

National Testing Agency

Question Paper Name :	B Tech 30 Jun 2022 Shift 1
Subject Name :	B. Tech
Duration :	180
Total Marks :	300
Display Marks:	Yes

B. Tech

Group Number :	1
Group Maximum Duration :	0
Group Minimum Duration :	180
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	300

Mathematics Section A

Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 1 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Let

$$S_1 = \left\{ x \in \mathbb{R} - \{1, 2\} : \frac{(x+2)(x^2+3x+5)}{-2+3x-x^2} \geq 0 \right\}$$

and

$$S_2 = \left\{ x \in \mathbb{R} : 3^{2x} - 3^{x+1} - 3^{x+2} + 27 \leq 0 \right\}$$

. Then, $S_1 \cup S_2$ is equal to :

Options :

- A. $(-\infty, -2] \cup (1, 2)$
- B. $(-\infty, -2] \cup [1, 2]$
- C. $(-2, 1] \cup [2, \infty)$
- D. $(-\infty, 2]$

Question Number : 2 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

The real part of the complex number

$$\frac{(1 + 2i)^8 \cdot (1 - 2i)^2}{(3 + 2i) \cdot (4 - 6i)}$$

is equal to :

Options :

- A. $\frac{500}{13}$
- B. $\frac{110}{13}$
- C. $\frac{55}{6}$
- D. $\frac{550}{13}$

Question Number : 3 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Let S be the set of all integral values of α for which the sum of squares of two real roots of the quadratic equation

$$3x^2 + (\alpha - 6)x + (\alpha + 3) = 0$$

is minimum. Then S :

Options :

- A. is an empty set
- B. is a singleton
- C. contains exactly two elements
- D. contains more than two elements

Question Number : 4 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Let

$$A = \begin{bmatrix} 1 & -2 & \alpha \\ \alpha & 2 & -1 \end{bmatrix}$$

and

$$B = \begin{bmatrix} 2 & \alpha \\ -1 & 2 \\ 4 & -5 \end{bmatrix}, \alpha \in C$$

. Then the absolute value of the sum of all values of α for which $\det(AB) = 0$ is :

Options :

A. 3

B. 4

C. 2

D. 5

Question Number : 5 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

For two positive real numbers a and b such that

$$\frac{1}{a^2} + \frac{1}{b^3} = 4$$

, then minimum value of the constant term in the expansion of

$$\left(ax^{\frac{1}{8}} + bx^{-\frac{1}{12}} \right)^{10}$$

is :

Options :

A. $\frac{105}{2}$

B. $\frac{105}{4}$

C. $\frac{105}{8}$

D. $\frac{105}{16}$

Question Number : 6 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

If xy^4 attains maximum value at the point (x, y) on the line passing through the points $(50 + \alpha, 0)$ and $(0, 50 + \alpha)$, $\alpha > 0$, then (x, y) also lies on the line :

Options :

- A. $y = 4x$
- B. $x = 4y$
- C. $y = 4x + \alpha$
- D. $x = 4y - \alpha$

Question Number : 7 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Let

$$f(x) = 4x^3 - 11x^2 + 8x - 5, x \in R$$

. Then f :

Options :

- has a local minima at
 - A. $x = \frac{1}{2}$
- has a local minima at
 - B. $x = \frac{3}{4}$
- is increasing in
 - C. $\left(\frac{1}{2}, \frac{3}{4}\right)$
- is decreasing in
 - D. $\left(\frac{1}{2}, \frac{4}{3}\right)$

Question Number : 8 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Let m and M respectively be the minimum and the maximum values of

$$f(x) = \sin^{-1}2x + \sin 2x + \cos^{-1}2x + \cos 2x, x \in \left[0, \frac{\pi}{8}\right]$$

. Then m + M is equal to :

Options :

- A. $1 + \sqrt{2} + \pi$

B.

$$(1 + \sqrt{2})\pi$$

C.

$$\pi + \sqrt{2}$$

D.

$$1 + \pi$$

Question Number : 9 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Let α_1, α_2 ($\alpha_1 < \alpha_2$) be the values of α for the points $(\alpha, -3)$, $(2, 0)$ and $(1, \alpha)$ to be collinear. Then the equation of the line, passing through (α_1, α_2) and making an angle of $\frac{\pi}{3}$ with the positive direction of the x-axis, is :

Options :

A.

$$x - \sqrt{3}y - 3\sqrt{3} + 1 = 0$$

B.

$$\sqrt{3}x - y + \sqrt{3} + 3 = 0$$

C.

$$x - \sqrt{3}y + 3\sqrt{3} + 1 = 0$$

D.

$$\sqrt{3}x - y + \sqrt{3} - 3 = 0$$

Question Number : 10 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Let the eccentricity of the ellipse $x^2 + a^2y^2 = 25a^2$ be b times the eccentricity of the hyperbola $x^2 - a^2y^2 = 5$, where a is the minimum distance between the curves $y = e^x$ and $y = \log_e x$. Then

$$a^2 + \frac{1}{b^2}$$

is equal to :

Options :

A.

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

B.

$$\frac{5}{2}$$

C.

$$3$$

D.

$$5$$

Question Number : 11 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Let

$$\alpha = \tan\left(\frac{5\pi}{16} \sin\left(2\cos^{-1}\left(\frac{1}{\sqrt{5}}\right)\right)\right)$$

and

$$\beta = \cos\left(\sin^{-1}\left(\frac{4}{5}\right) + \sec^{-1}\left(\frac{5}{3}\right)\right)$$

where the inverse trigonometric functions take principal values. Then, the equation whose roots are α and β is :

Options :

- A. $15x^2 - 8x - 7 = 0$
- B. $5x^2 - 12x + 7 = 0$
- C. $25x^2 - 18x - 7 = 0$
- D. $25x^2 - 32x + 7 = 0$

Question Number : 12 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Let A and B be two square matrices of order 2. If

$$\det(A) = 2$$

,

$$\det(B) = 3$$

and

$$\det\left((\det 5(\det A)B)A^2\right) = 2^a 3^b 5^c$$

for some $a, b, c, \in \mathbb{N}$, then $a + b + c$ is equal to :

Options :

- A. 10
- B. 12
- C. 13
- D. 14

Question Number : 13 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

The value of

$$1 + \frac{1}{1+2} + \frac{1}{1+2+3} + \dots + \frac{1}{1+2+3+\dots+11}$$

is equal to:

Options :

A. $\frac{20}{11}$

B. $\frac{11}{6}$

C. $\frac{241}{132}$

D. $\frac{21}{11}$

Question Number : 14 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

$$\lim_{n \rightarrow \infty} \sum_{r=1}^n \frac{r}{2r^2 - 7rn + 6n^2}$$

is equal to :

Options :

A. $\log_e \left(\frac{\sqrt{3}}{2} \right)$

B. $\log_e \left(\frac{3\sqrt{3}}{4} \right)$

C. $\log_e \left(\frac{27}{4} \right)$

D. $\log_e \left(\frac{4}{3} \right)$

Question Number : 15 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Let

$$\frac{dy}{dx} = \frac{ax - by + a}{bx + cy + a}, a, b, c \in R$$

, represents a circle with center (α, β) . Then, $\alpha + 2\beta$ is equal to :

Options :

- A. -1
- B. 0
- C. 1
- D. 2

Question Number : 16 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Consider three circles:

$$C_1 : x^2 + y^2 = r^2$$

$$C_2 : (x - 1)^2 + (y - 1)^2 = r^2$$

$$C_3 : (x - 2)^2 + (y - 1)^2 = r^2$$

If a line $L : y = mx + c$ be a common tangent to C_1, C_2 and C_3 such that C_1 and C_3 lie on one side of line L while C_2 lies on other side, then the value of $20(r^2 + c)$ is equal to :

Options :

- A. 23
- B. 15
- C. 12
- D. 6

Question Number : 17 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

The distance of the point $(3, 2, -1)$ from the plane $3x - y + 4z + 1 = 0$ along the line

$$\frac{2-x}{2} = \frac{y-3}{2} = \frac{z+1}{1}$$

is equal to :

Options :

- A. 9
- B. 6

C. 3

D. 2

Question Number : 18 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Let a vector $\vec{c}$ be coplanar with the vectors

$$\vec{a} = -\hat{i} + \hat{j} + \hat{k}$$

and

$$\vec{b} = 2\hat{i} + \hat{j} - \hat{k}$$

. If the vector $\vec{c}$ also satisfies the conditions

$$\vec{c} \cdot \left[\left(\vec{a} + \vec{b} \right) \times \left(\vec{a} \times \vec{b} \right) \right] = -42$$

and

$$\left(\vec{c} \times \left(\vec{a} - \vec{b} \right) \right) \cdot \hat{k} = 3$$

, then the value of $|\vec{c}|^2$ is equal to :

Options :

A. 24

B. 29

C. 35

D. 42

Question Number : 19 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

If a random variable X follows the Binomial distribution B(5, p) such that $P(X = 0) = P(X = 1)$, then

$$\frac{P(X = 2)}{P(X = 3)}$$

is equal to :

Options :

A. 1

B. 10

C. 25

D. 5

Question Number : 20 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

The conditional statement

$((p \wedge q) \rightarrow ((\sim p) \vee r)) \vee (((\sim p) \vee r) \rightarrow (p \wedge q))$ is :

Options :

- A. a tautology
- B. a contadiction
- C. equivalent to $p \wedge q$
- D. equivalent to $(\sim p) \vee r$

Mathematics Section B

Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 21 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The number of 6-digit numbers made by using the digits 1, 2, 3, 4, 5, 6, 7, without repetition and which are multiple of 15 is _____.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 22 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Suppose

$$\lim_{x \rightarrow 0} \frac{F(x)}{x^3}$$

exists and is equal to L, where

$$F(x) = \begin{vmatrix} a + \sin \frac{x}{2} & -b \cos x & 0 \\ -b \cos x & 0 & a + \sin \frac{x}{2} \\ 0 & a + \sin \frac{x}{2} & -b \cos x \end{vmatrix}$$

.

Then, $-112 L$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 23 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

If for some $\alpha > 0$, the area of the region $\{(x, y) : |x + \alpha| \leq y \leq 2 - |x|\}$ is equal to $\frac{3}{2}$, then the area of the region $\{(x, y) : 0 \leq y \leq x + 2\alpha, |x| \leq 1\}$ is equal to _____.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 24 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let

$$f(t) = \int_0^t e^{x^3} \left(\frac{x^8}{(x^6 + 2x^3 + 2)^2} \right) dx$$

. If

$$f(1) + f'(1) = \alpha e - \frac{1}{6}$$

, then the value of 150α is equal to _____.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 25 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

A hostel has 100 students. On a certain day (consider it day zero) it was found that two students are infected with some virus. Assume that the rate at which the virus spreads is directly proportional to the product of the number of infected students and the number of non-infected students. If the number of infected students on 4th day is 30, then number of infected students on 8th day will be _____.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 26 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let PQ be a focal chord of length 6.25 units of the parabola $y^2 = 4x$. If O is the vertex of the parabola, then 10 times the area (in sq. units) of ΔPOQ is equal to _____.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 27 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Consider a triangle ABC whose vertices are $A(0, \alpha, \alpha)$, $B(\alpha, 0, \alpha)$ and $C(\alpha, \alpha, 0)$, $\alpha > 0$. Let D be a point moving on the line $x + z - 3 = 0 = y$ and G be the centroid of ΔABC . If the minimum length of GD is

$$\sqrt{\frac{57}{2}}$$

, then α is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 28 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The probability distribution of X is :

X	0	1	2	3
P(X)	$\frac{1-d}{4}$	$\frac{1+2d}{4}$	$\frac{1-4d}{4}$	$\frac{1+3d}{4}$

For the minimum possible value of d, sixty times the mean of X is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 29 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let for

$$f(x) = a_0x^2 + a_1x + a_2, f'(0) = 1$$

and

$$f'(1) = 0$$

. If a_0, a_1, a_2 are in an arithmetico-geometric progression, whose corresponding A.P. has common difference 1 and corresponding G.P. has common ratio 2, then $f(4)$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 30 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let

$$S_1 = \{x \in [0, 12\pi] : \sin^5 x + \cos^5 x = 1\}$$

and

$$S_2 = \{x \in [0, 8\pi] : \sin^7 x + \cos^7 x = 1\}$$

Then $n(S_1) - n(S_2)$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Physics Section A

Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 31 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

At $t = 0$, truck, starting from rest, moves in the positive x -direction at uniform acceleration of 5 ms^{-2} . At $t = 20 \text{ s}$, a ball is released from the top of the truck. The ball strikes the ground in 1 s after the release. The velocity of the ball, when it strikes the ground, will be :

(Given $g = 10 \text{ ms}^{-2}$)

Options :

- A. $100\hat{i} - 10\hat{j}$
- B. $10\hat{i} - 100\hat{j}$
- C. $100\hat{i}$
- D. $-10\hat{j}$

Question Number : 32 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

If n main scale divisions coincide with $(n + 1)$ vernier scale divisions. The least count of vernier callipers, when each centimetre on the main scale is divided into five equal parts, will be :

Options :

- A. $\frac{2}{n+1} \text{ mm}$
- B. $\frac{5}{n+1} \text{ mm}$
- C. $\frac{1}{2n} \text{ mm}$

D. $\frac{1}{5n} \text{ mm}$

Question Number : 33 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

The radii of two planets A and B are in the ratio 2 : 3. Their densities are 3ρ and 5ρ respectively. The ratio of their acceleration due to gravity is :

Options :

- A. 9 : 4
- B. 9 : 8
- C. 9 : 10
- D. 2 : 5

Question Number : 34 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Two projectiles P_1 and P_2 thrown with speed in the ratio $\sqrt{3}$:

$$\sqrt{2}$$

, attain the same height during their motion. If P_2 is thrown at an angle of 60° with the horizontal, the angle of projection of P_1 with horizontal will be :

Options :

- A. 15°
- B. 30°
- C. 45°
- D. 60°

Question Number : 35 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

An air bubble of negligible weight having radius r rises steadily through a solution of density σ at speed v . The coefficient of viscosity of the solution is given by :

Options :

A. $\eta = \frac{4r\sigma g}{9v}$

B. $\eta = \frac{2r^2\sigma g}{9v}$

C.

$$\eta = \frac{2\pi r^2 \sigma g}{9v}$$

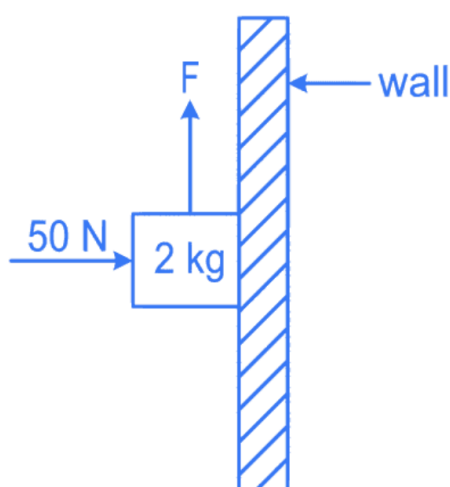
D.

$$\eta = \frac{2r^2 \sigma g}{3\pi v}$$

Question Number : 36 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A 2 kg block is pushed against a vertical wall by applying a horizontal force of 50 N. The coefficient of static friction between the block and the wall is 0.5. A force F is also applied on the block vertically upward (as shown in figure). The maximum value of F applied, so that the block does not move upward, will be :

(Given : $g = 10 \text{ ms}^{-2}$)



Options :

A. 10 N

B. 20 N

C. 25 N

D. 45 N

Question Number : 37 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Two bodies A and B of masses 5 kg and 8 kg are moving such that the momentum of body B is twice that of the body A. The ratio of their kinetic energies will be :

Options :

A. 4 : 5

B. 2 : 5

C. 5 : 4

D. 5 : 2

Question Number : 38 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

The pressure of the gas in a constant volume gas thermometer is 100 cm of mercury when placed in melting ice at 1 atm. When the bulb is placed in a liquid, the pressure becomes 180 cm of mercury. Temperature of the liquid is :

(Given $0^{\circ}\text{C} = 273\text{ K}$)

Options :

A. 300 K

B. 400 K

C. 600 K

D. 491 K

Question Number : 39 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

A coil of n number of turns wound tightly in the form of a spiral with inner and outer radii r_1 and r_2 respectively. When a current of strength I is passed through the coil, the magnetic field at its centre will be :

Options :

A.
$$\frac{\mu_0 n I}{2(r_2 - r_1)}$$

B.
$$\frac{\mu_0 n I}{r_2}$$

C.
$$\frac{\mu_0 n I}{r_2 - r_1} \log_e \frac{r_1}{r_2}$$

D.
$$\frac{\mu_0 n I}{2(r_2 - r_1)} \log_e \frac{r_2}{r_1}$$

Question Number : 40 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

C_o is the capacitance of a parallel plate capacitor with air as a medium between the plates (as shown in Fig. 1). If half space between the plates is filled with a dielectric of relative permittivity ϵ_r (as shown in Fig. 2), the new capacitance of the capacitor will be :



Fig. 1



Fig. 2

Options :

A. $\frac{C_o}{2}(1 + \epsilon_r)$

B. $C_o + \epsilon_r$

C. $\frac{C_o \epsilon_r}{2}$

D. $C_o(1 + \epsilon_r)$

Question Number : 41 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

A sample of monoatomic gas is taken at initial pressure of 75 kPa. The volume of the gas is then compressed from 1200 cm^3 to 150 cm^3 adiabatically. In this process, the value of workdone on the gas will be :

Options :

A. 79 J

B. 405 J

C. 4050 J

D. 9590 J

Question Number : 42 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Which of the following equations correctly represents a travelling wave having wavelength $\lambda = 4.0 \text{ cm}$, frequency $\nu = 100 \text{ Hz}$ and travelling in positive x-axis direction?

Options :

A. $y = A \sin[(0.50 \pi \text{ cm}^{-1})x - (100 \pi \text{ s}^{-1})t]$

B. $y = A \sin 2\pi[(0.25 \text{ cm}^{-1})x - (50 \text{ s}^{-1})t]$

C.

$$y = A \sin \left[\left(\frac{2\pi}{4} \text{ cm}^{-1} \right) x - \left(\frac{2\pi}{100} \text{ s}^{-1} \right) t \right]$$

D.

$$y = A \sin \pi [(0.5 \text{ cm}^{-1})x - (200 \text{ s}^{-1})t]$$

Question Number : 43 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

An expression for oscillating electric field in a plane electromagnetic wave is given as $E_z = 300 \sin(5\pi \times 10^3 x - 3\pi \times 10^{11} t) \text{ Vm}^{-1}$

Then, the value of magnetic field amplitude will be :

(Given : speed of light in Vacuum $c = 3 \times 10^8 \text{ ms}^{-1}$)

Options :

A. $1 \times 10^{-6} \text{ T}$

B. $5 \times 10^{-6} \text{ T}$

C. $18 \times 10^9 \text{ T}$

D. $21 \times 10^9 \text{ T}$

Question Number : 44 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

An electric cable of copper has just one wire of radius 9 mm. Its resistance is 14Ω . If this single copper wire of the cable is replaced by seven identical well insulated copper wires each of radius 3 mm connected in parallel, then the new resistance of the combination will be :

Options :

A. 9Ω

B. 18Ω

C. 28Ω

D. 126Ω

Question Number : 45 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

In series RLC resonator, if the self inductance and capacitance become double, the new resonant frequency (f_2) and new quality factor (Q_2) will be :

(f_1 = original resonant frequency, Q_1 = original quality factor)

Options :

$$f_2 = \frac{f_1}{2}$$

A. and $Q_2 = Q_1$

$$f_2 = f_1 \text{ and}$$

$$Q_2 = \frac{Q_1}{2}$$

B.

C. $f_2 = 2f_1$ and $Q_2 = Q_1$

D. $f_2 = f_1$ and $Q_2 = 2Q_1$

Question Number : 46 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Find the ratio of maximum intensity to the minimum intensity in the interference pattern if the widths of the two slits in Young's experiment are in the ratio of 9 : 16. (Assuming intensity of light is directly proportional to the width of slits)

Options :

A. 3 : 4

B. 4 : 3

C. 7 : 1

D. 49 : 1

Question Number : 47 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

A source of monochromatic light liberates 9×10^{20} photon per second with wavelength 600 nm when operated at 400 W. The number of photons emitted per second with wavelength of 800 nm by the source of monochromatic light operating at same power will be :

Options :

A. 12×10^{20}

B. 6×10^{20}

C. 9×10^{20}

D. 24×10^{20}

Question Number : 48 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

A hydrogen atom in ground state absorbs 12.09 eV of energy. The orbital angular momentum of the electron is increased by :

Options :

- A. $1.05 \times 10^{-34} \text{ Js}$
- B. $2.11 \times 10^{-34} \text{ Js}$
- C. $3.16 \times 10^{-34} \text{ Js}$
- D. $4.22 \times 10^{-34} \text{ Js}$

Question Number : 49 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

A cyclotron is working at a frequency of 10 MHz. If the radius of its dees is 60 cm. The maximum kinetic energy of accelerated proton will be :

(Take : $e = 1.6 \times 10^{-19} \text{ C}$, $m_p = 1.67 \times 10^{-27} \text{ kg}$)

Options :

- A. 7.4 MeV
- B. 14.86 MeV
- C. 7.4 GeV
- D. 704 GeV

Question Number : 50 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

A speech signal given by $11 \sin(2200 \pi t) \text{ V}$ is used for amplitude modulation with a carrier signal given by $44 \sin(6600 \pi t) \text{ V}$. The minimum amplitude of modulated wave will be :

Options :

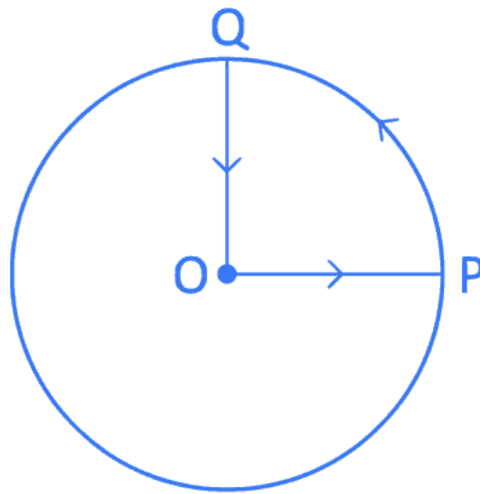
- A. 33 V
- B. 55 V
- C. 8.25 V
- D. 13.75 V

Physics Section B

Section Number :	4
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 51 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

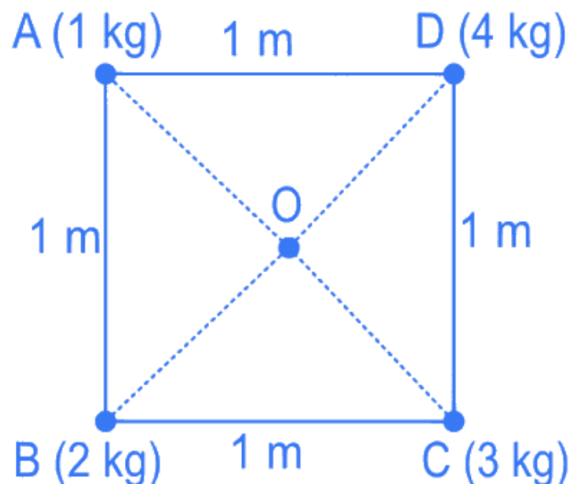
A person starts his journey from centre 'O' of the park and comes back to the same position following path OPQO as shown in the figure. The radius of path taken by the person is 200 m and he takes 3 min 58 sec to complete his journey. The average speed of the person is _____ ms^{-1} . (take $\pi = 3.14$)



Response Type : Numeric
 Evaluation Required For SA : Yes
 Show Word Count : Yes
 Answers Type : Equal
 Text Areas : PlainText

Question Number : 52 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Four particles with a mass of 1 kg, 2 kg, 3 kg and 4 kg are situated at the corners of a square with side 1 m (as shown in the figure). The moment of inertia of the system, about an axis passing through the point O and perpendicular to the plane of the square, is _____ kg m^2 .



Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 53 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The excess pressure inside a liquid drop is 500 Nm^{-2} . If the radius of the drop is 2 mm, the surface tension of liquid is $x \times 10^{-3} \text{ Nm}^{-1}$. The value of x is _____.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 54 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Eight similar drops of mercury are maintained at 12 V each. All these spherical drops combine into a single big drop. The potential energy of bigger drop will be _____ E. Where E is the potential energy of a single smaller drop.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 55 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

A series LCR circuit with

$$R = \frac{250}{11} \Omega$$

and

$$X_L = \frac{70}{11} \Omega$$

is connected across a 220 V, 50 Hz supply. The value of capacitance needed to maximize the average power of the circuit will be _____ μF . (Take :

$$\pi = \frac{22}{7}$$

)

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 56 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The refractive index of an equilateral prism is $\sqrt{2}$. The angle of emergence under minimum deviation position of prism, in degree, is _____.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 57 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

A hydrogen atom in its first excited state absorbs a photon of energy $x \times 10^{-2}$ eV and excited to a higher energy state where the potential energy of electron is -1.08 eV. The value of x is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

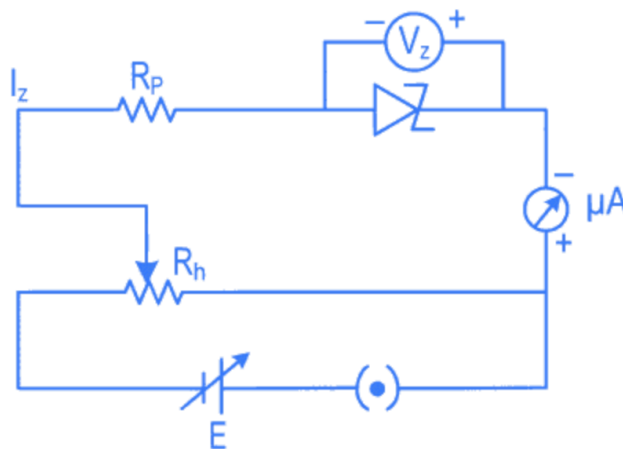
Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 58 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The circuit diagram used to study the characteristic curve of a zener diode is connected to variable power supply (0 – 15 V) as shown in figure. A zener diode with maximum potential $V_z = 10$ V and maximum power dissipation of 0.4 W is connected across a potential divider arrangement. The value of resistance R_p connected in series with the zener diode to protect it from the damage is _____ Ω .



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 59 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

An employee of a factory moving away from his workplace by a car listens to the siren of the factory. He drives the car at the speed of 72 kmh^{-1} in the direction of wind which is blowing at 72 kmh^{-1} speed. Frequency of siren is 720 Hz. The employee hears an apparent frequency of _____ Hz.

(Assume speed of sound to be 340 ms^{-1})

Response Type : Numeric

Evaluation Required For SA : Yes

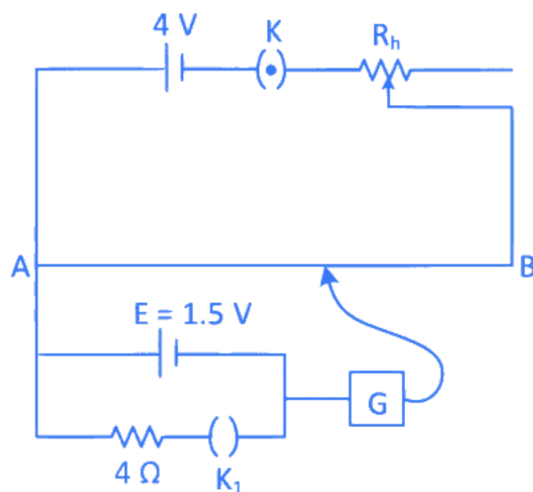
Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 60 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The circuit diagram of potentiometer used to measure the internal resistance of a cell (E) is shown in figure. The key 'K' is kept closed so as to send constant current through potentiometer wire. When key 'K₁' is kept open the null point is found to be at 120 cm on the potentiometer wire. When the key 'K₁' is closed the null point is shifted at 80 cm at the potentiometer wire. The internal resistance of the given cell is _____ Ω .



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Chemistry Section A

Section Number :	5
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 61 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

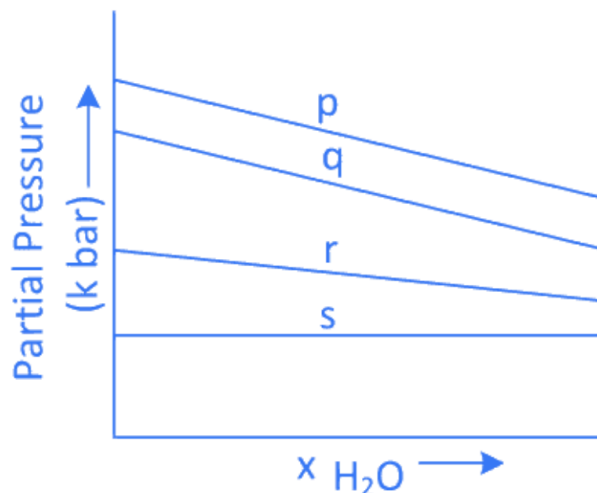
The number of radial nodes and total number of nodes in 4p orbital respectively are :

Options :

- A. 2 and 3
- B. 2 and 2
- C. 3 and 4
- D. 4 and 4

Question Number : 62 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

For a solution of the gases A, B, C and D in water at 298 K, the values of Henry's law constant (K_H) are 30.40, 2.34, 1.56×10^{-5} and 0.513 k bar respectively. In the given graph, the lines marked as 'p' and 's' correspond respectively to :

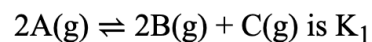
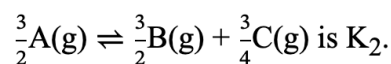


Options :

- A. A and C
- B. B and A
- C. D and A
- D. C and D

Question Number : 63 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

The equilibrium constant for the reversible reaction



K_1 and K_2 are related as :

Options :

- A. $K_1 = \sqrt{K_2}$
- B. $K_2 = \sqrt{K_1}$
- C. $K_2 = K_1^{3/4}$
- D. $K_1 = K_2^{3/4}$

Question Number : 64 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

In which of the following half cells, electrochemical reaction is pH dependent?

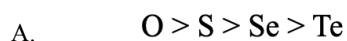
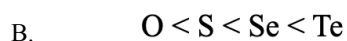
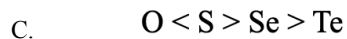
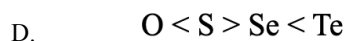
Options :



Question Number : 65 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

The correct order of electron gain enthalpy (– ve value) is :

Options :

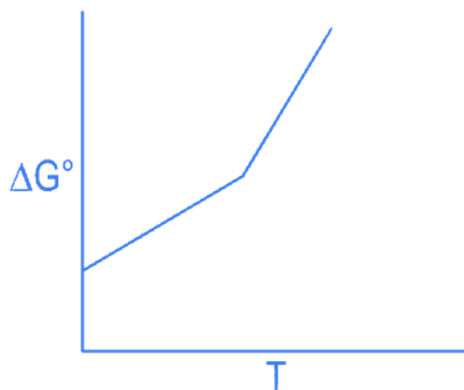


Question Number : 66 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

ΔG° vs T plot for the formation of MgO, involving reaction

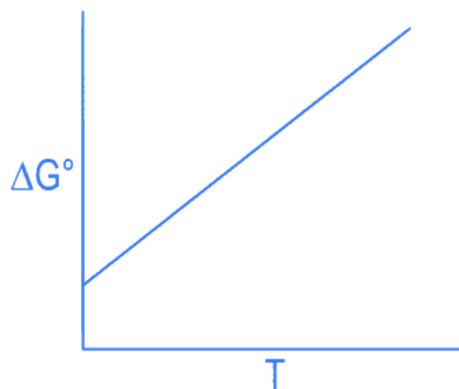


Options :

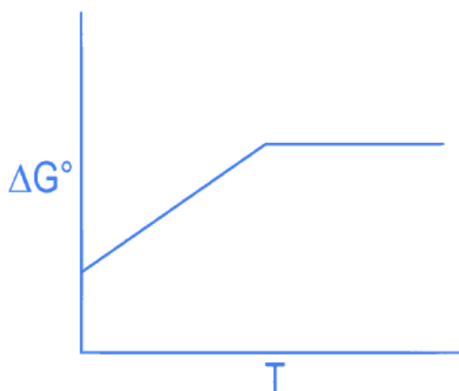


A.

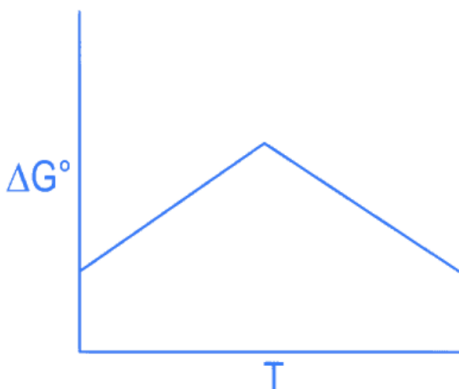
B.



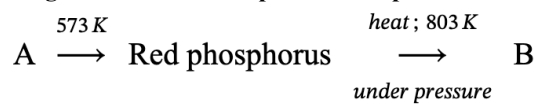
C.



D.



Question Number : 67 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical



Red phosphorus is obtained by heating "A" at 573 K, and can be converted to "B" by heating at 803 K under pressure.

A and B, respectively, are

Options :

A. β -black phosphorus and white phosphorus.

B. white phosphorus and β -black phosphorus.

C. α -black phosphorus and white phosphorus.

D. white phosphorus and α -black phosphorus.

Question Number : 68 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Correct formula of the compound which gives a white precipitate with BaCl_2 solution, but not with AgNO_3 solution, is :

Options :

A. $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$

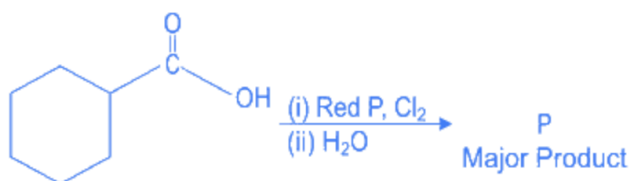
B. $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Br}$

C. $[\text{Pt}(\text{NH}_3)_4\text{Cl}_2]\text{Br}_2$

D. $[\text{Pt}(\text{NH}_3)_4\text{Br}_2]\text{Cl}_2$

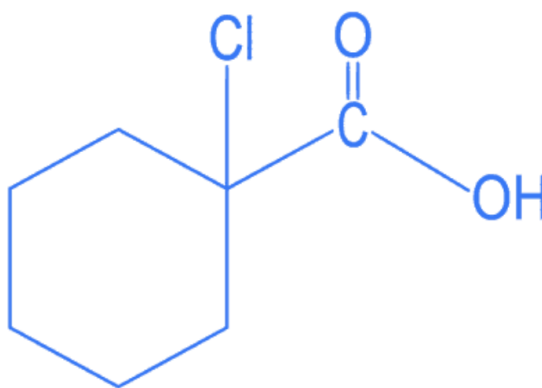
Question Number : 69 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Consider the given chemical reaction

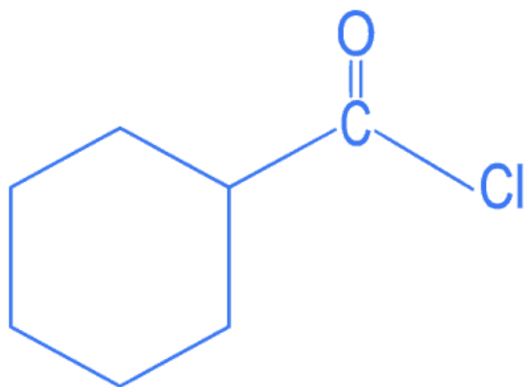


Identify the product P.

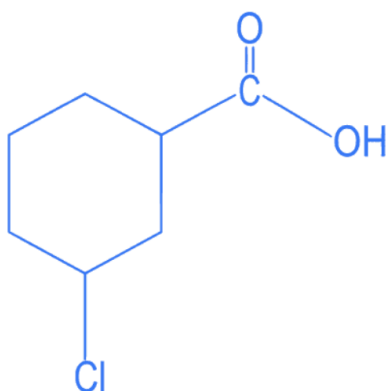
Options :



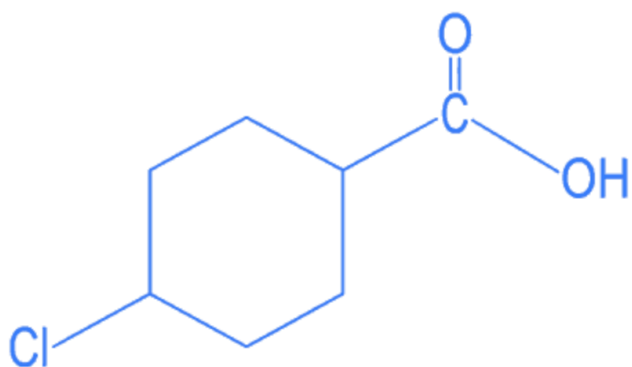
A.



B.



C.

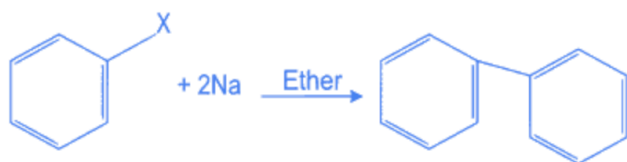


D.

Question Number : 70 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

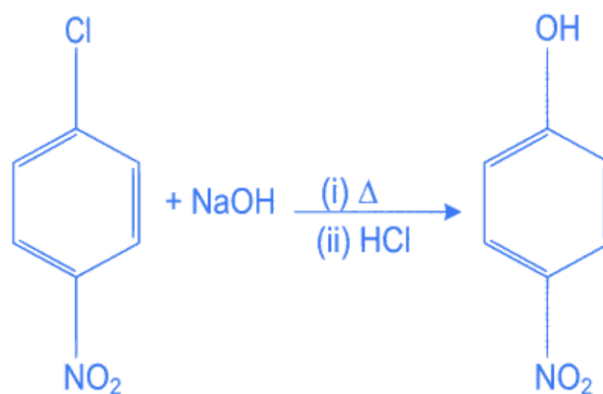
Choose the reaction which is not possible:

Options :

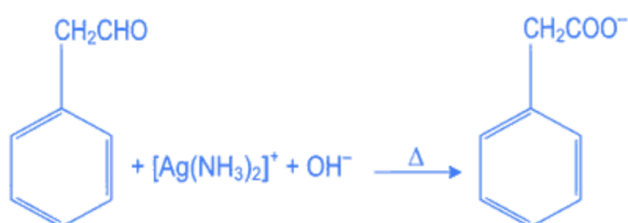


A.

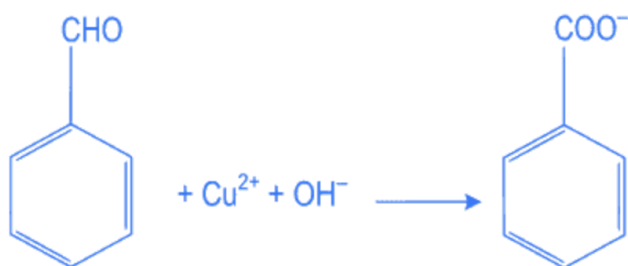
B.



C.

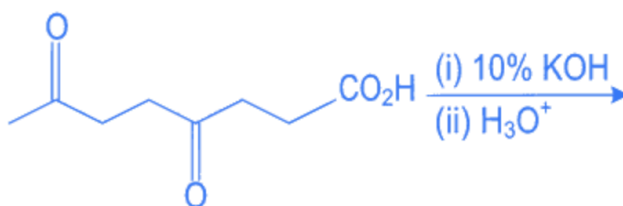


D.

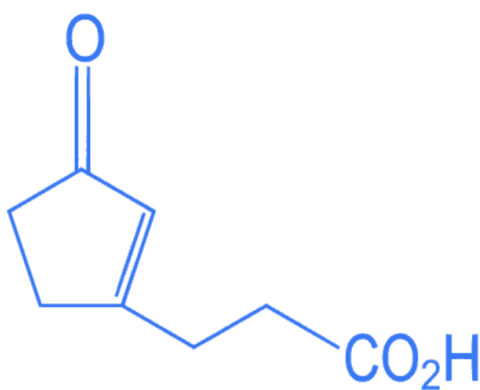


Question Number : 71 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

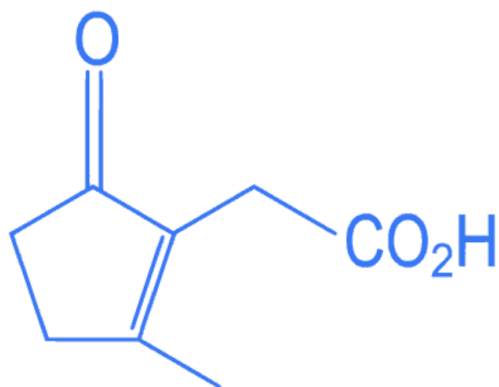
Which among the following will be the major product of the given reaction?



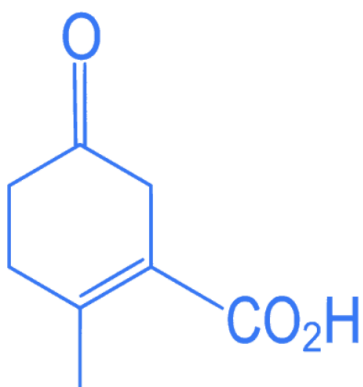
Options :



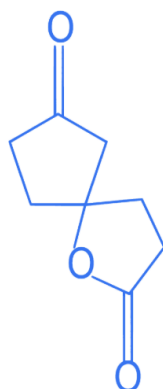
A.



B.

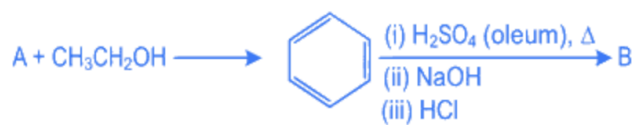


C.



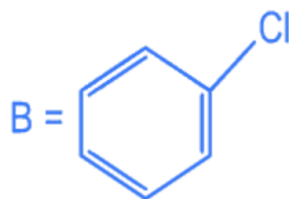
D.

Question Number : 72 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

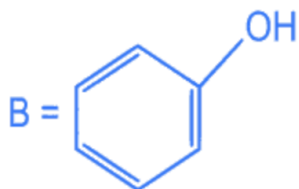


Consider the above reaction sequence. Identify the component A and component B :

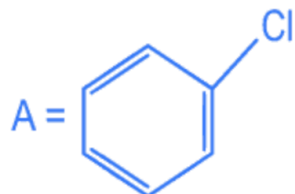
Options :



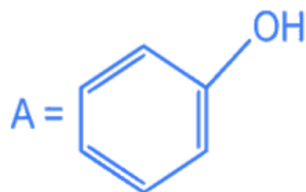
A.



B.



C.



D.

Question Number : 73 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

The sugar produced after complete hydrolysis of DNA is

Options :

- A. a pentose sugar.
- B. a hexose sugar.
- C. a polysaccharide.
- D. a disaccharide.

Question Number : 74 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

The reagent neutral ferric chloride is used to detect the presence of _____

Options :

- A. sulphide ion and alcoholic –OH group.
- B. acetate ion and phenolic –OH group.
- C. sulphide ion and phenolic –OH group.
- D. acetate ion and alcoholic –OH group.

Question Number : 75 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

An element X has a body centred cubic (bcc) structure with a cell edge of 200 pm. The density of the element is 5 g cm^{-3} . The number of atoms present in 300 g of the element X is _____.

Given : Avogadro constant, $N_A = 6.0 \times 10^{23} \text{ mol}^{-1}$.

Options :

- A. $5 N_A$
- B. $6 N_A$
- C. $15 N_A$
- D. $25 N_A$

Question Number : 76 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Match List - I with List - II :

	List-I		List-II
(a)	Sodium hydride	(i)	Lewis acid
(b)	Silane	(ii)	Saline hydride
(c)	Vanadium hydride	(iii)	Molecular hydride
(d)	Aluminium hydride	(iv)	Non-stoichiometric hydride

Correct answer is :

Options :

- A. (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)
- B. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)
- C. (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)
- D. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

Question Number : 77 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Correct statement about alkali metal oxides is :

Options :

- A. peroxides are colored.
- B. superoxides are paramagnetic.

- C. oxides are paramagnetic.
- D. peroxides are both colored and paramagnetic.

Question Number : 78 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

Which one of the following chemicals has not been used for the dry cleaning of clothes?

Options :

- A. Tetrachloroethene
- B. Liquid CO₂
- C. Ethanol
- D. H₂O₂

Question Number : 79 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No
Single Line Question Option : No Option Orientation : Vertical

TLC analysis of a mixture having 3 components (A, B, C) using silica gel as the stationary phase gave following R_f values; for A = 0.72, B = 0.48, C = 0.20.

Regarding the above observations, which one of the following statements is not correct for column chromatography of the mixture?

Options :

- A. A is the most non-polar component
- B. C is the most soluble component in mobile phase
- C. A will be eluted first
- D. C is the most strongly absorbed component

Match List - I with List - II.

	List-I Polymer		List-II Repeat Unit
(a)	Acrilan	(i)	$\left(\text{CH}_2 - \overset{\text{Cl}}{\underset{ }{\text{C}}} = \text{CH} - \text{CH}_2 \right)_n$
(b)	Neoprene	(ii)	$\left(\text{CH}_2 - \underset{\underset{\text{C}_6\text{H}_5}{ }}{\text{CH}} \right)_n$
(c)	Polystyrene	(iii)	$\left(\text{CH}_2 - \underset{\underset{\text{CN}}{ }}{\text{CH}} \right)_n$
(d)	Buna-N	(iv)	$\left(\text{CH}_2 - \text{CH} = \text{CH} - \text{CH}_2 - \text{CH}_2 - \underset{\underset{\text{CN}}{ }}{\text{CH}} \right)_n$

Choose the correct match from the options given below :

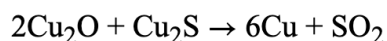
Options :

- A. (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)
- B. (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)
- C. (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)
- D. (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 81 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Blister copper is produced by reaction of copper oxide with copper sulphide.



When 2.86×10^3 g of Cu_2O and 4.77×10^3 g of Cu_2S are used for reaction, the mass of copper produced is _____ g. (nearest integer)

(Atomic mass of Cu = 63.5 a.m. u, S = 32.0 a.m. u, O = 16.0 a.m. u)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 82 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Amongst the following, the number of molecule/(s) having net resultant dipole moment is _____.

NF_3 , BF_3 , BeF_2 , CHCl_3 , H_2S , SiF_4 , CCl_4 , PF_5

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

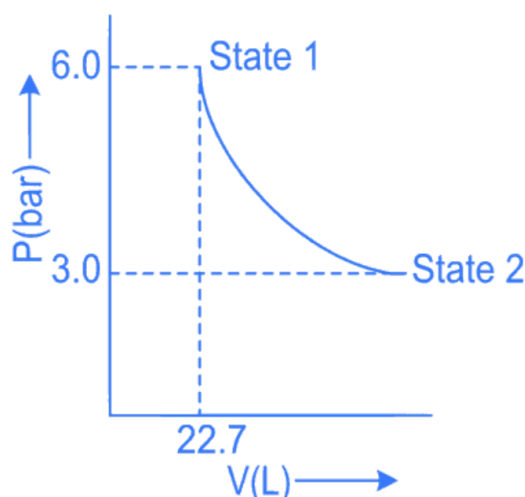
Answers Type : Equal

Text Areas : PlainText

Question Number : 83 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

1.0 mol of monoatomic ideal gas is expanded from state 1 to state 2 as shown in the figure. The magnitude of the work done for the expansion of gas from state 1 to state 2 at 300 K is _____ J. (Nearest integer)

(Given : $R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$, $\ln 10 = 2.3$, $\log 2 = 0.30$)



Response Type : Numeric

Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 84 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

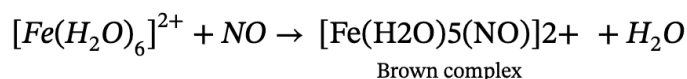
For the reaction $P \rightarrow B$, the values of frequency factor A and activation energy E_A are $4 \times 10^{13} \text{ s}^{-1}$ and 8.3 kJ mol^{-1} respectively. If the reaction is of first order, the temperature at which the rate constant is $2 \times 10^{-6} \text{ s}^{-1}$ is _____ $\times 10^{-1} \text{ K}$.

(Given : $\ln 10 = 2.3$, $R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$, $\log 2 = 0.30$)

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 85 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

In the following brown complex, the oxidation state of iron is + _____.



Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 86 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Spin only magnetic moment (μ_s) of $\text{K}_3[\text{Fe}(\text{CN})_6]$ is _____ B.M.

(Nearest integer)

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 87 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

An organic compound with 51.6% sulfur is heated in a Carius tube. The amount of this compound which will form 0.752 g of barium sulphate is _____ $\times 10^{-1} \text{ g}$.

(Given molar mass of barium sulphate 233 g mol^{-1}) (Nearest integer).

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 88 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

A hydrocarbon 'X' is found to have molar mass of 80. A 10.0 mg of compound 'X' on hydrogenation consumed 8.40 mL of H₂ gas (measured at STP). Ozonolysis of compound 'X' yields only formaldehyde and dialdehyde. The total number of fragments/molecules produced from the ozonolysis of compound 'X' is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 89 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

100 mL of 0.3 M acetic acid is shaken with 0.8 g of wood charcoal. The final concentration of acetic acid in the solution after adsorption is 0.125 M. The mass of acetic acid adsorbed per gram of carbon is _____ $\times 10^{-4}$ g.

(Given : Molar mass of acetic acid = 60 g mol⁻¹)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 90 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

How many of the following drugs belong to the tranquilizer class _____ ?

Veronal, Luminal, Propanal, Seconal

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText