16 kg

Assume all the surfaces shown in the figure to be frictionless.

Options :

86435171189. $\dfrac{4}{3} g$

86435171190.

$$\frac{2}{3} g$$

86435171191. $$\frac{3}{5} g$$

86435171192. $$\frac{6}{5} g$$

Question Number : 14 Question Id : 86435121533 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An object of mass 'm' is being moved with a constant velocity under the action of an applied force of 2N along a frictionless surface with following surface profile.

The correct applied force vs distance graph will be :

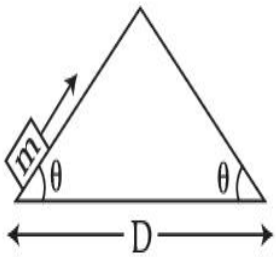**Options :**

86435171193.
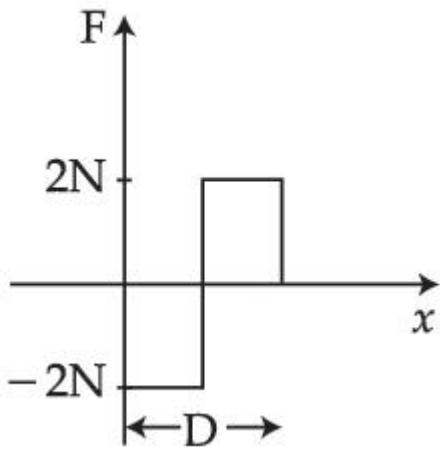
86435171194.
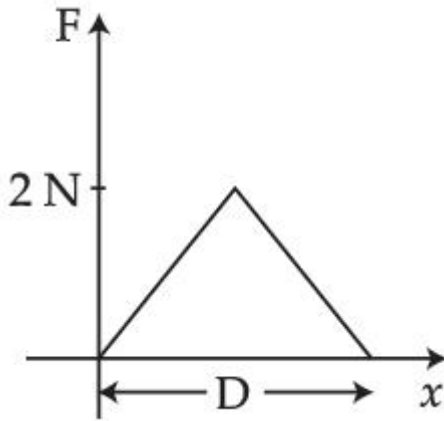
86435171195.
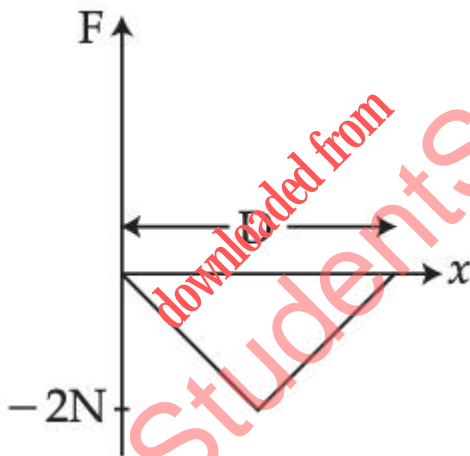
86435171196.

Question Number : 15 Question Id : 86435121534 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A body of mass 'm' dropped from a height 'h' reaches the ground with a speed of $0.8\sqrt{gh}$.

The value of workdone by the air-friction is :

Options :

86435171197. mgh

86435171198. $-0.68\ \text{mgh}$

86435171199. $0.64\ \text{mgh}$

86435171200. $1.64\ \text{mgh}$

Question Number : 16 Question Id : 86435121535 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

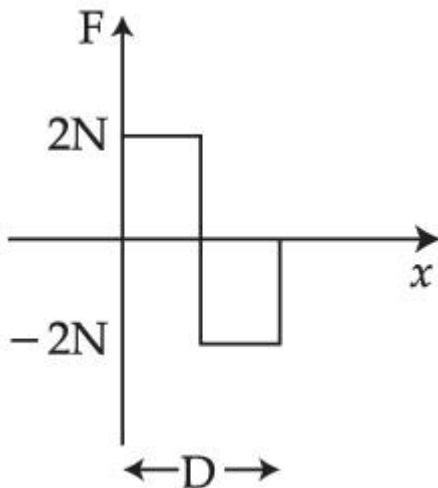**Correct Marks : 4 Wrong Marks : 1**

Four particles each of mass M, move along a circle of radius R under the action of their mutual gravitational attraction as shown in figure. The speed of each particle is :

Options :

86435171201. $\dfrac{1}{2}\sqrt{\dfrac{GM}{R}\left(2\sqrt{2}+1\right)}$

86435171202.

$$\frac{1}{2} \sqrt{\frac{GM}{R} (2\sqrt{2} - 1)}$$

86435171203.
$$\frac{1}{2} \sqrt{\frac{GM}{R (2\sqrt{2} + 1)}}$$

86435171204.
$$\sqrt{\frac{GM}{R}}$$

Question Number : 17 Question Id : 86435121536 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A mass of 5 kg is connected to a spring. The potential energy curve of the simple harmonic motion executed by the system is shown in the figure. A simple pendulum of length 4 m has the same period of oscillation as the spring system. What is the value of acceleration due to gravity on the planet where these experiments are performed ?

Options :

86435171205. 9.8 m/s^2

86435171206. 10 m/s^2
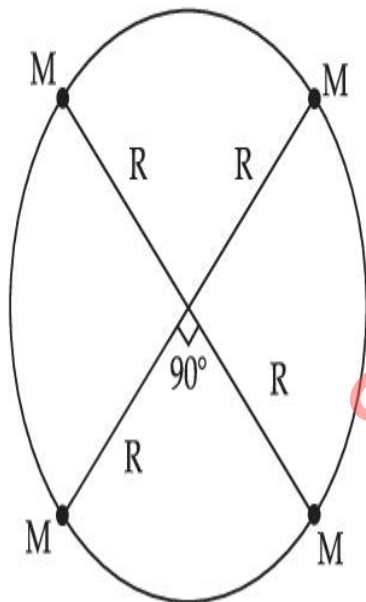
86435171207. 5 m/s^2

86435171208. 4 m/s^2

Question Number : 18 Question Id : 86435121537 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A capacitor is connected to a 20 V battery through a resistance of 10 Ω. It is found that the potential difference across the capacitor rises to 2 V in 1 μs. The capacitance of the capacitor is _____ μF.

Given $\ln\left(\dfrac{10}{9}\right) = 0.105$

Options :

86435171209. 1.85

86435171210. 0.95

86435171211. 9.52

86435171212. 0.105
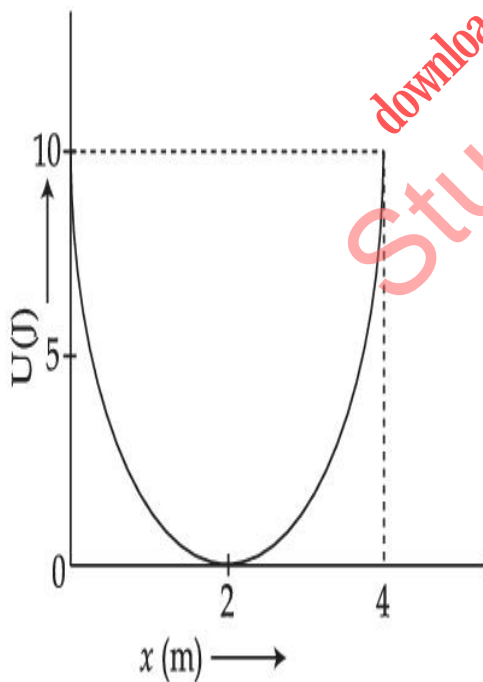
Question Number : 19 Question Id : 86435121538 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A student determined Young's Modulus of elasticity using the formula $Y = \dfrac{MgL^3}{4bd^3\delta}$. The value of g is taken to be 9.8 m/s², without any significant error, his observation are as following.

Physical Quantity	Least count of the Equipment used for measurement	Observed Value
Mass (M)	1 g	2 kg
Length of bar (L)	1 mm	1 m
Breadth of bar (b)	0.1 mm	4 cm
Thickness of bar (d)	0.01 mm	0.4 cm
Depression (δ)	0.01 mm	5 mm

Then the fractional error in the measurement of Y is :

Options :

86435171213. 0.0083

86435171214. 0.083

86435171215. 0.0155

86435171216. 0.155

Question Number : 20 Question Id : 86435121539 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two resistors $R_1 = (4 \pm 0.8)\ \Omega$ and $R_2 = (4 \pm 0.4)\ \Omega$ are connected in parallel. The equivalent resistance of their parallel combination will be :

Options :

86435171217. $(4 \pm 0.4)\ \Omega$

86435171218. $(2 \pm 0.3)\ \Omega$

86435171219. $(2 \pm 0.4)\ \Omega$

86435171220. $(4 \pm 0.3)\ \Omega$

Physics Section B

Section Id :	8643511005
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	8643511232
Question Shuffling Allowed :	Yes

Question Number : 21 Question Id : 86435121540 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The temperature of 3.00 mol of an ideal diatomic gas is increased by 40.0°C without changing the pressure of the gas. The molecules in the gas rotate but do not oscillate. If the ratio of change in internal energy of the gas to the amount of workdone by the gas is $\frac{x}{10}$. Then the value of x (round off to the nearest integer) is _____.

(Given R = 8.31 J mol^{-1} K^{-1})

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 22 Question Id : 86435121541 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A uniform heating wire of resistance 36 Ω is connected across a potential difference of 240 V. The wire is then cut into half and a potential difference of 240 V is applied across each half separately. The ratio of power dissipation in first case to the total power dissipation in the second case would be 1 : x, where x is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 23 Question Id : 86435121542 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The width of one of the two slits in a Young's double slit experiment is three times the other slit. If the amplitude of the light coming from a slit is proportional to the slit-width, the ratio of minimum to maximum intensity in the interference pattern is x : 4 where x is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 24 Question Id : 86435121543 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A carrier wave with amplitude of 250 V is amplitude modulated by a sinusoidal base band signal of amplitude 150 V. The ratio of minimum amplitude to maximum amplitude for the amplitude modulated wave is 50 : x, then value of x is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 25 Question Id : 86435121544 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Two satellites revolve around a planet in coplanar circular orbits in anticlockwise direction. Their period of revolutions are 1 hour and 8 hours respectively. The radius of the orbit of nearer satellite is 2×10^3 km. The angular speed of the farther satellite as observed from the nearer satellite at the instant when both the satellites are closest is $\frac{\pi}{x}$ rad h^{-1} where x is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 26 Question Id : 86435121545 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

When a body slides down from rest along a smooth inclined plane making an angle of 30° with the horizontal, it takes time T. When the same body slides down from the rest along a rough inclined plane making the same angle and through the same distance, it takes time αT, where α is a constant greater than 1. The co-efficient of friction between the body and the rough plane is $\frac{1}{\sqrt{x}} \left(\frac{\alpha^2 - 1}{\alpha^2} \right)$ where $x =$ _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 27 Question Id : 86435121546 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

An engine is attached to a wagon through a shock absorber of length 1.5 m. The system with a total mass of 40,000 kg is moving with a speed of 72 kmh^{-1} when the brakes are applied to bring it to rest. In the process of the system being brought to rest, the spring of the shock absorber gets compressed by 1.0 m. If 90% of energy of the wagon is lost due to friction, the spring constant is _____ ×10^5 N/m.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 28 Question Id : 86435121547 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The average translational kinetic energy of N$_2$ gas molecules at _____ °C becomes equal to the K.E. of an electron accelerated from rest through a potential difference of 0.1 volt. (Given k$_B$ = 1.38×10^{-23} J/K) (Fill the nearest integer).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 29 Question Id : 86435121548 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A steel rod with $y = 2.0 \times 10^{11} \, Nm^{-2}$ and $\alpha = 10^{-5} \, °C^{-1}$ of length 4 m and area of cross-section 10 cm^2 is heated from 0°C to 400°C without being allowed to extend. The tension produced in the rod is $x \times 10^5$ N where the value of x is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 30 Question Id : 86435121549 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A 2 kg steel rod of length 0.6 m is clamped on a table vertically at its lower end and is free to rotate in vertical plane. The upper end is pushed so that the rod falls under gravity. Ignoring the friction due to clamping at its lower end, the speed of the free end of rod when it passes through its lowest position is _____ ms^{-1}.
(Take g = 10 ms^{-2})

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Chemistry Section A

Section Id : 8643511006
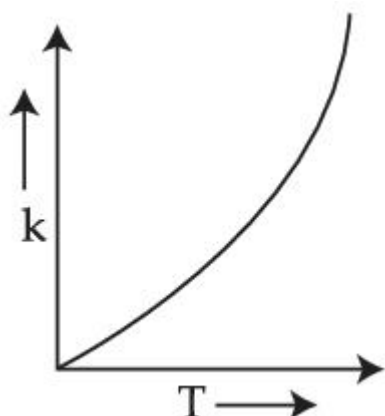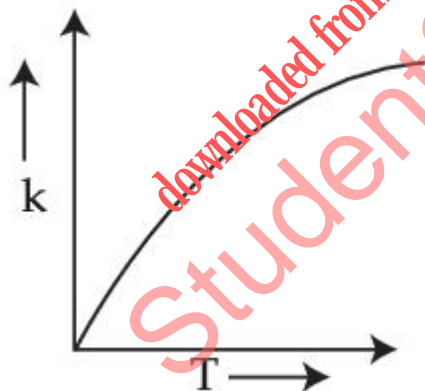
Section Number : 3

Section type : Online

Mandatory or Optional : Mandatory

Number of Questions : 20

Number of Questions to be attempted : 20

Section Marks : 80

Enable Mark as Answered Mark for Review and Clear Response : Yes

Sub-Section Number : 1

Sub-Section Id : 8643511233
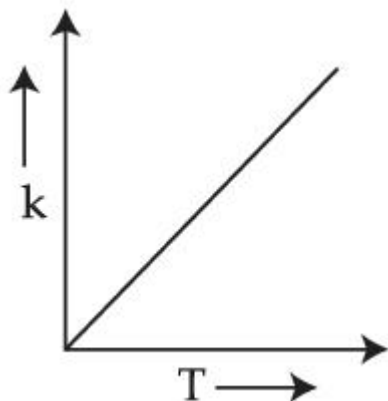
Question Shuffling Allowed : Yes

Question Number : 31 Question Id : 86435121550 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
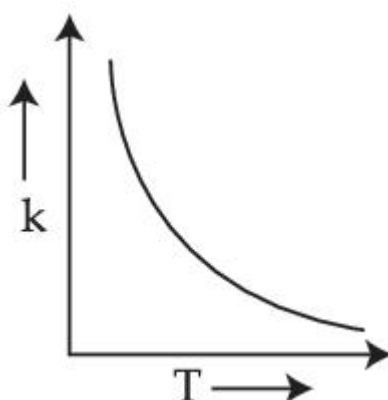
Correct Marks : 4 Wrong Marks : 1

Which one of the following given graphs represents the variation of rate constant (k) with temperature (T) for an endothermic reaction ?

Options :

86435171231.

86435171232.

86435171233.

86435171234.

Question Number : 32 Question Id : 86435121551 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II.

	List - I (Colloid Preparation Method)		List - II (Chemical Reaction)
(a)	Hydrolysis	(i)	$2AuCl_3 + 3HCHO + 3H_2O \rightarrow$ $2Au(sol) + 3HCOOH + 6HCl$
(b)	Reduction	(ii)	$As_2O_3 + 3H_2S \rightarrow As_2S_3(sol) + 3H_2O$
(c)	Oxidation	(iii)	$SO_2 + 2H_2S \rightarrow 3S(sol) + 2H_2O$
(d)	Double Decomposition	(iv)	$FeCl_3 + 3H_2O \rightarrow Fe(OH)_3(sol) + 3HCl$

Choose the **most appropriate** answer from the options given below :

Options :

86435171235. (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

86435171236. (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

86435171237. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

86435171238. (a)-(iv), (b)-(i), (c)-(iii), (d)-(ii)

Question Number : 33 Question Id : 86435121552 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Identify the element for which electronic configuration in +3 oxidation state is $[Ar]3d^5$:

Options :

86435171239. Mn

86435171240. Fe

86435171241. Ru

86435171242. Co

Question Number : 34 Question Id : 86435121553 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Calamine and Malachite, respectively, are the ores of :

Options :

86435171243. Copper and Iron

86435171244. Zinc and Copper

86435171245. Aluminium and Zinc

86435171246. Nickel and Aluminium

Question Number : 35 Question Id : 86435121554 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Hydrogen peroxide reacts with iodine in basic medium to give :

Options :

86435171247. IO_3^-

86435171248. I^-

86435171249. IO^-

86435171250. IO_4^-

Question Number : 36 Question Id : 86435121555 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Number of paramagnetic oxides among the following given oxides is _____.

Li_2O, CaO, Na_2O_2, KO_2, MgO and K_2O

Options :

86435171251. 3

86435171252. 2

86435171253. 1

86435171254. 0

Question Number : 37 Question Id : 86435121556 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The oxide **without** nitrogen-nitrogen bond is :

Options :

86435171255. N_2O

86435171256. N_2O_3

86435171257. N_2O_4

86435171258. N_2O_5

Question Number : 38 Question Id : 86435121557 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In the given chemical reaction, colors of the Fe^{2+} and Fe^{3+} ions, are respectively :

$$5Fe^{2+} + MnO_4^- + 8H^+ \rightarrow Mn^{2+} + 4H_2O + 5Fe^{3+}$$

Options :

86435171259. Yellow, Orange

86435171260. Green, Yellow

86435171261. Green, Orange

86435171262. Yellow, Green
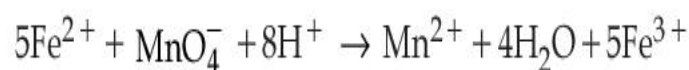
Question Number : 39 Question Id : 86435121558 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The Crystal Field Stabilization Energy (CFSE) and magnetic moment (spin-only) of an octahedral aqua complex of a metal ion (M^{Z+}) are $-0.8 \, \Delta_0$ and 3.87 BM, respectively. Identify (M^{Z+}) :

Options :

86435171263. Co^{2+}

86435171264. V^{3+}

86435171265. Mn^{4+}

86435171266. Cr^{3+}

Question Number : 40 Question Id : 86435121559 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Water sample is called cleanest on the basis of which one of the BOD values given below :

Options :

86435171267. 3 ppm

86435171268. 11 ppm

86435171269. 15 ppm

86435171270. 21 ppm

Question Number : 41 Question Id : 86435121560 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Experimentally reducing a functional group **cannot** be done by which one of the following reagents ?

Options :

86435171271. $Pd\text{-}C/H_2$

86435171272. $Pt\text{-}C/H_2$

86435171273. Zn/H_2O

86435171274. Na/H_2

Question Number : 42 Question Id : 86435121561 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The stereoisomers that are formed by electrophilic addition of bromine to *trans*-but-2-ene is/are :

Options :

86435171275. 2 identical mesomers

86435171276. 2 enantiomers

86435171277. 1 racemic and 2 enantiomers

86435171278. 2 enantiomers and 2 mesomers

Question Number : 43 Question Id : 86435121562 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which one of the following compounds is aromatic in nature ?

Options :

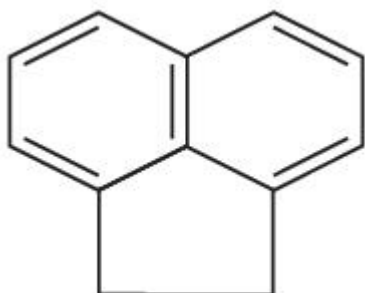86435171279.

86435171280.

86435171281.

86435171282.
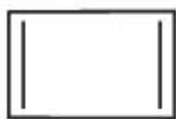
Question Number : 44 Question Id : 86435121563 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In the following sequence of reactions,

$$C_3H_6 \xrightarrow{H^+/H_2O} A \xrightarrow[\text{dil KOH}]{KIO} B + C$$

The compounds **B** and **C** respectively are :

Options :

86435171283. CH₃I, HCOOK

86435171284. CHI₃, CH₃COOK

86435171285. CI₃COOK, CH₃I
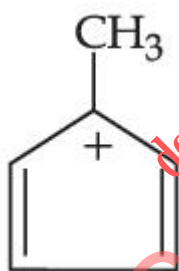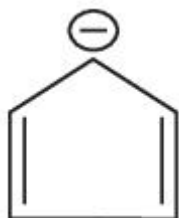
86435171286. CI₃COOK, HCOOH
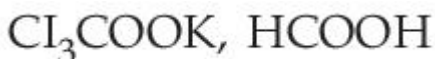
Question Number : 45 Question Id : 86435121564 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In the following sequence of reactions a compound **A**, (molecular formula $C_6H_{12}O_2$) with a straight chain structure gives a C_4 carboxylic acid. **A** is :

$$A \xrightarrow[\text{H}_3\text{O}^+]{\text{LiAlH}_4} B \xrightarrow{\text{Oxidation}} C_4\text{ - carboxylic acid}$$

Options :

86435171287.
$$CH_3 - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_2 - O - CH = CH_2$$

86435171288.
$$CH_3 - CH_2 - CH_2 - O - CH = CH - CH_2 - OH$$

86435171289.
$$CH_3 - CH_2 - CH_2 - COO - CH_2 - CH_3$$

86435171290.
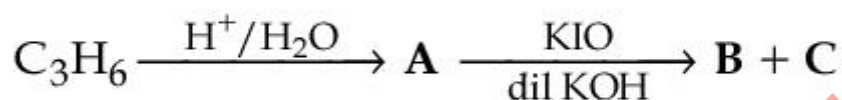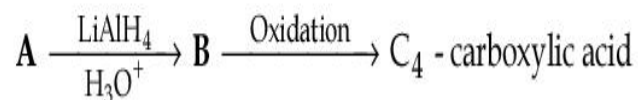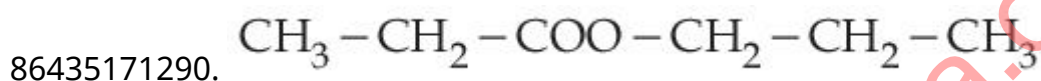$$CH_3 - CH_2 - COO - CH_2 - CH_2 - CH_3$$

Question Number : 46 Question Id : 86435121565 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are **two** statements :

Statement I : The nucleophilic addition of sodium hydrogen sulphite to an aldehyde or a ketone involves proton transfer to form a stable ion.

Statement II : The nucleophilic addition of hydrogen cyanide to an aldehyde or a ketone yields amine as final product.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

Options :

86435171291. Both **Statement I** and **Statement II** are true.

86435171292. Both **Statement I** and **Statement II** are false.

86435171293. **Statement I** is true but **Statement II** is false.

86435171294. **Statement I** is false but **Statement II** is true.

Question Number : 47 Question Id : 86435121566 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Identify A in the following reaction.
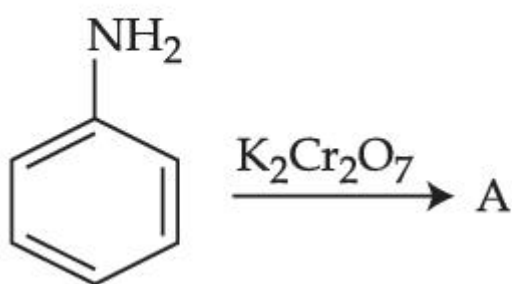
Options :
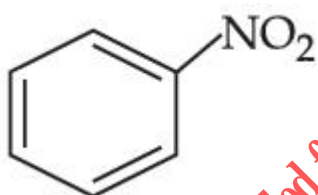
86435171295.
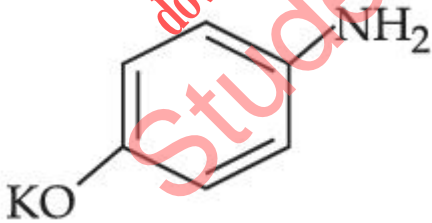
86435171296.
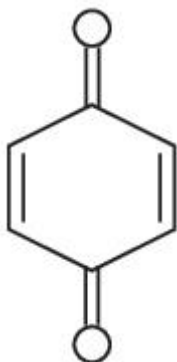
86435171297.
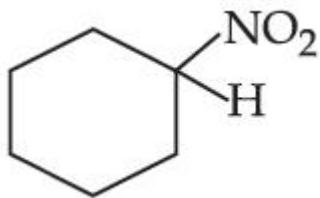
86435171298.

Question Number : 48 Question Id : 86435121567 Question Type : MCQ Option Shuffling : Yes

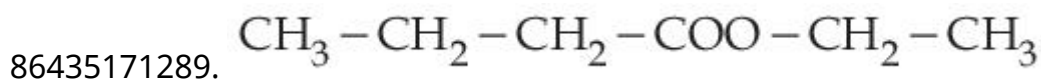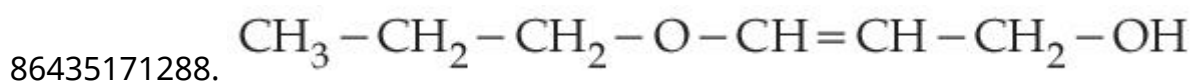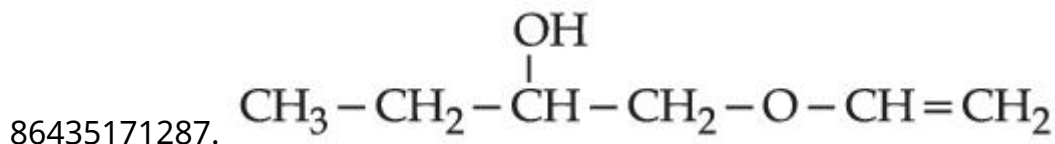**Is Question Mandatory : No**

Correct Marks : 4 Wrong Marks : 1

Which one of the following gives the most stable Diazonium salt ?

Options :

86435171299.

86435171300.

$CH_3 - CH_2 - CH_2 - NH_2$
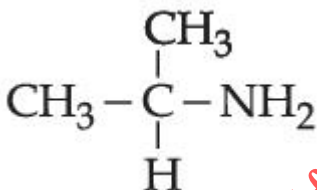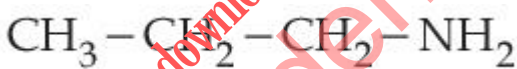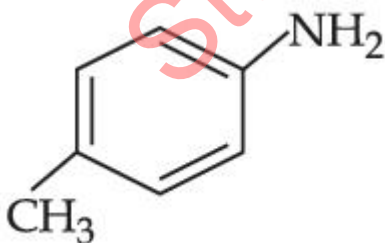
86435171301.

86435171302.

Question Number : 49 Question Id : 86435121568 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Monomer units of Dacron polymer are :

Options :

86435171303. glycerol and phthalic acid

86435171304. ethylene glycol and phthalic acid

86435171305. ethylene glycol and terephthalic acid

86435171306. glycerol and terephthalic acid

Question Number : 50 Question Id : 86435121569 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

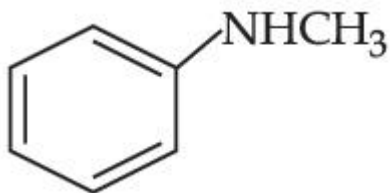The potassium ferrocyanide solution gives a Prussian blue colour, when added to :

Options :

86435171307. $FeCl_2$

86435171308. $FeCl_3$

86435171309. $CoCl_3$

86435171310. $CoCl_2$

Chemistry Section B

Section Id : 8643511007

Section Number : 4

Section type : Online

Mandatory or Optional : Mandatory

Number of Questions : 10

Number of Questions to be attempted : 5

Section Marks : 20

Enable Mark as Answered Mark for Review and Clear Response : Yes

Sub-Section Number : 1

Sub-Section Id : 8643511234

Question Shuffling Allowed : Yes

Question Number : 51 Question Id : 86435121570 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The number of atoms in 8 g of sodium is $x \times 10^{23}$. The value of x is _____.
(Nearest integer)

[Given : $N_A = 6.02 \times 10^{23}$ mol^{-1}

Atomic mass of Na = 23.0 u]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 52 Question Id : 86435121571 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

An empty LPG cylinder weighs 14.8 kg. When full, it weighs 29.0 kg and shows a pressure of 3.47 atm. In the course of use at ambient temperature, the mass of the cylinder is reduced to 23.0 kg. The final pressure inside the cylinder is _____ atm. (Nearest integer) (Assume LPG to be an ideal gas)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 53 Question Id : 86435121572 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A 50 watt bulb emits monochromatic red light of wavelength of 795 nm. The number of photons emitted per second by the bulb is $x \times 10^{20}$. The value of x is _____. (Nearest integer)

[Given : $h = 6.63 \times 10^{-34}$ Js and $c = 3.0 \times 10^{8}$ ms^{-1}]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 54 Question Id : 86435121573 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The spin-only magnetic moment value of B_2^+ species is _____ $\times 10^{-2}$ BM. (Nearest integer)

[Given : $\sqrt{3} = 1.73$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 55 Question Id : 86435121574 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

For the reaction $2NO_2(g) \rightleftharpoons N_2O_4(g)$, when $\Delta S = -176.0$ J K^{-1} and $\Delta H = -57.8$ kJ mol^{-1}, the magnitude of ΔG at 298 K for the reaction is _____ kJ mol^{-1}. (Nearest integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 56 Question Id : 86435121575 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If 80 g of copper sulphate $CuSO_4 \cdot 5H_2O$ is dissolved in deionised water to make 5 L of solution. The concentration of the copper sulphate solution is $x \times 10^{-3}$ mol L^{-1}. The value of x is _____.

[Atomic masses Cu : 63.54 u, S : 32 u, O : 16 u, H : 1 u]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 57 Question Id : 86435121576 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The molar solubility of $Zn(OH)_2$ in 0.1 M NaOH solution is $x \times 10^{-18}$ M. The value of x is
_____. (Nearest integer)

(Given : The solubility product of $Zn(OH)_2$ is 2×10^{-20})

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 58 Question Id : 86435121577 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the conductivity of mercury at 0°C is 1.07×10^6 S m^{-1} and the resistance of a cell containing
mercury is 0.243 Ω, then the cell constant of the cell is $x \times 10^4$ m^{-1}. The value of x is
_____. (Nearest integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 59 Question Id : 86435121578 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The sum of oxidation states of two silver ions in $[Ag(NH_3)_2]$ $[Ag(CN)_2]$ complex is

_____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 60 Question Id : 86435121579 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A peptide synthesized by the reaction of one molecule each of Glycine, Leucine, Aspartic acid and Histidine will have _____ peptide linkages.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Mathematics Section A

Section Id :	8643511008
Section Number :	5
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	8643511235
Question Shuffling Allowed :	Yes

Question Number : 61 Question Id : 86435121580 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The range of the function

$$f(x) = \log_{\sqrt{5}}\left(3 + \cos\left(\frac{3\pi}{4} + x\right) + \cos\left(\frac{\pi}{4} + x\right) + \cos\left(\frac{\pi}{4} - x\right) - \cos\left(\frac{3\pi}{4} - x\right)\right) \text{ is :}$$

Options :

86435171321. $(0, \sqrt{5})$

86435171322. $\left[\frac{1}{\sqrt{5}}, \sqrt{5}\right]$

86435171323. $[0, 2]$

86435171324. $[-2, 2]$

Question Number : 62 Question Id : 86435121581 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The number of pairs (a, b) of real numbers, such that whenever α is a root of the equation $x^2 + ax + b = 0$, $\alpha^2 - 2$ is also a root of this equation, is :

Options :

86435171325. 2

86435171326. 4

86435171327. 6

86435171328. 8

Question Number : 63 Question Id : 86435121582 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Consider the system of linear equations

$$-x + y + 2z = 0$$
$$3x - ay + 5z = 1$$
$$2x - 2y - az = 7$$

Let S_1 be the set of all $a \in \mathbf{R}$ for which the system is inconsistent and S_2 be the set of all $a \in \mathbf{R}$ for which the system has infinitely many solutions. If $n(S_1)$ and $n(S_2)$ denote the number of elements in S_1 and S_2 respectively, then

Options :

86435171329. $n(S_1) = 1, \; n(S_2) = 0$

86435171330. $n(S_1) = 0, \; n(S_2) = 2$

86435171331. $n(S_1) = 2,\ n(S_2) = 2$

86435171332. $n(S_1) = 2,\ n(S_2) = 0$

Question Number : 64 Question Id : 86435121583 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $J_{n,m} = \int_0^{1/2} \frac{x^n}{x^m - 1}\, dx$, $\forall\ n > m$ and $n,\ m \in N$. Consider a matrix $A = [a_{ij}]_{3\times 3}$ where

$$a_{ij} = \begin{cases} J_{6+i,\,3} - J_{i+3,\,3}, & i \le j \\ 0, & i > j \end{cases}$$

. Then $|\mathrm{adj}\ A^{-1}|$ is :

Options :

86435171333. $(105)^2 \times 2^{38}$

86435171334. $(105)^2 \times 2^{3?}$

86435171335. $(15)^2 \times 2^{34}$

86435171336. $(15)^2 \times 2^{42}$

Question Number : 65 Question Id : 86435121584 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let P_1, P_2 ..., P_{15} be 15 points on a circle. The number of distinct triangles formed by points P_i, P_j, P_k such that $i + j + k \neq 15$, is :

Options :

86435171337. 12

86435171338. 443

86435171339. 455

86435171340. 419

Question Number : 66 Question Id : 86435121585 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $S_n = 1 \cdot (n-1) + 2 \cdot (n-2) + 3 \cdot (n-3) + ... + (n-1) \cdot 1$, $n \geq 4$.

The sum $\sum_{n=4}^{\infty} \left(\dfrac{2S_n}{n!} - \dfrac{1}{(n-2)!} \right)$ is equal to :

Options :

86435171341. $\dfrac{e}{3}$

86435171342. $\dfrac{e}{6}$

86435171343. $\dfrac{e-1}{3}$

86435171344.

$$\frac{e-2}{6}$$

Question Number : 67 Question Id : 86435121586 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The function $f(x) = x^3 - 6x^2 + ax + b$ is such that $f(2) = f(4) = 0$. Consider two statements.

(S1) there exists $x_1, x_2 \in (2, 4)$, $x_1 < x_2$, such that $f'(x_1) = -1$ and $f'(x_2) = 0$.

(S2) there exists $x_3, x_4 \in (2, 4)$, $x_3 < x_4$, such that f is decreasing in $(2, x_4)$, increasing in $(x_4, 4)$ and $2f'(x_3) = \sqrt{3} f(x_4)$.

Then

Options :

86435171345. (S1) is true and (S2) is false

86435171346. (S1) is false and (S2) is true

86435171347. both (S1) and (S2) are false

86435171348. both (S1) and (S2) are true

Question Number : 68 Question Id : 86435121587 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $f : \mathbf{R} \to \mathbf{R}$ be a continuous function. Then $\displaystyle\lim_{x \to \pi/4} \dfrac{\dfrac{\pi}{4}\displaystyle\int_{2}^{\sec^2 x} f(x)\,dx}{x^2 - \dfrac{\pi^2}{16}}$ is equal to :

Options :

86435171349. $f(2)$

86435171350. $2f(2)$

86435171351. $4f(2)$

86435171352. $2f(\sqrt{2})$

Question Number : 69 Question Id : 86435121588 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The function $f(x)$, that satisfies the condition $f(x) = x + \displaystyle\int_{0}^{\pi/2} \sin x \cdot \cos y\, f(y)\; dy$, is :

Options :

86435171353. $x + \dfrac{\pi}{2}\sin x$

86435171354. $x + (\pi + 2)\sin x$

86435171355. $x + (\pi - 2)\sin x$

86435171356. $x + \frac{2}{3}(\pi - 2)\sin x$

Question Number : 70 Question Id : 86435121589 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The area, enclosed by the curves $y = \sin x + \cos x$ and $y = |\cos x - \sin x|$ and the lines $x = 0$, $x = \frac{\pi}{2}$,

is :

Options :

86435171357. $4(\sqrt{2} - 1)$

86435171358. $2\sqrt{2}(\sqrt{2} - 1)$

86435171359. $2(\sqrt{2} + 1)$

86435171360. $2\sqrt{2}(\sqrt{2} + 1)$

Question Number : 71 Question Id : 86435121590 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If $y = y(x)$ is the solution curve of the differential equation

$x^2 dy + \left(y - \frac{1}{x}\right)dx = 0$; $x > 0$, and $y(1) = 1$, then $y\left(\frac{1}{2}\right)$ is equal to :

Options :

86435171361. $3 + e$

86435171362. $3 - e$

86435171363. $\dfrac{3}{2} - \dfrac{1}{\sqrt{e}}$

86435171364. $3 + \dfrac{1}{\sqrt{e}}$

Question Number : 72 Question Id : 86435121591 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Consider the parabola with vertex $\left(\dfrac{1}{2}, \dfrac{3}{4}\right)$ and the directrix $y = \dfrac{1}{2}$. Let P be the point

where the parabola meets the line $x = -\dfrac{1}{2}$. If the normal to the parabola at P intersects the

parabola again at the point Q, then $(PQ)^2$ is equal to :

Options :

86435171365. $\dfrac{125}{16}$

86435171366. $\dfrac{25}{2}$

86435171367. $\dfrac{75}{8}$

86435171368. $\dfrac{15}{2}$

Question Number : 73 Question Id : 86435121592 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following is equivalent to the Boolean expression $p \wedge \sim q$?

Options :

86435171369. $\sim p \rightarrow \sim q$

86435171370. $\sim(p \rightarrow \sim q)$

86435171371. $\sim(q \rightarrow p)$

86435171372. $\sim(p \rightarrow q)$

Question Number : 74 Question Id : 86435121593 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let the acute angle bisector of the two planes $x - 2y - 2z + 1 = 0$ and $2x - 3y - 6z + 1 = 0$ be the plane P. Then which of the following points lies on P ?

Options :

86435171373. $(4, 0, -2)$

86435171374. $(0, 2, -4)$

86435171375. $(3, 1, -\frac{1}{2})$

86435171376. $\left(-2,\ 0,\ -\dfrac{1}{2}\right)$

Question Number : 75 Question Id : 86435121594 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The distance of line $3y - 2z - 1 = 0 = 3x - z + 4$ from the point $(2,\ -1,\ 6)$ is :

Options :

86435171377. $4\sqrt{2}$

86435171378. $2\sqrt{6}$

86435171379. $\sqrt{26}$

86435171380. $2\sqrt{5}$

Question Number : 76 Question Id : 86435121595 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $a_1, a_2, ..., a_{21}$ be an AP such that $\displaystyle\sum_{n=1}^{20} \dfrac{1}{a_n\, a_{n+1}} = \dfrac{4}{9}$. If the sum of this AP is 189, then

$a_6\, a_{16}$ is equal to :

Options :

86435171381. 57

86435171382. 72

86435171383. 48

86435171384. 36

Question Number : 77 Question Id : 86435121596 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two squares are chosen at random on a chessboard (see figure). The probability that they have a side in common is :

→ 64 squares

Options :

86435171385. $\dfrac{1}{18}$

86435171386. $\dfrac{2}{7}$

86435171387. $\dfrac{1}{7}$

86435171388.

$$\frac{1}{9}$$

Question Number : 78 Question Id : 86435121597 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let θ be the acute angle between the tangents to the ellipse $\frac{x^2}{9} + \frac{y^2}{1} = 1$ and the circle $x^2 + y^2 = 3$ at their point of intersection in the first quadrant. Then $\tan\theta$ is equal to :

Options :

86435171389. 2

86435171390. $\dfrac{5}{2\sqrt{3}}$

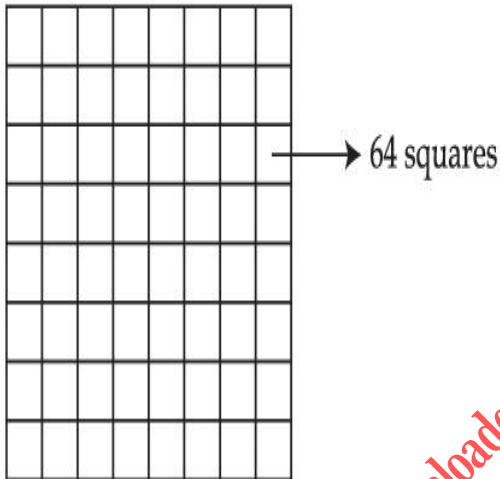86435171391. $\dfrac{2}{\sqrt{3}}$

86435171392. $\dfrac{4}{\sqrt{3}}$

Question Number : 79 Question Id : 86435121598 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If n is the number of solutions of the equation $2\cos x \left(4 \sin\left(\frac{\pi}{4}+x\right) \sin\left(\frac{\pi}{4}-x\right) - 1 \right) = 1$,

$x \in [0, \pi]$ and S is the sum of all these solutions, then the ordered pair (n, S) is :

Options :

86435171393. $(2, 2\pi/3)$

86435171394. $(3, 13\pi/9)$

86435171395. $(3, 5\pi/3)$

86435171396. $(2, 8\pi/9)$

Question Number : 80 Question Id : 86435121599 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\cos^{-1}(\cos(-5)) + \sin^{-1}(\sin(6)) - \tan^{-1}(\tan(12))$ is equal to :
(The inverse trigonometric functions take the principal values)

Options :

86435171397. $4\pi - 9$

86435171398. $3\pi + 1$

86435171399. $3\pi - 11$

86435171400. $4\pi - 11$

Mathematics Section B

Section Id : 8643511009

Section Number : 6

Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	8643511236
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 86435121600 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If for the complex numbers z satisfying $|z - 2 - 2i| \leq 1$, the maximum value of $|3iz + 6|$ is attained at $a + ib$, then $a + b$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 82 Question Id : 86435121601 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $f(x) = x^6 + 2x^4 + x^3 + 2x + 3$, $x \in \mathbf{R}$. Then the natural number n for which

$$\lim_{x \to 1} \frac{x^n f(1) - f(x)}{x - 1} = 44 \text{ is } \underline{\hspace{1cm}}.$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 83 Question Id : 86435121602 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let the points of intersections of the lines $x - y + 1 = 0$, $x - 2y + 3 = 0$ and $2x - 5y + 11 = 0$ are the mid points of the sides of a triangle ABC. Then the area of the triangle ABC is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 84 Question Id : 86435121603 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $f(x)$ be a polynomial of degree 3 such that $f(k) = -\dfrac{2}{k}$ for $k = 2, 3, 4, 5$. Then the value of

$52 - 10\, f(10)$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 85 Question Id : 86435121604 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A man starts walking from the point P(-3, 4), touches the x-axis at R, and then turns to reach at the point Q(0, 2). The man is walking at a constant speed. If the man reaches the point Q in the minimum time, then $50((PR)^2 + (RQ)^2)$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 86 Question Id : 86435121605 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the sum of the coefficients in the expansion of $(x + y)^n$ is 4096, then the greatest coefficient in the expansion is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 87 Question Id : 86435121606 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $[t]$ denote the greatest integer $\leq t$. The number of points where the function

$$f(x) = [x]\left|x^2 - 1\right| + \sin\left(\frac{\pi}{[x] + 3}\right) - [x + 1], \; x \in (-2, 2) \text{ is not continuous is } \underline{\qquad}.$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 88 Question Id : 86435121607 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let X be a random variable with distribution.

x	-2	-1	3	4	6
$P(X = x)$	$\dfrac{1}{5}$	a	$\dfrac{1}{3}$	$\dfrac{1}{5}$	b

If the mean of X is 2.3 and variance of X is σ^2, then $100\,\sigma^2$ is equal to :

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 89 Question Id : 86435121608 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $\vec{a} = 2\hat{i} - \hat{j} + 2\hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} - \hat{k}$. Let a vector $\vec{v}$ be in the plane containing $\vec{a}$ and $\vec{b}$. If $\vec{v}$ is perpendicular to the vector $3\hat{i} + 2\hat{j} - \hat{k}$ and its projection on $\vec{a}$ is 19 units, then $\left|2\vec{v}\right|^2$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 90 Question Id : 86435121609 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

All the arrangements, with or without meaning, of the word FARMER are written excluding any word that has two R appearing together. The arrangements are listed serially in the alphabetic order as in the English dictionary. Then the serial number of the word FARMER in this list is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1