Telangana State Council Higher Education

Notations :

1.Options shown in green color and with ✔ icon are correct.

2.Options shown in red color and with ✖ icon are incorrect.

Question Paper Name :	EngineeringEnglish 19th Jul 2022 Shift 1
Subject Name :	Engineering (English)
Creation Date :	2022-07-20 13:41:36
Duration :	180
Total Marks :	160
Display Marks:	No
Calculator :	None
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console?	Yes
Change Font Color :	No
Change Background Color :	No
Change Theme :	No
Help Button :	No
Show Reports :	No
Show Progress Bar :	No

Engineering (English)

Group Number :	1
Group Id :	1056154
Group Maximum Duration :	0
Group Minimum Duration :	180
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	160
Is this Group for Examiner? :	No
Examiner permission :	Cant View
Show Progress Bar? :	No

Mathematics

Section Id :	10561510
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	80
Number of Questions to be attempted :	80
Section Marks :	80
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	10561510
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 105615481 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

The set of all real values of x for which $f(x)=\log_2\left(2^x-2\right)+\sqrt{1-x}$ is also real is

Options :

1. ✖ $\mathbb{R}$

2. ✖ $(1,\infty)$

3. ✖ $(-\infty,1]$

4. ✔ ϕ

Question Number : 2 Question Id : 105615482 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Let $f(x)=1-x,\ g(x)=\dfrac{1}{1-x},\ h(x)=\dfrac{1}{x}$ be three functions, for $x\neq 0,1$. If a function $F(x)$ satisfies $f(F(h(x)))=g(x)$, then

Options :

1. ✖ $F(2022)=f(2022)$

2. ✔ $F(2022)=g(2022)$

3. ✖ $F(2022)=h(2022)$

4. ✖ $F(2022)=\frac{1}{2022}f(2022)$

Question Number : 3 Question Id : 105615483 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If $\begin{bmatrix} 0 & 2 & a \\ b & 0 & 4 \\ -3 & c & 0 \end{bmatrix}$ is a skew-symmetric matrix, then $\begin{bmatrix} a & b \\ b & a \end{bmatrix}\begin{bmatrix} b & c \\ c & b \end{bmatrix}=$

Options :

1. ✖ $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

2. ✖ $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

3. ✔ $\begin{bmatrix} 2 & -8 \\ -8 & 2 \end{bmatrix}$

4. ✖ $\begin{bmatrix} 2 & 8 \\ 8 & 2 \end{bmatrix}$

Question Number : 4 Question Id : 105615484 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If $\begin{bmatrix} -1 & 2 & b \\ a & 5 & 6 \\ 3 & c & 7 \end{bmatrix}$ is a symmetric matrix, then $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} =$

Options :

1. ✖ 0

2. ✖ -121

143

3. ✖

-143

4. ✔

Question Number : 5 Question Id : 105615485 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If the matrix $A=\begin{bmatrix}1 & 2 & 2\\ 2 & 1 & 2\\ 2 & 2 & 1\end{bmatrix}$ satisfies the matrix equation $A^2-4A-5I=0$, then $A^{-1}=$

Options :

1. ✖ $\frac{1}{5}\begin{bmatrix}-3 & 2 & 2\\ -2 & 3 & -2\\ 2 & 2 & -3\end{bmatrix}$

2. ✔ $\frac{1}{5}\begin{bmatrix}-3 & 2 & 2\\ 2 & -3 & 2\\ 2 & 2 & -3\end{bmatrix}$

3. ✖ $\frac{1}{5}\begin{bmatrix} -3 & 2 & 2 \\ 2 & -3 & 2 \\ -2 & -2 & 3 \end{bmatrix}$

4. ✖ $\frac{1}{5}\begin{bmatrix} -3 & 2 & 2 \\ 2 & -3 & 2 \\ 2 & 2 & 3 \end{bmatrix}$

Question Number : 6 Question Id : 105615486 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Consider the simultaneous linear equations $AX=B$ and $AY=Q$. If A is an invertible matrix and B is the unique solution of $AY=Q$, then the solution of $AX=B$ is

Options :

1. ✖ $A^{-1}(B+Q)$

2. ✖ $\left(A^{-1}\right)^2 B$

3. ✖ $A^{-1}BQ$

4. ✔ $\left(A^{-1}\right)^2 Q$

Question Number : 7 Question Id : 105615487 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If $(2x-y+1)+i(x-2y-1)=2-3i$, then the multiplicative inverse of $(x-iy)$ is

Options :

1. ✖ $\frac{15}{41}+\frac{12}{41}i$

2. ✖ $\frac{6}{29}+\frac{15}{29}i$

3. ✖ $\frac{15}{29}+\frac{6}{29}i$

4. ✔ $\frac{12}{41}+\frac{15}{41}i$

Question Number : 8 Question Id : 105615488 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If α, β are the roots of the equation $x^2 - 2\sqrt{3}\,x + 4 = 0$ then $\alpha^6 + \beta^6 =$

Options :

1. 128 ✖

2. -64 ✖

3. 64 ✖

4. -128 ✔

Question Number : 9 Question Id : 105615489 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If $cis\,\alpha$ is the common value of $(-1)^{1/4}$ and $(-i)^{1/2}$ then $\tan\alpha =$

Options :

1. ✔ -1

2. ✖ 1

3. ✖ $\sqrt{3}$

4. ✖ $\frac{1}{\sqrt{3}}$

Question Number : 10 Question Id : 105615490 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

When $b = 17$, it is found that the roots of the equation $x^2 + bx + c = 0$ are -2 and -15.
If α, β are the roots of the same equation when $b = 13$ then $|\alpha - \beta| =$

Options :

1. ✔ 7

13

2. ✖

17

3. ✖

30

4. ✖

Question Number : 11 Question Id : 105615491 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Let x be a real number.

Match the following:

	List - I		List - II
A)	The maximum value of $2x^2+4x+5$	I)	-1
B)	The maximum value of $\frac{x^2+4x+1}{x^2+x+1}$	II)	1
C)	If $1 \le \frac{3x^2-5x+6}{x^2+1} \le 2$, $\forall x \in [a,b]$ then $b =$	III)	2
D)	If $1 \le \frac{3x^2-5x+6}{x^2+1} \le 2$, $\forall x \in [a,b]$ then $a =$	IV)	3
		V)	4

The correct match is:

Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.

Options :

A	B	C	D
IV	III	II	V

1.

A	B	C	D
IV	V	II	III

2.

A	B	C	D
IV	III	V	II

3.

A	B	C	D
III	V	IV	I

4.

Question Number : 12 Question Id : 105615492 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If α, β, γ are the roots of the equation $5x^3 - 2x - 4 = 0$, then $\alpha^3 + \beta^3 + \gamma^3 =$

Options :

1. ✔ $\frac{12}{5}$

2. ✖ $\frac{18}{29}$

3. ✖ 4

4. ✖ -4

Question Number : 13 Question Id : 105615493 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If the roots of $x^5 - ax^4 + bx^3 - cx^2 + dx - 1 = 0$ are all positive such that their arithmetic mean and geometric mean are equal, then $a + b + c + d =$

Options :

1. ✖ 10

15

2. ✖

20

3. ✖

30

4. ✔

Question Number : 14 Question Id : 105615494 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

The equation of lowest degree with rational coefficients having roots $\sqrt{3}+\sqrt{2}i$ and $\sqrt{3}-\sqrt{2}$ is

Options :

$\left(x^4-2x^2+25\right)\left(x^4-10x^2+1\right)=0$

1. ✔

$\left(x^2-2\sqrt{3}\,x+5\right)\left(x^2-2\sqrt{3}\,x+1\right)=0$

2. ✖

3. ✖ $\left(x^4-2x^2+25\right)\left(x^4+10x^2+1\right)=0$

4. ✖ $\left(x^4-10x^2+1\right)\left(x^4+2x^2+25\right)=0$

Question Number : 15 Question Id : 105615495 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The number of non-real roots of the equation $x^{10}-3x^8+5x^6-5x^4+3x^2-1=0$ is

Options :

1. ✔ 8

2. ✖ 6

3. ✖ 4

2

4. ✖

Question Number : 16 Question Id : 105615496 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Let $\mathbb{N}$ be the set of positive integers. The number of distinct triplets (x, y, z) satisfying $x, y, z \in \mathbb{N}$, $x < y < z$ and $x + y + z = 12$ is

Options :

5

1. ✖

7

2. ✔

6

3. ✖

8

4. ✖

Question Number : 17 Question Id : 105615497 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

A question paper has 3 parts and each part contains 4 questions. The number of different ways in which a candidate can answer 8 questions choosing at least two from each part is

Options :

1. ✔ 396

2. ✖ 204

3. ✖ 224

4. ✖ 132

Question Number : 18 Question Id : 105615498 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If k is the coefficient of x^5 in the expansion of $\left(2x^2 - \frac{1}{3x^3}\right)^5$ then $\frac{3k}{2} =$

Options :

1. ✖ -20

2. ✔ -40

3. ✖ 20

4. ✖ 40

Question Number : 19 Question Id : 105615499 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If $\frac{42-13x}{x^2+x-6}=\frac{A}{lx+m}+\frac{B}{px+q}$ where $lm>0$ and $pq<0$ then $\frac{Alp}{Bmq}=$

Options :

1. ✔ $\frac{27}{32}$

2. ✖ $\frac{27}{8}$

3. ✖ $\frac{8}{243}$

4. ✖ $\frac{243}{32}$

Question Number : 20 Question Id : 105615500 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If $\frac{3x+5}{(x+1)(2x^2+3)} = \frac{A}{x+1} + \frac{Bx+C}{2x^2+3}$ and $f(x) = Ax^3 + Bx^2 + 7x + C$, then

$5C - f'(-2) =$

Options :

1. ✖ 19

2. ✖ 15

4

3. ✔

34

4. ✖

Question Number : 21 Question Id : 105615501 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If $f(x)=\begin{vmatrix} -\sin x & 2\sin 2x & 4\cos^2 x \\ \cos x & 4\sin^2 x & 2\sin 2x \\ 0 & -\cos x & \sin x \end{vmatrix}$ then $f\left(\frac{5\pi}{4}\right)+f'\left(\frac{5\pi}{4}\right)=$

Options :

0

1. ✖

-1

2. ✖

-2

3. ✖

-4

4. ✔

Question Number : 22 Question Id : 105615502 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If $\left|\sin\alpha-\cos\alpha\right|=\frac{3}{4}$, then $\left|\sec 2\alpha-\tan 2\alpha\right|=$

Options :

$\frac{12}{17}$

1. ✖

$\frac{4}{\sqrt{23}}$

2. ✖

$\frac{3}{\sqrt{23}}$

3. ✔

$\frac{7}{\sqrt{23}}$

4. ✖

Question Number : 23 Question Id : 105615503 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

$$\text{If } \frac{1}{\sin 45^\circ \sin 46^\circ} + \frac{1}{\sin 46^\circ \sin 47^\circ} + \ldots \text{ upto 45 terms} = \frac{1}{\sin x^\circ}, \text{ then } \sin\left(\frac{\pi}{2}x\right) =$$

Options :

0

1. ✖

$\sin 1$

2. ✖

1

3. ✔

$\cos 1$

4. ✖

Question Number : 24 Question Id : 105615504 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If the minimum value of $\cos(\sin h(\log x)+\cos h(\log x))$ is k, then $\cos h(k+1)=$

Options :

1. ✖ $\frac{e+e^{-1}}{2}$

2. ✖ $\frac{e^2+e^{-2}}{2}$

3. ✖ e

4. ✔ 1

Question Number : 25 Question Id : 105615505 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If $\sin h\, x=\frac{-1}{2}$ then $\tan h\, 2x=$

Options :

1. ✖ $\frac{-\sqrt{5}}{2}$

2. ✖ $-\sqrt{3}$

3. ✔ $\frac{-\sqrt{5}}{3}$

4. ✖ $\frac{-\sqrt{3}}{2}$

Question Number : 26 Question Id : 105615506 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If the sides of a triangle ABC whose perimeter is 42 are in arithmetic progression, its circum-radius is $\frac{65}{8}$ and $B < A < C$ then sin A=

Options :

1. ✖ $\frac{4}{13}$

2. ✖ $\frac{28}{65}$

3. ✔ $\frac{56}{65}$

4. ✖ $\frac{14}{65}$

Question Number : 27 Question Id : 105615507 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

In a triangle ABC, if $a = 7, c = 11, \cos A = \frac{17}{22}$, $\cos C = \frac{1}{14}$ then $b \tan\frac{B}{2} \tan\frac{C-A}{2} =$

Options :

18

1. ✖

14

2. ✖

2

3. ✔

9

4. ✖

Question Number : 28 Question Id : 105615508 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

In any triangle ABC, $r^2 \cot\frac{A}{2}\cot\frac{B}{2}\cot\frac{C}{2} =$

Options :

Δ

1. ✔

2Δ

2. ✖

Δ^2

3. ✖

5Δ

4. ✖

Question Number : 29 Question Id : 105615509 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Let the vectors $\overline{AB} = 2\bar{i} + 2\bar{j} + \bar{k}$ and $\overline{AC} = 2\bar{i} + 4\bar{j} + 4\bar{k}$ be two sides of a triangle ABC.

If G is the centroid of ΔABC, then $\frac{27}{7}\left|\overline{AG}\right|^2 + 5 =$

Options :

25

1. ✖

38

2. ✔

47

3. ✖

52

4. ✖

Question Number : 30 Question Id : 105615510 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If (α, β, γ) is a triad of real numbers satisfying $\bar{i} - 2\bar{j} + 5\bar{k} = \alpha\left(\bar{i} + \bar{j} + \bar{k}\right) + \beta\left(\bar{i} + 2\bar{j} + 3\bar{k}\right) + \gamma\left(2\bar{i} - \bar{j} + \bar{k}\right)$, then $\alpha^2 - \beta^2 + \gamma^2 =$

Options :

23

1. ✖

31

2. ✔

40

3. ✖

-6

4. ✖

Question Number : 31 Question Id : 105615511 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Let L be a line passing through a point A and parallel to the vector $2\bar{i}+\bar{j}-2\bar{k}$. Let $-7\bar{i}-5\bar{j}+11\bar{k}$ be the position vector of a point P on L such that $\left|\overline{AP}\right|=12$. Then the position vector of A can be

Options :

$\bar{i}+\bar{j}+3\bar{k}$

1. ✖

$15\bar{i}+9\bar{j}-19\bar{k}$

2. ✖

$-\bar{i}-\bar{j}+3\bar{k}$

3. ✖

$-15\bar{i}-9\bar{j}+19\bar{k}$

4. ✔

Question Number : 32 Question Id : 105615512 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If θ is the angle between the vectors $2\bar{i}-\bar{j}+2\bar{k}$ and $a\bar{i}+4\bar{j}+b\bar{k}$ and $\cos\theta=\frac{2}{3}$ then $2(a+b+3)=$

Options :

1. a^2+b^2 ✖

2. a^2 ✖

3. b^2 ✖

4. ab ✔

Question Number : 33 Question Id : 105615513 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A bisector of the angle between the normals of the planes $4x+3y=5$ and $x+2y+2z=4$ is along the vector

Options :

1. ✖ $\left(17\bar{i}+9\bar{j}-12\bar{k}\right)$

2. ✖ $\left(17\bar{i}-9\bar{j}+12\bar{k}\right)$

3. ✖ $\left(17\bar{i}-\bar{j}+10\bar{k}\right)$

4. ✔ $\left(7\bar{i}-\bar{j}-10\bar{k}\right)$

Question Number : 34 Question Id : 105615514 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Let the volume of the tetrahedron with vertices $\bar{i}-\bar{j}-2\bar{k}, -2\bar{i}+\bar{j}-2\bar{k}, -\bar{i}-2\bar{j}+\bar{k}$, $2\bar{i}+2\bar{j}+a\bar{k}$ be $\frac{20}{3}$. Then the integral value of a is

Options :

1. ✖ -2

2. ✖ 1

3. ✔ -1

4. ✖ 2

Question Number : 35 Question Id : 105615515 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The mean deviation from the mean for the observations 1, 3, 5, 7, 11, 13, 17, 19, 23 is

Options :

1. ✖ 6

2. ✖ $11\frac{4}{9}$

3. ✖ 11

4. ✔ $6\frac{2}{9}$

Question Number : 36 Question Id : 105615516 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

When two dice are thrown, the probability of getting an ordered pair (x, y) such that $x^2 + y^2 \leq 25$ where x, y are numbers that show up on the two dice, is

Options :

1. ✖ $\frac{4}{9}$

2. ✖ $\frac{25}{36}$

3. ✖ $\frac{7}{12}$

4. ✔ $\frac{5}{12}$

Question Number : 37 Question Id : 105615517 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If two cards are drawn simultaneously from a well shuffled pack of 52 cards, then the probability of getting a card having a prime number and a card having a number which is a multiple of 5 is

Options :

1. ✖ $\frac{94}{663}$

2. ✔ $\frac{62}{663}$

3. ✖ $\frac{30}{663}$

4. ✖ $\frac{64}{663}$

Question Number : 38 Question Id : 105615518 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If A and B are two events of a random experiment such that $P(\overline{A})=\frac{2}{3}, P(B)=\frac{4}{15}$ and $P(A\cap\overline{B})=\frac{1}{5}$, then $\sqrt{195\left[P\left(B\mid\left(A\cup\overline{B}\right)\right)+P(A\cup B)\right]}=$

Options :

1. ✖ 9

2. ✔ 11

3. ✖ 13

15

4. ✖

Question Number : 39 Question Id : 105615519 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A random variable X has the range $\{0,1,2,...\}$. If $P(X=r)=k(1+r)3^{-r}$, for $r=0,1,2,...$ where $k>0$ is a real number, then $P(X=0)+P(X=1)+P(X=2)=$

Options :

$\frac{4}{9}$

1. ✖

$\frac{8}{9}$

2. ✔

$\frac{2}{3}$

3. ✖

$\frac{1}{3}$

4. ✖

Question Number : 40 Question Id : 105615520 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

In an experiment a person gets success α times out of β trails. If the experiment consists of n trials, then the probability that he fails at least $(n-1)$ times is

Options :

1. ✖ $\frac{\alpha^{n-1}}{\beta^n}(n\beta - n\alpha + \alpha)$

2. ✔ $\frac{(\beta-\alpha)^{n-1}}{\beta^n}(n\alpha + \beta - \alpha)$

3. ✖ $\frac{\alpha^n}{\beta^n}(n\alpha + \beta)$

4. ✖ $\left(\frac{\beta-\alpha}{\beta}\right)^n (n\beta + n\alpha + 1)$

Question Number : 41 Question Id : 105615521 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If the distance from a variable point P to a fixed point $A(a,0)$ is equal to the perpendicular distance from P to the line $x + y = 0$ then the equation of the locus of P is

Options :

1. $x^2 + y^2 - 2xy - 4ax = 0$ ✖

2. $x^2 + y^2 - 2xy - 4ax + 2a^2 = 0$ ✔

3. $x^2 - 4ay + y^2 = 0$ ✖

4. $(x-a)^2 + y^2 = 4axy$ ✖

Question Number : 42 Question Id : 105615522 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

The point to which the origin is to be shifted by translation of axes so that the transformed equation of $y^2 + 4y + 8x - 2 = 0$ will not contain y term and constant term is

Options :

1. $\left(\frac{3}{4},-2\right)$ ✔

2. $\left(\frac{-3}{4},-2\right)$ ✖

3. $\left(2,\frac{3}{4}\right)$ ✖

4. $\left(-2,\frac{-3}{4}\right)$ ✖

Question Number : 43 Question Id : 105615523 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If the line $2x-y-4=0$ divides the line segment joining the points $(2,-1)$ and $(1,-4)$ at the point (a,b) in the ratio $m:n$ then $4\left(a-b\left(\frac{m}{n}\right)^2\right)=$

Options :

-5

1. ✖

14

2. ✖

11

3. ✖

10

4. ✔

Question Number : 44 Question Id : 105615524 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The distance between the points of concurrency of the two families of straight lines given by $x+(5\lambda+1)y+1-3\lambda=0$ and $(5\mu+2)x-3y+3+6\mu=0$ is

Options :

4

1. ✖

2. ✔ $\frac{2\sqrt{2}}{5}$

3. ✖ $\frac{\sqrt{2}}{5}$

4. ✖ 6

Question Number : 45 Question Id : 105615525 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Let the line L drawn perpendicular to the lines $2x-3y+4=0$ and $6x-9y+7=0$ meet them at A and B respectively. If P(1, 1) is a point on L, then the ratio in which P divides AB is

Options :

1. ✖ 9 : 4 internally

2. ✔ 9 : 4 externally

$4:9$ internally

3. ✖

$4:9$ externally

4. ✖

Question Number : 46 Question Id : 105615526 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The orthocentre of the triangle formed by the points $(1,3)$, $(-3,5)$ and $(5,-1)$ is

Options :

$(-8,-10)$

1. ✖

$(-3,\ 2)$

2. ✖

$\left(-\frac{2}{3},\frac{4}{3}\right)$

3. ✖

$(19,27)$

4. ✔

Question Number : 47 Question Id : 105615527 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If $\alpha x^2 + 2\gamma xy + \beta y^2 = 0$ is the equation of pair of lines passing through the origin and perpendicular to the pair of lines $bhx^2 + abxy + ahy^2 = 0\ (a \neq 0, b \neq 0)$, then $\frac{\alpha\beta}{\gamma^2} =$

Options :

1. $\frac{h^2}{ab}$ ✖

2. $\frac{-2h^2}{ab}$ ✖

3. $\frac{-h^2}{ab}$ ✖

4. $\frac{4h^2}{ab}$ ✔

Question Number : 48 Question Id : 105615528 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

$\frac{x^2}{a}+\frac{xy}{h}+\frac{y^2}{b}=0\ (a\neq 0,\ h\neq 0,\ b\neq 0)$ represents two coincident lines if

Options :

1. ✖ $h^2=ab$

2. ✔ $4h^2=ab$

3. ✖ $h^2=4ab$

4. ✖ $h^2=2ab$

Question Number : 49 Question Id : 105615529 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If the lines joining the origin to the points of intersection of the line $x+y=k$ and the curve $x^2+y^2-2x-4y+2=0$ are at right angles then the sum of all the possible values of k is

Options :

1. ✖ 0

2. ✖ 1

3. ✔ 3

4. ✖ 5

Question Number : 50 Question Id : 105615530 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

The equation of the incircle of the triangle formed by the lines $x=0,\ y=0$ and $3x+4y-24=0$ is

Options :

1. ✖ $x^2+y^2-24x-24y+144=0$

2. ✖ $x^2+y^2-6x-6y+9=0$

$x^2+y^2-4x-4y+4=0$

3. ✔

$x^2+y^2-8x-8y+16=0$

4. ✖

Question Number : 51 Question Id : 105615531 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If two tangents are drawn from the point $P\left(\frac{\pi}{4}\right)$ on the circle $x^2+y^2=4$ to the circle $x^2+y^2=1$ then the slopes of the tangents are

Options :

$2\pm\sqrt{2}$

1. ✖

$1\pm\sqrt{2}$

2. ✖

$2\pm\sqrt{3}$

3. ✔

$1 \pm \sqrt{3}$

4. ✖

Question Number : 52 Question Id : 105615532 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If $5x+6y-34=0$ and $2x+y+c=0$ are conjugate lines with respect to the circle $x^2+y^2-8x-10y+25=0$ then the point on the line $2x+y+c=0$ is

Options :

$(3, 3)$

1. ✖

$(2, 4)$

2. ✖

$(1, -5)$

3. ✔

$(-2, -2)$

4. ✖

Question Number : 53 Question Id : 105615533 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If C_1 and C_2 are the centres of similitude with respect to the circles $x^2+y^2+6x+8y+24=0$ and $x^2+y^2-6x-8y+9=0$ then $C_1C_2=$

Options :

1. ✖ 10

2. ✖ 5

3. ✔ $\frac{16}{3}$

4. ✖ $\frac{19}{3}$

Question Number : 54 Question Id : 105615534 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Let $x+y=0$ be the radical axis of the circles $S\equiv x^2+y^2+2gx+2fy+c=0$ and $S^1\equiv x^2+y^2-6x-4y+4=0$ and the radius of the circle $S=0$ be 1. The $g+f=$

Options :

1. ± 5 ✖

2. ± 3 ✔

3. ± 2 ✖

4. ± 1 ✖

Question Number : 55 Question Id : 105615535 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The radius of the circle which cuts all the three circles $x^2+y^2-4x-4y+3=0$, $x^2+y^2+4x-4y+3=0$ and $x^2+y^2+4x+4y+3=0$ orthogonally is

Options :

1. 1 ✖

2. ✔ $\sqrt{3}$

3. ✖ $\sqrt{5}$

4. ✖ $\sqrt{7}$

Question Number : 56 Question Id : 105615536 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Statement I : $4x^2 + y^2 - 4xy - 30x - 50y + 40 = 0$ is the equation of parabola having $(2,3)$ as its focus and $x + 2y + 5 = 0$ as its directrix.

Statement II : The equation of the directrix of the parabola $x^2 - 4x + 16y + 52 = 0$ is $y + 1 = 0$.

Which of the above statements is (are) true?

Options :

1. ✔ Statement I is true, but Statement II is false

Statement II is true, but Statement I is false

2. ✖

Both Statement I and Statement II are true

3. ✖

Both Statement I and Statement II are false

4. ✖

Question Number : 57 Question Id : 105615537 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The cartesian equation of the parabola $x = -2 + 2t^2$, $y = 2 + 4t$ is

Options :

$y^2 - 8x - 4y + 12 = 0$

1. ✖

$y^2 - 8x - 4y - 12 = 0$

2. ✔

$y^2 + 8x - 4y - 12 = 0$

3. ✖

$y^2 - 8x + 4y - 12 = 0$

4. ✖

Question Number : 58 Question Id : 105615538 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If $ax^2 + by^2 = 15$ is the equation of the ellipse for which distance between its foci is 2 and distance between its directrices is 5, then $a + b =$

Options :

10

1. ✖

8

2. ✖

16

3. ✔

12

4. ✖

Question Number : 59 Question Id : 105615539 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Assertion(A) : The image of $\frac{x^2}{25}+\frac{y^2}{16}=1$ in the line $x+y=10$ is $\frac{(x-10)^2}{16}+\frac{(y-10)^2}{25}=1$.

Reason(R) : The image of a curve 'C' in a line L is the locus of the image of every point of C with respect to the line L.

The correct option among the following is:

Options :

1. ✔ (A) is true, (R) is true and (R) is the correct explanation for (A)

2. ✖ (A) is true, (R) is true but (R) is not the correct explanation for (A)

3. ✖ (A) is true but (R) is false

4. ✖ (A) is false but (R) is true

Question Number : 60 Question Id : 105615540 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If the latus rectum of a hyperbola subtends an angle of 120° at its centre, then its eccentricity is

Options :

1. ✖ $\frac{\sqrt{3}+2}{\sqrt{2}}$

2. ✖ $\frac{\sqrt{3}+\sqrt{5}}{2}$

3. ✖ $\frac{\sqrt{3}-\sqrt{2}}{3}$

4. ✔ $\frac{\sqrt{3}+\sqrt{7}}{2}$

Question Number : 61 Question Id : 105615541 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Let $P\left(\frac{\pi}{4}\right), Q\left(\frac{5\pi}{4}\right), R\left(\frac{3\pi}{4}\right), T\left(\frac{7\pi}{4}\right)$ be the points on the hyperbola $x^2 - 4y^2 - 4 = 0$ in the parametric form. Then the area of the quadrilateral $PQRT$ is (in square units)

Options :

$4\sqrt{2}$

1. ✖

$16\sqrt{2}$

2. ✖

$32\sqrt{2}$

3. ✖

$8\sqrt{2}$

4. ✔

Question Number : 62 Question Id : 105615542 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If A(1, 2, 3), B(2, –3, 1), C(3, 2, –1) are three vertices of a tetrahedron ABCD and $G\left(\frac{5}{2},\frac{3}{2},\frac{9}{4}\right)$ is its centroid then the point which divides GD in the ratio 1 : 2 is

Options :

1. ✖ (6, 1, 3)

2. ✖ $\left(3,\frac{8}{3},3\right)$

3. ✖ $\left(\frac{1}{3},\frac{2}{3},1\right)$

4. ✔ $\left(3,\frac{8}{3},\frac{7}{2}\right)$

Question Number : 63 Question Id : 105615543 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Let D be the foot of the perpendicular drawn from the point A(2, 0, 3) to the line joining the points B(0, 4, 1) and C(–2, 0, 4). Then the ratio in which D divides BC is

Options :

1. ✖ $3 : 2$

2. ✖ $2\sqrt{6} : \sqrt{17}$

3. ✔ $18 : 11$

4. ✖ $16 : 9$

Question Number : 64 Question Id : 105615544 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Let $6x-3y+2z-6=0$ be the given plane. If a, b, c are the intercepts made by the plane on X, Y, Z - axes respectively; l, m, n are the direction cosines of a normal drawn to the plane and p is the perpendicular distance from the origin to the plane, then $|al+bm+cn| =$

Options :

1. ✖ p

2p

2. ✖

3p

3. ✔

4p

4. ✖

Question Number : 65 Question Id : 105615545 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

$$\lim_{x\to 0}\frac{\tan^2\left(\pi\sec^4 x\right)}{\pi^2 x^4}=$$

Options :

0

1. ✖

4

2. ✔

1

3. ✖

16

4. ✖

Question Number : 66 Question Id : 105615546 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

$$\lim_{x\to 0}\left(\frac{4!}{x^8}\left(1-\cos\frac{x^2}{3}-\cos\frac{x^2}{4}+\cos\frac{x^2}{3}\cos\frac{x^2}{4}\right)\right)=$$

Options :

8

1. ✖

$\frac{1}{6}$

2. ✖

$\frac{1}{24}$

3. ✔

$\frac{2}{3}$

4. ✖

Question Number : 67 Question Id : 105615547 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Let $f(x)=\sin x, g(x)=\cos x, h(x)=x^2$ then $\lim_{x\to 1}\frac{f(g(h(x)))-f(g(h(1)))}{x-1}=$

Options :

0

1. ✖

$-2\sin 1\cos(\cos 1)$

2. ✔

∞

3. ✖

$-2\sin 1\cos 1$

4. ✖

Question Number : 68 Question Id : 105615548 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If $x\cos(k+y)=\cos y$ then $\frac{dy}{dx}$ at $y=\frac{\pi}{2}$ is

Options :

1. ✔ $\sin k$

2. ✖ $\cos k$

3. ✖ 1

4. ✖ 0

Question Number : 69 Question Id : 105615549 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If $x = a(\cos\theta + \theta\sin\theta)$, $y = f(\theta), f(2\pi) = 0$, $\frac{dy}{dx} = \frac{\tan\theta}{\theta}$, $\theta \neq 0$ and $\theta \neq (2n+1)\frac{\pi}{2}$, then $f\left(\frac{\pi}{3}\right) =$

Options :

1. ✖ $2a\pi$

2. ✖ $\frac{\pi}{2}a$

3. ✔ $\frac{a}{2}$

4. ✖ $-2a$

Question Number : 70 Question Id : 105615550 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

The equation of the normal to the curve $4x^2+9y^2=36$ at the point $P\left(\frac{7\pi}{4}\right)$ is

Options :

1. $2x-3y-6\sqrt{2}=0$ ✖

2. $2x+3y=0$ ✖

3. $3\sqrt{2}\,x+2\sqrt{2}\,y-5=0$ ✔

4. $3\sqrt{2}\,x-2\sqrt{2}\,y-13=0$ ✖

Question Number : 71 Question Id : 105615551 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If θ is the acute angle between the curves $x^2+y^2=4$ and $y^2=3x$ then $\tan\theta=$

Options :

1. ✔ $\frac{5}{\sqrt{3}}$

2. ✖ $\frac{\sqrt{3}}{4}$

3. ✖ $\frac{4}{\sqrt{3}}$

4. ✖ $\frac{\sqrt{3}}{5}$

Question Number : 72 Question Id : 105615552 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Let $\sqrt{3}$ be the radius and $\frac{\pi}{3}$ be the semivertical angle of the given cone. Then the height of the right circular cylinder of maximum volume that can be inscribed in the given cone is

Options :

1. ✖ 3

2. ✖ $\frac{\sqrt{3}}{2}$

3. ✖ $\frac{2}{\sqrt{3}}$

4. ✔ $\frac{1}{3}$

Question Number : 73 Question Id : 105615553 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Given that $\frac{d}{dx}(\text{Tan}^{-1}x)=\frac{1}{1+x^2}$ and $\frac{d}{dx}(\text{Sin h}^{-1}x)=\frac{1}{\sqrt{1+x^2}}$. Then

$$\int\frac{3x^6-2x^4+x^2-2}{x^2+1}\,dx=$$

Options :

1. ✖ $\frac{3}{7}x^7-\frac{2}{5}x^5+\frac{1}{3}x^3-2x+c$

2. ✖ $\frac{\frac{3}{7}x^7-\frac{2}{5}x^5+\frac{1}{3}x^3-2x}{\frac{x^3}{3}+x}+c$

3. ✔ $\frac{3}{5}x^5-\frac{5}{3}x^3+6x-8\,\mathrm{Tan}^{-1}x+c$

4. ✖ $\frac{3}{5}x^5-\frac{5}{3}x^3+6x-8\,\mathrm{Sinh}^{-1}x+c$

Question Number : 74 Question Id : 105615554 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

$$\int\frac{\sin x.\sec^2 x-\tan x.\sin x+\cos x}{(1-\cos 2x)}\,dx=$$

Options :

1. ✖ $\frac{1}{2}\left[\sec x-\operatorname{cosec} x-\log\left|\tan\left(\frac{x}{2}\right)\tan\left(\frac{\pi}{4}+\frac{x}{2}\right)\right|\right]+c$

2. ✖ $\sec x-\operatorname{cosec} x+\log\left|\frac{\tan\left(\frac{x}{2}\right)}{\tan\left(\frac{\pi}{4}+\frac{x}{2}\right)}\right|+c$

3. ✔ $\frac{1}{2}\left[\sec x-\operatorname{cosec} x-\log\left|\frac{\tan\left(\frac{\pi}{4}+\frac{x}{2}\right)}{\tan\left(\frac{x}{2}\right)}\right|\right]+c$

4. ✖ $\sec x+\operatorname{cosec} x-\log\left|\tan\left(\frac{x}{2}\right)\right|+c$

Question Number : 75 Question Id : 105615555 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

If $f(x)=\int \frac{16x^7+5x^{10}}{\left(x^3+2+3x^8\right)^2}dx(x\geq 0)$ and $f(0)=1$, then the value of $f(-1)$ is

Options :

1. $\frac{7}{6}$ ✖

2. $\frac{5}{4}$ ✔

3. $\frac{-3}{4}$ ✖

4. $\frac{-5}{6}$ ✖

Question Number : 76 Question Id : 105615556 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

It is given that $\frac{d}{dt}(t\log t - t) = \log t$ then $\exp\left(\int_0^1 2x\log\left(1+x^2\right)dx\right) =$

Options :

1. ✖ e

2. ✖ 2

3. ✔ $\frac{4}{e}$

4. ✖ $\frac{e}{4}$

Question Number : 77 Question Id : 105615557 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

$\int_0^{2a} f(x)dx =$

Options :

1. ✖ $2\int_0^a f(x)\,dx$

2. ✔ $\int_0^a \left(f(x)+f(x+a)\right)\,dx$

3. ✖ 0

4. ✖ $\int_0^{2a} f(2a+x)\,dx$

Question Number : 78 Question Id : 105615558 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The equation of any member of the family of all the ellipses whose axes are along the coordinate axes satisfies the differential equation

Options :

1. ✔ $xyy'' + x(y')^2 - yy' = 0$

$$xyy'' + x(y')^2 - y = y'$$

2. ✖

$$y'' + \frac{(y')^2}{y} - \frac{y}{x} = 0$$

3. ✖

$$y'' + (y')^2 + x^2y^2 = 0$$

4. ✖

Question Number : 79 Question Id : 105615559 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The degree of the differential equation $\left(\frac{d^2y}{dx^2}\right)^{\frac{4}{3}} + x\left(\frac{dy}{dx}\right)^2 - y\cos\left(\frac{dy}{dx}\right) = 0$ is

Options :

4

1. ✖

3

2. ✖

6

3. ✖

not defined

4. ✔

Question Number : 80 Question Id : 105615560 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The general solution of the differential equation $\frac{dy}{dx}=\frac{2x-3y+5}{6x-9y+7}$ is

Options :

1. ✖ $x-3y+\frac{22}{3}\log|3x-7|+c=0$

2. ✔ $x-3y+\frac{8}{3}\log|6x-9y-1|+c=0$

3. ✖ $3x-3y+\frac{8}{3}\log|3x-9y+1|+c=0$

$$3x-2y+\frac{22}{3}\log|2x-3y-7|+c=0$$

4. ✖

Physics

Section Id :	10561511
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	40
Number of Questions to be attempted :	40
Section Marks :	40
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	10561511
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 105615561 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Two charged particles of mass 1gm each are placed 1m apart. If each of these possesses 1 femto coulomb of charge, then the dominant force of interaction between them is

Options :

Gravitational

1. ✔

Electrostatic

2. ✖

Weak

3. ✖

Strong

4. ✖

Question Number : 82 Question Id : 105615562 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A physical quantity S is related to four observables a, b, c, d as $S=\frac{\sqrt{a}\,b}{c^3 d^4}$. If the percentage errors of measurement in a, b, c, d are 2%, 1%, 1% and 1% respectively, then percentage error in the quantity S is

Options :

6%

1. ✖

8%

2. ✖

9%

3. ✔

10%

4. ✖

Question Number : 83 Question Id : 105615563 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A particle moves along a straight line such that its displacement 'x' varies with time 't' as $x = \alpha t^3 + \beta t^2 + \gamma$, where α, β, γ are constants. V_1 is the average velocity of the particle during its journey between $t = 1$s and $t = 3$s. V_2 is the instantaneous velocity of the particle at $t = 3$s. The ratio $\frac{V_1}{V_2}$ is

Options :

$\frac{27\alpha + 9\beta}{26\alpha + 6\beta}$

1. ✖

$\frac{9\alpha + 3\beta}{18\alpha + 4\beta}$

2. ✖

$\frac{13\alpha+4\beta}{27\alpha+6\beta}$

3. ✔

$\frac{26\alpha+8\beta}{9\alpha+3\beta}$

4. ✖

Question Number : 84 Question Id : 105615564 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A man walking along a straight line with a velocity 6 km/h encounters rain falling vertically down with a velocity $6\sqrt{3}$ km/h . At what angle the man should hold his umbrella so that he can protect himself from rain

Options :

30° with respect to ground

1. ✖

30° with respect to vertical

2. ✔

45° with respect to ground

3. ✖

60° with respect to vertical

4. ✖

Question Number : 85 Question Id : 105615565 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

An aircraft is flying at a height of *'H'* above the ground and at a speed of *'V'*. The maximum angle subtended at a ground observation point by the aircraft after time *T* is

Options :

$\tan^{-1}\left(\frac{VT}{H}\right)$

1. ✖

$\tan^{-1}\left(\frac{VT}{2H}\right)$

2. ✖

$2\tan^{-1}\left(\frac{2VT}{H}\right)$

3. ✖

$2\tan^{-1}\left(\frac{VT}{2H}\right)$

4. ✔

Question Number : 86 Question Id : 105615566 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

A merry – go – round rotating at a constant angular speed completes 9 rotations in 18 seconds. What is its angular speed?

Options :

π/2 rad/s

1. ✖

π rad/s

2. ✔

2π rad/s

3. ✖

3π rad/s

4. ✖

Question Number : 87 Question Id : 105615567 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

A motor car moving with velocity 7 m/s stops in 10 m distance when brakes are applied. What is the relation between the resistance force (R) and the weight (W) of the car? (Take value of $g = 9.8\ m/s^2$)

Options :

1. $R = W$ ✖

2. $R = -W$ ✖

3. $R = -\frac{W}{2}$ ✖

4. $R = -\frac{W}{4}$ ✔

Question Number : 88 Question Id : 105615568 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

A ball of mass 1 kg moves in a straight line with velocity $v = cx^{\alpha}$, where $c = 1$ (SI unit) and α is a constant. If the work done by the net force during its displacement from $x = 0$ to $x = 4m$ is 128 J, then the α is

Options :

1. ✖ 1

2. ✖ $\frac{3}{2}$

3. ✔ 2

4. ✖ $\frac{1}{2}$

Question Number : 89 Question Id : 105615569 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Assertion(A): In an elastic collision of two billiard balls, both kinetic energy and linear momentum remain conserved.

Reason (R) : During the collision of the balls, as the collision is elastic there is no exchange of energy. Therefore, both energy and momentum are conserved.

The correct option among the following is

Options :

(A) is true, (R) is true and (R) is the correct explanation for (A)

1. ✖

(A) is true, (R) is true but (R) is not the correct explanation for (A)

2. ✖

(A) is true but (R) is false

3. ✔

(A) is false but (R) is true

4. ✖

Question Number : 90 Question Id : 105615570 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

A wheel of radius with 0.5 m and a moment of inertia of 10 $kg.m^2$ is rotating freely at an angular speed of 70 rev/min. The wheel can be stopped in 5.0 s by pressing a wet cloth against the rim and exerting a radially inward force of 88 N. The coefficient of kinetic friction between the wheel and wet cloth is

Options :

1. ✖ 0.17

2. ✔ 0.33

3. ✖ 0.40

4. ✖ 0.60

Question Number : 91 Question Id : 105615571 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

A simple pendulum of length 1 m and having a bob of mass 100 g is suspended in a car, moving on a circular track of radius 100 m with uniform speed 10 m/s. If the pendulum makes small oscillation in a radial direction about its equilibrium position, then its time period can be given by $T = 2\pi / \alpha^{1/4}$. The value of α is
[Take g = 10 m/s^2]

Options :

1. ✖ 11

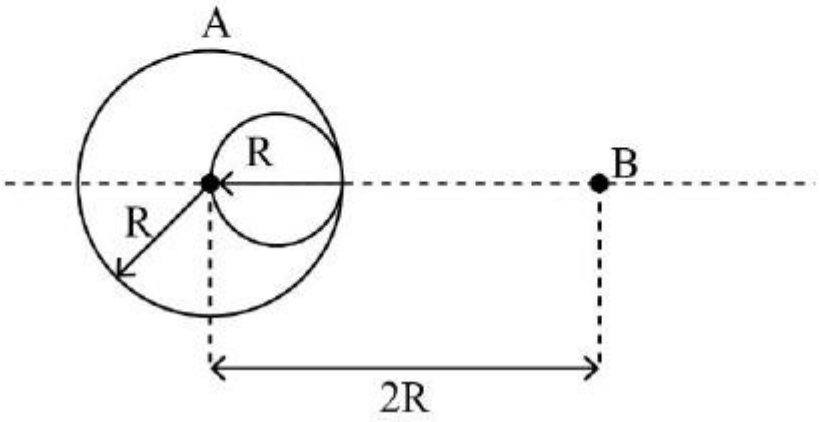
2. ✖ 110

3. ✔ 101

4. ✖ 1100

Question Number : 92 Question Id : 105615572 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A uniform sphere A with radius R exerts a force F on a small particle B situated at a distance 2R from the centre of the sphere. A spherical portion of diameter R is cut from the sphere A as shown in the figure. If F' is the new gravitational force between the remaining part of the sphere A and the particle B then the correct relation between F and F'



Options :

1. $F' = \frac{9}{14}F$ ✖

2. $F' = \frac{14}{9}F$ ✖

3. $F' = \frac{7}{9}F$ ✔

$$F' = \frac{9}{7}F$$

4. ✖

Question Number : 93 Question Id : 105615573 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

An object of mass 15 kg is attached to the end of a metal wire of unstretched length 1.0 m. The object is then whirled in a vertical circle with an angular velocity of $4\ rad/s$ at the bottom of the circle. If the cross sectional area of the wire is 0.05 cm^2 and Young's modulus of metal is $2\times10^{11}\ N/m^2$, then the elongation of the wire when the mass is at the lowest point of its path
(Take $g = 10\ m/s^2$)

Options :

0.27 mm

1. ✖

0.39 mm

2. ✔

0.55 mm

3. ✖

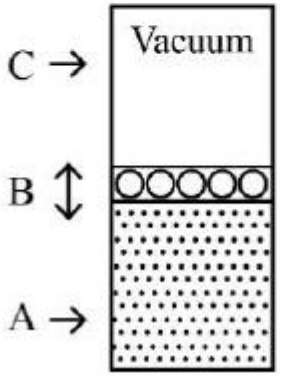
0.25 mm

4. ✖

Question Number : 94 Question Id : 105615574 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

In the figure, the chamber A contains a gas, movable chamber B is placed on the top of the gas and it contains n metal balls. The weight of chamber B is supported by the gas. Chamber C has vacuum. Let the gas be in equilibrium at pressure P. Let P′ be the pressure if one of the balls is taken away. Find (P− P′)/ P.



Options :

1

1. ✖

n

2. ✖

2n

3. ✖

1/n

4. ✔

Question Number : 95 Question Id : 105615575 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A liquid flows steadily through a cylindrical pipe having a radius 2R at a point A and radius R at point B farther along the flow direction. If the velocity at point B is $4v$, what will be the velocity at point A?

Options :

$\frac{1}{2}v$

1. ✖

v

2. ✔

2ν

3. ✖

3ν

4. ✖

Question Number : 96 Question Id : 105615576 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

A piece of metal has a weight of 49 gm in air and 39 gm in a liquid of density 1.2×10^3 kg/m^3 kept at 32 °C. When the temperature of the liquid is raised to 42 °C the metal piece has a weight of 40 gm. If the density of the liquid at 42 °C is 1.0×10^3 kg/m^3, then the coefficient of linear expansion of the metal is

Options :

$\frac{8}{3}\times10^{-3}/^{\circ}\text{C}$

1. ✔

$\frac{11}{3}\times10^{-3}/^{\circ}\text{C}$

2. ✖

$\frac{1}{3} \times 10^{-4} / {}^{\circ}\mathrm{C}$

3. ✖

$\frac{4}{3} \times 10^{-3} / {}^{\circ}\mathrm{C}$

4. ✖

Question Number : 97 Question Id : 105615577 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A metal cooking pot has a base area of 0.2 m^2 and thickness 2.0 cm. It boils water at a rate of 3.0 kg/min when placed on a hot plate. The temperature of the part of the hot plate in contact with the pot is approximately
[Thermal conductivity of metal is 120 $Js^{-1}m^{-1}K^{-1}$, heat of vaporisation of water is $2\times10^{6}\,J/kg$]

Options :

246 $^{\circ}C$

1. ✖

183 $^{\circ}C$

2. ✔

162 °C

3. ✖

214 °C

4. ✖

Question Number : 98 Question Id : 105615578 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

A quantity of monoatomic gas undergoes a process in which pressure is changed linearly with volume. The pressure and volume are changed from initial value (P_o, V_o) to final value ($3P_o$, $3V_o$). The heat absorbed by the gas during the process is

Options :

$8\ P_o\ V_o$

1. ✖

$12\ P_o\ V_o$

2. ✖

$16\ P_o\ V_o$

3. ✔

$20\ P_o\ V_o$

4. ✖

Question Number : 99 Question Id : 105615579 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

An ideal gas having initial pressure P, volume V and temperature T is allowed to expand adiabatically until its volume becomes 4V, while its temperature falls to $\frac{T}{2}$. If the work done by the gas during the expansion is αPV, the value of α is

Options :

1.25

1. ✖

1.0

2. ✔

1.50

3. ✖

2.0

4. ✖

Question Number : 100 Question Id : 105615580 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

At what temperature, an oxygen molecule has the same r.m.s velocity as the hydrogen molecule has at 20 K?

Options :

1. 160 K ✖

2. 320 K ✔

3. 293 K ✖

4. 347 K ✖

Question Number : 101 Question Id : 105615581 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Two strings A and B produce beat of frequency $\Delta f_1 > 0$. The tension in string A is slightly increased and the beat frequency is found to be $\Delta f_2 > 0$. If the original frequency of A is f_0 and $\Delta f_2 < \Delta f_1$, then the frequency of B is

Options :

1. $f_0 + \Delta f_1$ ✔

2. $f_0 + \Delta f_1 - \Delta f_2$ ✖

3. $f_0 - \Delta f_1$ ✖

4. $f_0 + \frac{(\Delta f_1 + \Delta f_2)}{2}$ ✖

Question Number : 102 Question Id : 105615582 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A light ray travels from a medium with refractive index n_1 to another medium of refractive index n_2. If $n_1=2$ and $n_2=\sqrt{3}$, then find the critical angle.

Options :

1. ✖ 15°

2. ✖ 30°

3. ✖ 45°

4. ✔ 60°

Question Number : 103 Question Id : 105615583 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

In Young's double slit experiment for what order does the wavelength of red light ($\lambda = 780$ nm) coincide with $(m+1)^{th}$ order of blue light $(\lambda = 520\,nm)$

Options :

1

1. ✖

2

2. ✔

3

3. ✖

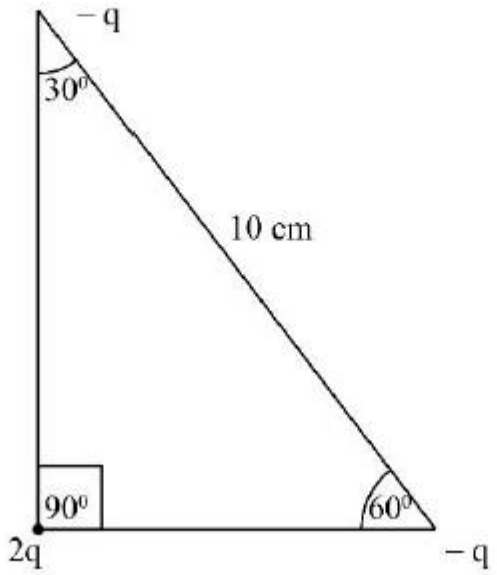
4

4. ✖

Question Number : 104 Question Id : 105615584 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Three charges are arranged on the vertices of a right angle triangle as shown in the figure. The magnitude of dipole moment of the combination in the unit of C-cm is



Options :

1. ✖ $10\sqrt{2}\,q$

2. ✖ $5\,q$

3. ✖ $10\sqrt{3}\,q$

10 q

4. ✔

Question Number : 105 Question Id : 105615585 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A parallel – plate capacitor of plate area 10 cm^2 and plate separation 3 mm is charged to a potential difference 12 V and then the battery is disconnected. A slab of dielectric constant 3 is then inserted between the plates. The work done on the system in the process of inserting the slab is $\alpha \varepsilon_0$. The value of α is

(Take ε_0 as the permittivity of free space)

Options :

8

1. ✖

12

2. ✖

16

3. ✔

18

4. ✖

Question Number : 106 Question Id : 105615586 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A metal has 9×10^{28} conduction electrons per m^3 and its resistivity is 1×10^{-8} Ω .m. If the drift speed of an electron in the metal is 1.6×10^{6} m/s then its mean free path is (mass of electron = 9×10^{-31} kg and charge of electron = 1.6×10^{-19}C)

Options :

55.5 nm

1. ✖

78.0 nm

2. ✖

40.0 nm

3. ✖

62.5 nm

4. ✔

Question Number : 107 Question Id : 105615587 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The resistivity of a metal is $1 \times 10^{-8}\ \Omega m$. If it contains 9×10^{28} electrons per m^3 then the relaxation time of electrons inside the metal is nearly
(electron mass = $9 \times 10^{-31} kg$)

Options :

1. $4 \times 10^{-14} s$ ✔

2. $7 \times 10^{-14} s$ ✖

3. $1.0 \times 10^{-14} s$ ✖

4. $9 \times 10^{-14} s$ ✖

Question Number : 108 Question Id : 105615588 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A particle of mass m and charge q travelling with a velocity v along the x – axis enters a uniform electric field $\vec{E}$ directed along the y – axis. What will be the trajectory of the particle?

Options :

1. ✖ Circular

2. ✖ Elliptical

3. ✔ Parabolic

4. ✖ Helical

Question Number : 109 Question Id : 105615589 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

A long solenoid with 10.0 turn/cm and a radius of 8 cm carries a current of 7 mA. A current carrying straight conductor is located along the central axis of the solenoid. If the direction of resulting magnetic field is 60° to axial direction at a point 5 cm from the axis of the solenoid along the radial direction, then the current in the conductor is [Take $\sqrt{2}=1.4, \sqrt{3}=1.7$]

Options :

1. ✖ 3.41A

2. ✖ 4.21A

3. ✔ 3.74A

4. ✖ 4.5 A

Question Number : 110 Question Id : 105615590 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A thin magnetic needle is placed in a magnetic field of 200 G with its axis at 30° to the direction of the field. Find the magnetic moment of the needle if it experiences a torque of 0.012 Nm in this field.

Options :

1. ✔ $1.2\ Am^2$

2. ✖ $12.0\ Am^2$

3. ✖ $0.6\ Am^2$

4. ✖ $6.0\ Am^2$

Question Number : 111 Question Id : 105615591 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A wire loop of area $0.2m^2$ has a resistance of 20 Ω . A magnetic field pointing normal to the loop has a magnitude of 0.25 T and is reduced to zero at a uniform rate in 10^{-4} sec. What is induced emf and resulting current?

Options :

1. ✖ 50 V, 2.5 A

2. ✔ 500 V, 25 A

3. ✖ 250 V, 12.5 A

4. ✖ 500 V, 2.5 A

Question Number : 112 Question Id : 105615592 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A resistor of resistance of 100 Ω is connected to an AC source $\varepsilon = 10\sin(250\ \pi s^{-1})t$.
The energy dissipated as heat during t = 0 to t =1 ms is approximately.

Options :

1. ✔ $\frac{0.57}{\pi}$ mJ

2. ✖ $\frac{1.141}{\pi}$ mJ

3. ✖ 1 mJ

4. ✖ 0.5 mJ

Question Number : 113 Question Id : 105615593 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

About 20% of the power of a 100 W bulb is converted to visible radiation. Assuming that the radiation is emitted isotropically and neglecting reflection, the average intensity of visible radiation at a distance of 5 m is $\frac{\alpha}{25\pi}$ W/m^2 . The value of α is

Options :

1. ✖ 15

2. ✔ 5

37.5

3. ✖

30

4. ✖

Question Number : 114 Question Id : 105615594 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Light strikes a metal surface causing photoelectric emission. The wavelength of incident light is 248 nm. If the stopping potential for the ejected electrons is 2.8 eV, then the work function of the metal is
(Take hc = 1240 eV.nm)

Options :

5.2 eV

1. ✖

4.4 eV

2. ✖

3.8 eV

3. ✖

2.2 eV

4. ✔

Question Number : 115 Question Id : 105615595 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The de-Broglie wavelength associated with an electron, accelerated through a potential difference of 121 volts is about:
[Take Plank's constant $= h = 6.6\times10^{-34} J\cdot s$, mass of electron 9×10^{-31} kg]

Options :

0.123 nm

1. ✖

0.112 nm

2. ✔

0.221 nm

3. ✖

0.098 nm

4. ✖

Question Number : 116 Question Id : 105615596 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The difference in the wavelength between the maximum and minimum of Balmer series
[Use $R_H = 1 \times 10^7\ m^{-1}$]

Options :

1. 1600 Å ✖

2. 3200 Å ✔

3. 4000 Å ✖

4. 4800 Å ✖

Question Number : 117 Question Id : 105615597 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The radius and mass number of nucleus '1' is R_1 and A_1 respectively. The radius and mass number of nucleus '2' is R_2 and A_2 respectively. If A_2 is larger than A_1 by 2%, then R_2 is larger than R_1 by

Options :

1. ✔ $\frac{2}{3}\%$

2. ✖ 1%

3. ✖ 8%

4. ✖ $\frac{3}{2}\%$

Question Number : 118 Question Id : 105615598 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Current I through a given p – n junction when a voltage V is applied across it is given to be $I = I_0\left(e^{\frac{V}{2V_T}} - 1\right)$ where I_0 and V_T are constants. If $r_d(I)$ is the dynamic resistance of the junction, then $r_d(1000\ I_0) = \alpha\, r_d(10\ I_0)$, where α is approximately equal to

Options :

1. ✖ 10

2. ✖ 1/10

3. ✔ 1/100

4. ✖ 1/1000

Question Number : 119 Question Id : 105615599 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

For an n-p-n transistor structure which of the following statements is NOT true?

Options :

1. ✖ Emitter is heavily doped and moderate in size

2. ✖ Base is lightly doped and thin in size

3. ✔ Collector is lightly doped and large in size

4. ✖ Collector is moderately doped and large in size

Question Number : 120 Question Id : 105615600 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The range of frequency bands used for standard AM broadcast is

Options :

540 – 1600 KHz

1. ✔

88 – 108 MHz

2. ✖

800 – 900 MHz

3. ✖

3.7 – 4.2 GHz

4. ✖

Chemistry

Section Id :	10561512
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	40
Number of Questions to be attempted :	40
Section Marks :	40
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	10561512
Question Shuffling Allowed :	Yes

Question Number : 121 Question Id : 105615601 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

If the uncertainty in velocity is $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$, then the ratio of uncertainty in position and momentum is

Options :

1. 10 : 1 ✖

2. 100 : 1 ✖

3. 1 : 1 ✔

4. 0.5 : 1 ✖

Question Number : 122 Question Id : 105615602 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The valency shell electronic configuration of Cr and Cu atoms, respectively, are

Options :

1. $3d^4 4s^2$; $3d^{10} 4s^1$ ✖

2. $3d^5 4s^1$; $3d^{10} 4s^1$ ✔

3. $3d^5 4s^1$; $3d^9 4s^2$ ✖

4. $3d^4 4s^2$; $3d^9 4s^2$ ✖

Question Number : 123 Question Id : 105615603 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Identify all the correct statements for Lanthanide contraction.

a) The covalent properties of the Lanthanide metal hydroxides increases from La to Lu.
b) The chemical reactivity decreases from La to Lu.
c) $La(OH)_3$ is more basic than $Lu(OH)_3$.
d) Zr and Hf have about the same radius.
e) Separation of Lanthanides from one another is easy.

Options :

1. a, b, c, e only ✖

2. a, b, c, d only ✔

3. a, b, c only ✖

4. b, c, d only ✖

Question Number : 124 Question Id : 105615604 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The correct order of the electron gain enthalpy of the given elements is

Options :

1. ✔ O > Se > S

2. ✖ Se > S > O

3. ✖ O > S > Se

4. ✖ S > O > Se

Question Number : 125 Question Id : 105615605 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The correct pair of species with (A) the highest bond order and (B) diamagnetic character is

Options :

A	B
O_2	O_2^+

1. ✖

A	B
O_2^+	O_2^{2-}

2. ✔

A	B
O_2^-	O_2

3. ✖

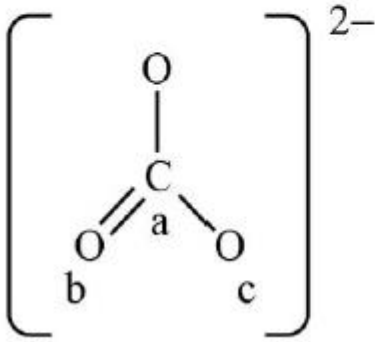
A	B
O_2^{2-}	O_2^+

4. ✖

Question Number : 126 Question Id : 105615606 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

The incomplete Lewis representation of CO_3^{2-} is given below. The formal charge on atoms marked as a, b, and c, respectively, are



Options :

1. ✔ a : 0 b : 0 c : –1

2. ✖ a : 0 b : –2 c : 0

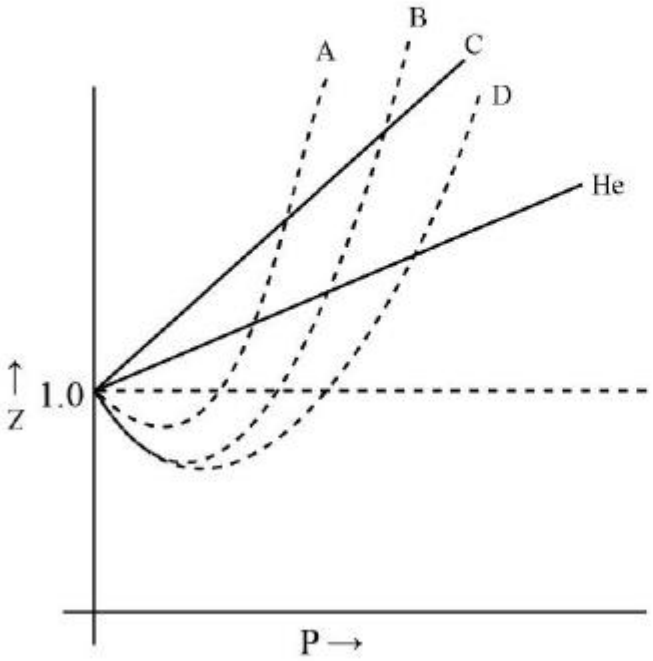
3. ✖ a : –2 b : 0 c : 0

4. ✖ a : 0 b : –1 c : –1

Question Number : 127 Question Id : 105615607 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A plot of the compressibility factor (z) vs P is shown below for H_2, He, N_2, CO_2 and SO_2. Identify the plot for CO_2 gas.



Options :

A

1. ✖

B

2. ✖

C

3. ✖

D

4. ✔

Question Number : 128 Question Id : 105615608 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The average molecular weight of the air which has 21 % of O_2 and 79 % of N_2, is

Options :

44.8

1. ✖

100

2. ✖

14.4

3. ✖

28.8

4. ✔

Question Number : 129 Question Id : 105615609 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The number of significant figures in 2.0400 is

Options :

1. ✖ 3

2. ✖ 2

3. ✖ 4

4. ✔ 5

Question Number : 130 Question Id : 105615610 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Identify the values of a, b, c, d and e for the following unbalanced reaction

$$a\,KNO_3 + 5C_{12}H_{22}O_{11} \longrightarrow b\,N_2 + c\,CO_2 + d\,H_2O + e\,K_2CO_3$$

Options :

1. ✖

a	b	c	d	e
10	12	18	55	12

2. ✖

a	b	c	d	e
6	8	6	11	12

3. ✖

a	b	c	d	e
48	36	6	8	12

4. ✔

a	b	c	d	e
48	24	36	55	24

Question Number : 131 Question Id : 105615611 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Given $H_2(g)+\frac{1}{2}O_2(g)\rightarrow H_2O(l);\ \Delta H=-285\,kJ$

$N_2O_5(g)+H_2O(l)\rightarrow 2HNO_3(l);\ \Delta H=-76.6\,kJ$

$N_2(g)+3O_2(g)+H_2(g)\rightarrow 2HNO_3(l);\ \Delta H=-348.2\,kJ$

Calculate the ΔH of $2N_2(g)+5O_2(g)\rightarrow 2N_2O_5(g)$.

Options :

572 kJ

1. ✖

419 kJ

2. ✖

14.5 kJ

3. ✖

26.8 kJ

4. ✔

Question Number : 132 Question Id : 105615612 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

In which of the following reactions at equilibria, the position of the equilibrium shifts towards the products, if the total pressure is increased?

(i) $X_2(g) + 3Y_2(g) \rightleftharpoons 2XY_3(g)$

(ii) $X_2(g) + Y_2(g) \rightleftharpoons 2XY(g)$

(iii) $X_2(g) + Z_2(g) \rightleftharpoons 2XZ(g)$

(iv) $X_2(g) + Y_4(g) \rightleftharpoons 2XY_2(g)$

Options :

(ii)

1. ✖

(iii)

2. ✖

(i)

3. ✔

(iv)

4. ✖

Question Number : 133 Question Id : 105615613 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Phosphorous and phosphoric acids are, respectively, _____ acids.

Options :

1. dibasic, tribasic ✔

2. tribasic, tribasic ✖

3. tribasic, dibasic ✖

4. tetrabasic, tribasic ✖

Question Number : 134 Question Id : 105615614 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The freezing point of heavy water at 1 atm pressure is

Options :

1. 0 °C ✖

3.8 °C

2. ✔

4.8 °C

3. ✖

1 °C

4. ✖

Question Number : 135 Question Id : 105615615 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Which of the following salts can accommodate more number of H_2O molecules per molecule in their halide hydrates?

Options :

$BaCl_2$

1. ✖

$MgCl_2$

2. ✔

$CaCl_2$

3. ✖

$SrCl_2$

4. ✖

Question Number : 136 Question Id : 105615616 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The correct order of Lewis acidic character of boron trihaldes is

Options :

$BF_3 > BCl_3 > BI_3 > BBr_3$

1. ✖

$BI_3 > BBr_3 > BF_3 > BCl_3$

2. ✖

$BI_3 > BBr_3 > BCl_3 > BF_3$

3. ✔

$BF_3 > BCl_3 > BBr_3 > BI_3$

4. ✖

Question Number : 137 Question Id : 105615617 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The acidic oxide from the following is

Options :

1. SnO_2 ✖

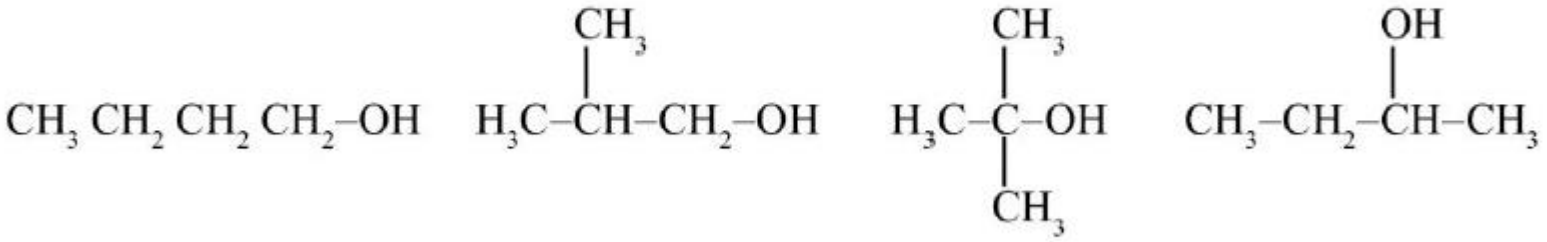
2. SiO_2 ✔

3. PbO_2 ✖

4. SnO ✖

Question Number : 138 Question Id : 105615618 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The correct order of rate of acid mediated dehydration reaction of the following compounds is



(I) (II) (III) (IV)

Options :

1. ✖ II > III > IV > I

2. ✖ IV > III > I> II

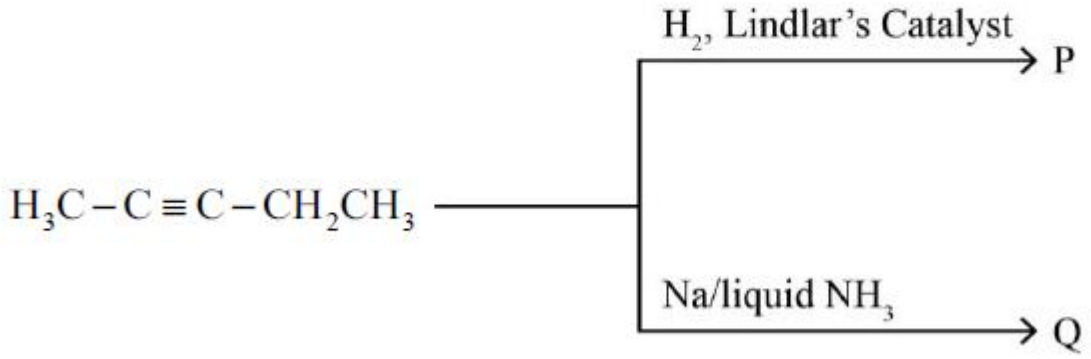
3. ✖ III > II > IV > I

4. ✔ III > IV > II > I

Question Number : 139 Question Id : 105615619 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

The major products P and Q in the following reactions, respectively, are



Options :

1. ✖

P	Q
Alkene (cis)	Alkene (cis)

2. ✖

P	Q
Alkane	Alkene (trans)

3. ✔

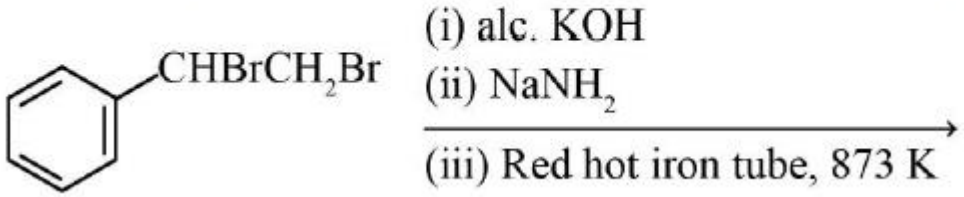
P	Q
Alkene (cis)	Alkene (trans)

P	Q
Alkene (trans)	Alkene (trans)

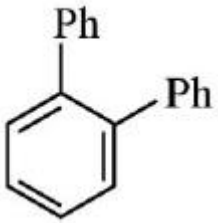
4. ✖

Question Number : 140 Question Id : 105615620 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The major product formed in the following reaction sequence is

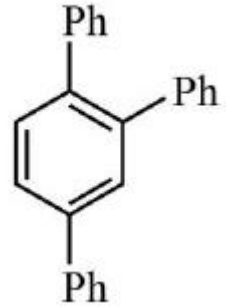


Options :

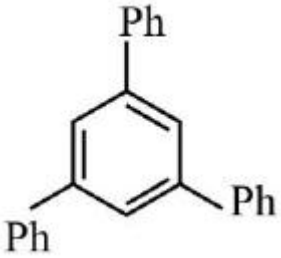


1. ✖

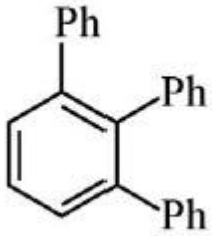
2. ✖



3. ✔



4. ✖



Question Number : 141 Question Id : 105615621 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

The number of nearest neighbours in a BCC unit cell is

Options :

1. ✖ 12

2. ✔ 8

3. ✖ 6

4. ✖ 4

Question Number : 142 Question Id : 105615622 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The Henry's law constant for the solubility of N_2 gas in water at 298 K is $1 \times 10^{+5}$ atm. The mole fraction of air is 0.8. The number of moles of N_2 from air dissolved in 10 moles of water at 298 K and 5 atm pressure is

Options :

1. ✖ 4×10^{-5}

2. ✔ 4×10^{-4}

3. ✖ 5×10^{-4}

4. ✖ 4×10^{-6}

Question Number : 143 Question Id : 105615623 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

What is the effect of external pressure on the osmotic pressure (OP) of a solution?

Options :

1. ✖ OP decreases with increase of pressure

2. ✖ OP decreases initially, then increases

OP remained nearly same with increase / decrease of external pressure

3. ✔

OP increases with increase of pressure

4. ✖

Question Number : 144 Question Id : 105615624 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Given $E^{\circ}_{Mn^{7+}/Mn^{2+}} = 1.51V$, $E^{\circ}_{Mn^{4+}/Mn^{2+}} = 1.23V$

Calculate the $E^{\circ}_{Mn^{7+}/Mn^{4+}}$

Options :

0.28 V

1. ✖

-0.28 V

2. ✖

1.7 V

3. ✔

0.48 V

4. ✖

Question Number : 145 Question Id : 105615625 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The reaction $2A \rightarrow 2B + C$ has a rate constant of $1.2 \times 10^{-2} s^{-1}$. Which of the following is correct?

Options :

Plot of [A] **vs** "$\frac{1}{t}$" will be straight line

1. ✖

Plot of $\frac{1}{[A]}$ **vs** t^2 will be a straight line

2. ✖

Plot of ln[A] **vs** t will be a straight line

3. ✔

Plot of [A] **vs** t^2 will be a straight line

4. ✖

Question Number : 146 Question Id : 105615626 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Which of the following does not show Tyndall effect?

Options :

1. ✖ Clouds

2. ✖ Milk

3. ✔ Sugar solution

4. ✖ Suspension

Question Number : 147 Question Id : 105615627 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

A nitrogen oxide that forms "in situ" when dilute $FeSO_4$ is treated with aqueous solution of nitrate ion and then careful addition of conc. H_2SO_4 along the sides of test tube, is

Options :

1. NO_2 ✖

2. NO ✔

3. N_2O ✖

4. N_2O_3 ✖

Question Number : 148 Question Id : 105615628 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

On treating SO_2 with aqueous solution of $KMnO_4$, the manganese ion reduces to

Options :

1. Mn^{2+} only ✔

Mn^{4+} only

2. ✖

Mn^{6+} only

3. ✖

Mn^{4+} and Mn^{6+}

4. ✖

Question Number : 149 Question Id : 105615629 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Match the following.

Column-I		Column-II	
Molecule			Colour
A)	F_2	I)	Red
B)	Cl_2	II)	Violet
C)	Br_2	III)	Yellow
D)	I_2	IV)	Greenish yellow

The correct match is

Options :

1. ✖

A	B	C	D
IV	III	I	II

2. ✔

A	B	C	D
III	IV	I	II

3. ✖

A	B	C	D
III	I	IV	II

A	B	C	D
IV	III	II	I

4. ✖

Question Number : 150 Question Id : 105615630 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The correct decreasing order of the following 'Xe' compounds to act as both fluorinating and oxidizing agent is

i) XeF_6 ii) XeF_4 iii) XeF_2

Options :

$XeF_2 > XeF_4 > XeF_6$

1. ✖

$XeF_6 > XeF_4 > XeF_2$

2. ✔

$XeF_4 > XeF_6 > XeF_2$

3. ✖

$XeF_6 = XeF_4 > XeF_2$

4. ✖

Question Number : 151 Question Id : 105615631 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The correct order of ionic radii of trivalent ions Y^{3+}, La^{3+}, Eu^{3+}, and Lu^{3+} is
(Y = 39, La = 57, Eu = 63, Lu = 71)

Options :

1. ✖ $Lu^{3+} < Eu^{3+} < La^{3+} < Y^{3+}$

2. ✖ $La^{3+} < Eu^{3+} < Lu^{3+} < Y^{3+}$

3. ✔ $Y^{3+} < Lu^{3+} < Eu^{3+} < La^{3+}$

4. ✖ $Y^{3+} < La^{3+} < Eu^{3+} < Lu^{3+}$

Question Number : 152 Question Id : 105615632 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

When permanganate ion is heated at 513 K, led to the formation of two manganese based products. The physical properties of the product in which manganese with the higher oxidation state than the other are

Options :

1. Diamagnetic and colourless ✖

2. Paramagnetic and colourless ✖

3. Paramagnetic and green ✔

4. Diamagnetic and green ✖

Question Number : 153 Question Id : 105615633 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Assertion (A) : Both Glucose and Fructose have the same D-configuration.

Reason (R) : Both Glucose and Fructose are dextrorotatory.

The correct option among the following is

Options :

1. (A) is true, (R) is true and (R) is the correct explanation for (A) ✖

(A) is true, (R) is true but (R) is not the correct explanation for (A)

2. ✖

(A) is true but (R) is false

3. ✔

(A) is false but (R) is true

4. ✖

Question Number : 154 Question Id : 105615634 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

The major product of the following reactions is



$\xrightarrow[\text{(ii) } CH_3Cl,\ AlCl_3 \text{ (anhyd.)}]{\text{(i) } Br_2,\ FeBr_3 \text{ (anhyd.)}}$

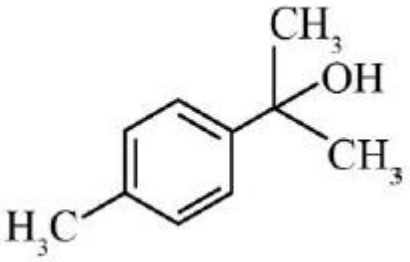
(iii) Mg / dry ether

(iv) CH_3CHO

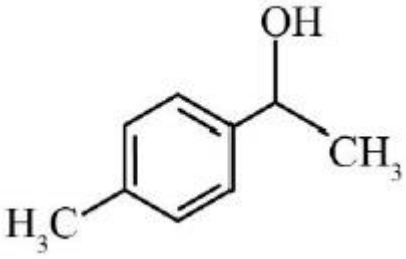
(v) H_2O

Options :

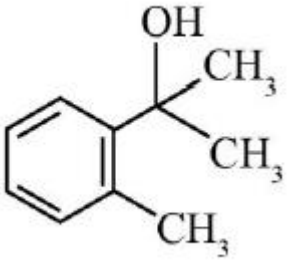
1. ✖

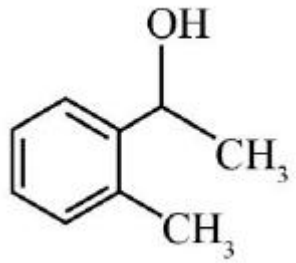


2. ✔



3. ✖





4. ✖

Question Number : 155 Question Id : 105615635 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Benzene on reaction with acetyl chloride in the presence of anhydrous $AlCl_3$ gave the product P. The product P on reaction with methylmagnesium bromide followed by treatment with water furnished the product Q. The molecular formula of Q is

Options :

1. $C_8H_{10}O$ ✖

2. C_8H_8O ✖

3. $C_9H_{12}O$ ✔

$C_9H_{10}O$

4. ✖

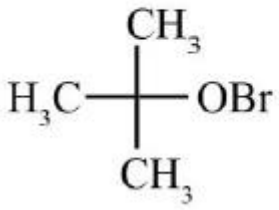
Question Number : 156 Question Id : 105615636 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

Sodium tertiary butoxide on reaction with methyl bromide produced the product P.
Sodium methoxide upon reaction with tertiary butyl bromide generated the product Q.
The products P and Q are

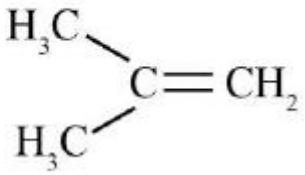
Options :

1. ✖

P

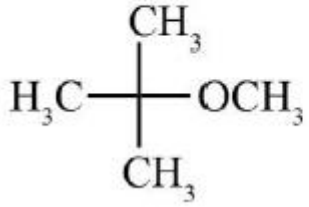


Q

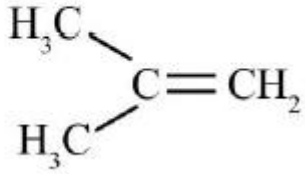


2. ✔

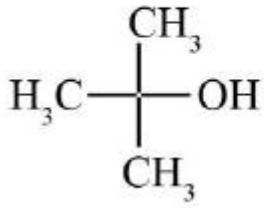
P



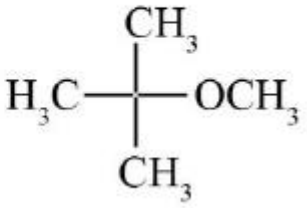
Q



P

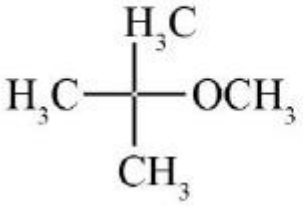


Q

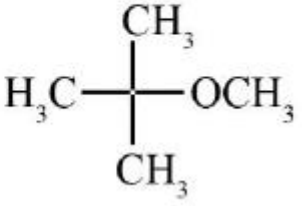


3. ✖

P



Q



4. ✖

Question Number : 157 Question Id : 105615637 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Match the following.

List - I		List - II	
A)	Acid chloride to aldehyde	I)	DIBAL–H
B)	Benzene to benzaldehyde	II)	CO, HCl, anhyd. $AlCl_3$
C)	Acetylene to aldehyde	III)	$HgSO_4$, H_2SO_4
D)	Ester to aldehyde	IV)	H_2, Pd – $BaSO_4$

The correct match is

Options :

1. ✖

A	B	C	D
IV	II	I	III

2. ✖

A	B	C	D
I	II	III	IV

3. ✖

A	B	C	D
III	II	I	IV

A	B	C	D
IV	II	III	I

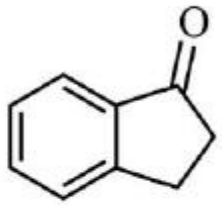
4. ✔

Question Number : 158 Question Id : 105615638 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

In the following compounds, the ones that give positive iodoform test are

$CH_3CH_2COCH_2CH_3$ (I)

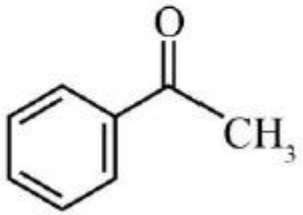
$CH_3CH(OH)CH_3$ (II)



(III)

$CH_3CH_2COCH_3$ (IV)

PhCOPh (V)



(VI)

Options :

I, II and III

1. ✖

II, III and V

2. ✖

IV, V and VI

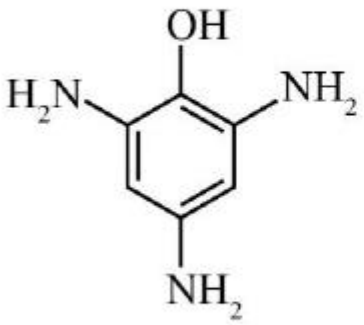
3. ✖

II, IV and VI

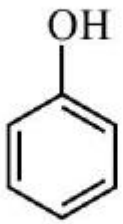
4. ✔

Question Number : 159 Question Id : 105615639 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 1 Wrong Marks : 0

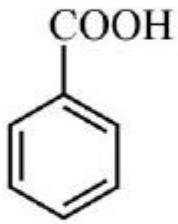
Which of the following set of compounds react with $NaHCO_3$?



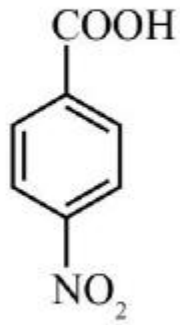
I



II



III



IV

Options :

1. ✖ I, II, III, IV

2. ✖ I, II, III only

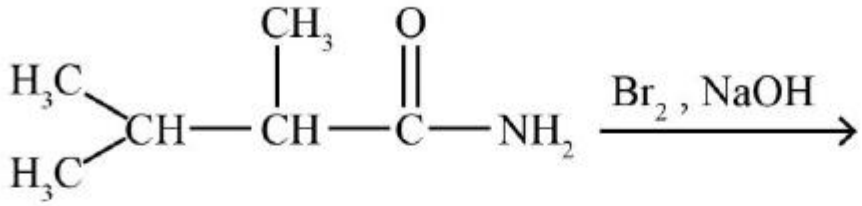
3. ✔ III, IV only

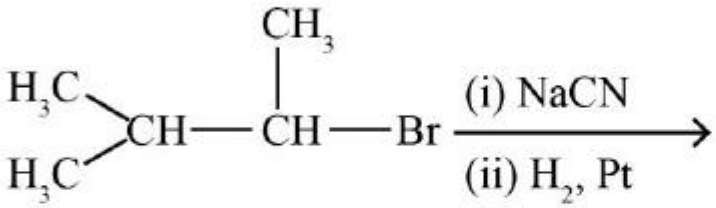
4. ✖ I, III, IV only

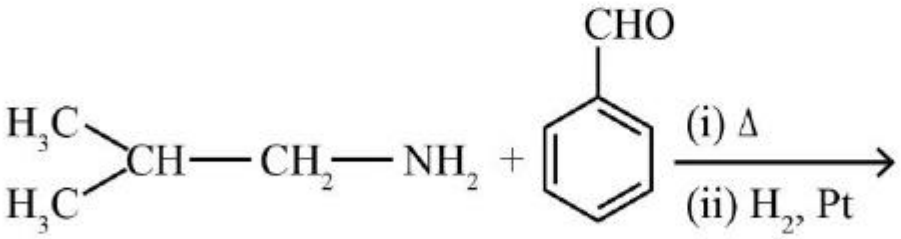
Question Number : 160 Question Id : 105615640 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

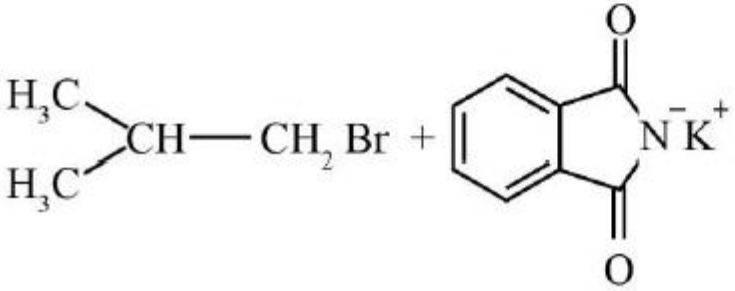
Correct Marks : 1 Wrong Marks : 0

Among the following set of reactions, the most suitable method for preparing secondary amine is

A) 

B) 

C) 

D) 

Options :

A

1. ✖

B

2. ✖

C

3. ✔

D

4. ✖