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 20th Jul 2022 Shift 1
Subject Name :	Engineering (English)
Creation Date :	2022-07-21 10:41:55
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 :	1056157
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 :	10561519
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 :	10561519
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 105615961 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 domain of the real valued function $f(x)=\sqrt{\frac{2x^2-7x+5}{3x^2-5x-2}}$ is

Options :

$\left(-\infty,-\frac{1}{3}\right)\cup[1,2)\cup\left[\frac{5}{2},\infty\right)$

1. ✔

$(-\infty,1)\cup(2,\infty)$

2. ✖

$\left(-\frac{1}{3},\frac{5}{2}\right]$

3. ✖

$\left(-\infty,\frac{-1}{3}\right]\cup\left[\frac{5}{2},\infty\right)$

4. ✖

Question Number : 2 Question Id : 105615962 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 the real valued function $f(x)=|x-2|+|x-3|$ is

Options :

$[3,\infty)$

1. ✖

$[1,\infty)$

2. ✔

$[2,\infty)$

3. ✖

$(0,2]\cup[3,\infty)$

4. ✖

Question Number : 3 Question Id : 105615963 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

$$\text{If } A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 3 & 2 \\ 3 & 4 & 5 \end{bmatrix} \text{ then} \left(A + A^T\right)\left(A - A^T\right) =$$

Options :

$$4\begin{bmatrix} 3 & 2 & -3 \\ 3 & 0 & -3 \\ 3 & 2 & -3 \end{bmatrix}$$

1. ✔

$$\begin{bmatrix} 12 & 8 & 12 \\ 12 & 0 & 12 \\ 12 & 8 & 12 \end{bmatrix}$$

2. ✖

$$4\begin{bmatrix} 3 & -2 & -3 \\ 3 & 0 & -3 \\ 3 & -2 & -3 \end{bmatrix}$$

3. ✖

$$\begin{bmatrix} -12 & 8 & 12 \\ -12 & 0 & 12 \\ -12 & 8 & 12 \end{bmatrix}$$

4. ✖

Question Number : 4 Question Id : 105615964 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 $f(x)=\begin{vmatrix} x & x+1 & x+3 \\ x+2 & x+4 & x+7 \\ x+6 & x+9 & x+13 \end{vmatrix}$, then $f(5)=$

Options :

-15

1. ✖

10

2. ✖

-2

3. ✔

0

4. ✖

Question Number : 5 Question Id : 105615965 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 $A=\begin{pmatrix}2 & 1 & 1\\ 0 & 1 & 0\\ 1 & 1 & 2\end{pmatrix}$. If $A^{-1}=\alpha A^2+\beta A+\gamma I$, where α,β,γ are real numbers and I is a 3×3 identity matrix, then $17\alpha+5\beta+\gamma=$

Options :

-1

1. ✖

$\frac{-1}{3}$

2. ✔

$\frac{2}{3}$

3. ✖

3

4. ✖

Question Number : 6 Question Id : 105615966 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 a system of simultaneous linear equations, if $AX=\begin{bmatrix}1\\1\\2\end{bmatrix}$, Adj $A=\begin{bmatrix}1&-1&-1\\1&1&-1\\1&1&1\end{bmatrix}$ and

$\det A > 0$, then $X =$

Options :

1. ✔ $\begin{bmatrix}-1\\0\\2\end{bmatrix}$

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

$$\begin{bmatrix} 0 \\ -1 \\ -1 \end{bmatrix}$$

3. ✖

$$\begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix}$$

4. ✖

Question Number : 7 Question Id : 105615967 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

$$\{x \in [0, 2\pi] / \sin x + i \cos 2x \text{ and } \cos x - i \sin 2x \text{ are conjugate to each other}\} =$$

Options :

$$\left\{\frac{\pi}{4}, \frac{\pi}{2}, \frac{3\pi}{4}, \pi, \frac{5\pi}{4}, \frac{3\pi}{2}, \frac{7\pi}{4}, 2\pi\right\}$$

1. ✖

$$\left\{\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}\right\}$$

2. ✖

$$\left\{\frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi\right\}$$

3. ✖

$$\phi$$

4. ✔

Question Number : 8 Question Id : 105615968 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 $|x+iy| = \sqrt{x^2+y^2}$, then $\left|\left(1-\sqrt{3}\,i\right)^9 + \left(\sqrt{3}+i\right)^9\right| =$

Options :

$$2^9$$

1. ✖

2^{18}

2. ✖

2^{10}

3. ✖

$2^{\frac{19}{2}}$

4. ✔

Question Number : 9 Question Id : 105615969 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 1, ω, ω^2 are the cube roots of unity and 1, α, α^2, α^3 are the fourth roots of unity in usual notation then $\alpha+\alpha\omega-\alpha^3\omega^2=$

Options :

3

1. ✖

2. ✖ 1

3. ✔ 0

4. ✖ -1

Question Number : 10 Question Id : 105615970 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 a quadratic equation $x^2 + bx + c = 0$ such that $\alpha^2 + \beta^2 = 5$ and $\alpha^3 + \beta^3 = 9$, then $b + c =$

Options :

1. ✖ -5

2. ✔ -1

3. ✖ 1

5

4. ✖

Question Number : 11 Question Id : 105615971 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 the expression $\frac{x^2-x+2}{x^2+x-2}$ for all $x \in \mathbb{R}-\{-2,1\}$ is

Options :

$(-2, 3)$

1. ✖

$\left[\frac{7}{9}, \infty\right)$

2. ✖

$(-\infty,-1] \cup \left[\frac{7}{9}, \infty\right)$

3. ✔

$(-\infty, -1]$

4. ✖

Question Number : 12 Question Id : 105615972 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 $x^3 - 9x^2 + 23x - 15 = 0$, then $\alpha^3 + \beta^3 + \gamma^3 =$

Options :

36

1. ✖

92

2. ✖

153

3. ✔

244

4. ✖

Question Number : 13 Question Id : 105615973 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 $\alpha, \beta, 2\beta$ are the real roots of the equation $x^3 - 9x^2 + k = 0$ and $k \in \mathbb{R} - \{0\}$, then $14\beta =$

Options :

1. ✖ 28

2. ✖ 36

3. ✖ 18

4. ✔ 54

Question Number : 14 Question Id : 105615974 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 sum of all distinct roots of the equation $x^5 - 3x^4 + 5x^3 - 5x^2 + 3x - 1 = 0$ is

Options :

1. ✖ 1

2. ✔ 2

3. ✖ 3

4. ✖ $2\sqrt{3}$

Question Number : 15 Question Id : 105615975 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

$(x^4+1)=\frac{1}{a}(x+1)^4$ is a reciprocal equation

Options :

only for $a = 1$

1. ✖

for all $a \in \mathbb{R} - \{1\}$

2. ✔

for all $a \in \mathbb{R}$

3. ✖

when a is an irrational number

4. ✖

Question Number : 16 Question Id : 105615976 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 $a, b, c \in \mathbb{N}$ and $a+b+c=5$. Let L, M be the least and greatest values of $2^a 3^b 5^c$ respectively. Then $M - L$ =

Options :

1. $2 \cdot 3^2 \cdot 5 \cdot 7$ ✔

2. $2^2 \cdot 3 \cdot 5 \cdot 7$ ✖

3. $2 \cdot 3^2 \cdot 5^2 \cdot 7^0$ ✖

4. $2^0 \cdot 3 \cdot 5^3 \cdot 7^0$ ✖

Question Number : 17 Question Id : 105615977 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 positive divisors of 360 which are multiples of 3 is

Options :

1. ✔ 16

2. ✖ 15

3. ✖ 24

4. ✖ 23

Question Number : 18 Question Id : 105615978 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

$$\frac{1}{8}-\frac{7}{8.12}+\frac{7.10}{8.12.16}-...=$$

Options :

$$\sqrt[3]{\frac{4}{7}}$$

1. ✖

$$\sqrt[3]{\frac{4}{7}}-\frac{3}{4}$$

2. ✔

$$\sqrt[3]{\frac{4}{7}}+\frac{3}{4}$$

3. ✖

$$\sqrt[3]{\frac{7}{4}}-\frac{3}{4}$$

4. ✖

Question Number : 19 Question Id : 105615979 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 $\frac{2x^2-3x+5}{(x-7)^3}=\frac{A}{x-7}+\frac{B}{(x-7)^2}+\frac{C}{(x-7)^3}$, then $2A-3B+C=$

Options :

1. 0 ✖

2. 27 ✖

3. 11 ✔

4. 15 ✖

Question Number : 20 Question Id : 105615980 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 $\frac{3x^2+ax+3}{(2x+3)(x^2+2)}=\frac{3}{2x+3}+\frac{Bx+C}{x^2+2}$ then $a\,(B+C)=$

Options :

1. ✖ -2

2. ✖ 3

3. ✖ -3

4. ✔ 2

Question Number : 21 Question Id : 105615981 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 $\sin(A+B)\sin(A-B)+\cos(A+B)\cos(A-B)=\frac{1}{2}$ and $0 < B < \frac{\pi}{2}$, then B =

Options :

1. $\frac{\pi}{6}$ ✔

2. $\frac{\pi}{4}$ ✖

3. $\frac{\pi}{3}$ ✖

4. $\frac{5\pi}{12}$ ✖

Question Number : 22 Question Id : 105615982 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

$$\frac{1}{\sin 250^\circ}+\frac{\sqrt{3}}{\cos 290^\circ}=$$

Options :

1. ✖ $\frac{1}{\sqrt{3}}$

2. ✔ 4

3. ✖ $\frac{4}{\sqrt{3}}$

4. ✖ 1

Question Number : 23 Question Id : 105615983 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 $A+B+C=\frac{\pi}{2}$, then $\sqrt{2}\cos\left(\frac{\pi}{4}-A\right)+\sqrt{2}\cos\left(\frac{\pi}{4}-B\right)+\sqrt{2}\cos\left(\frac{\pi}{4}-C\right)+1=$

Options :

1. $4\sqrt{2}\cos\frac{A}{2}\cos\frac{B}{2}\cos\frac{C}{2}$ ✔

2. $4\cos\frac{A}{2}\cos\frac{B}{2}\cos\frac{C}{2}$ ✖

3. $4\sin\frac{A}{2}\sin\frac{B}{2}\cos\frac{C}{2}$ ✖

4. $4\sqrt{2}\sin\frac{A}{2}\sin\frac{B}{2}\cos\frac{C}{2}$ ✖

Question Number : 24 Question Id : 105615984 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 $\sin h\, x = \tan A$, then $|\tan h\, x| =$

Options :

1. $|\sin A|$ ✔

2. $|\cos A|$ ✖

3. $|\sec A|$ ✖

4. $|\operatorname{cosec} A|$ ✖

Question Number : 25 Question Id : 105615985 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

$$\frac{\sin h(x+y)+\sin h(x-y)}{\cos h(x+y)-\cos h(x-y)}=$$

Options :

1. ✖ tan hy

2. ✔ cot hy

3. ✖ tan hx cot hy

4. ✖ tan hy cot hx

Question Number : 26 Question Id : 105615986 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, b, c are the sides of a triangle ABC and $\begin{vmatrix} b & 1 & a \\ a & 1 & c \\ c & 1 & b \end{vmatrix} = 0$, then

$2(\cos A + \cos B + \cos C) =$

Options :

1 ✖

2 ✖

3 ✔

4 ✖

Question Number : 27 Question Id : 105615987 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 triangle ABC, if $A = \frac{\pi}{3}$ and $B = \frac{\pi}{4}$ then $\frac{a^2 - b^2}{c^2} =$

Options :

1. $2 - \sqrt{3}$ ✔

2. $2 + \sqrt{3}$ ✖

3. $\sqrt{2} - 1$ ✖

4. $\sqrt{2} + 1$ ✖

Question Number : 28 Question Id : 105615988 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 $a = 3,\ b = 7,\ c = 8$ then $\sin\frac{B}{2}\tan\frac{C-A}{2} =$

Options :

1. ✖ $\frac{15\sqrt{3}}{22\sqrt{7}}$

2. ✖ $\frac{5\sqrt{2}}{11\sqrt{7}}$

3. ✖ $\frac{5\sqrt{3}}{11}$

4. ✔ $\frac{5\sqrt{3}}{22}$

Question Number : 29 Question Id : 105615989 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 ABC be a triangle and $\bar{a}, \bar{b}, \bar{c}$ be the position vectors of A, B, C respectively. If D divides BC in the ratio 2 : 3 internally and E divides CA in the ratio 2 : 1 internally then the position vector of the point P which divides DE in the ratio 3 : 5 internally is

Options :

1. $\frac{1}{8}(2\bar{a}+3\bar{b}+3\bar{c})$ ✔

2. $\frac{1}{8}(3\bar{a}+2\bar{b}+3\bar{c})$ ✖

3. $\frac{1}{8}(3\bar{a}+3\bar{b}+2\bar{c})$ ✖

4. $\frac{3}{8}(\bar{a}+\bar{b}+\bar{c})$ ✖

Question Number : 30 Question Id : 105615990 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 $2\bar{i}+4\bar{j}-5\bar{k}$, $\bar{i}+\bar{j}+\bar{k}$, $\bar{j}+2\bar{k}$ are the position vectors of the vertices A, B, C of a triangle respectively, then a unit vector along the median drawn through the vertex A is

Options :

1. $\frac{1}{\sqrt{174}}\left(5\bar{i}+10\bar{j}-7\bar{k}\right)$ ✖

2. $\frac{1}{\sqrt{214}}\left(3\bar{i}+6\bar{j}-13\bar{k}\right)$ ✔

3. $\frac{1}{\sqrt{66}}\left(\bar{i}+\bar{j}-8\bar{k}\right)$ ✖

4. $\frac{1}{7}\left(3\bar{i}+6\bar{j}-2\bar{k}\right)$ ✖

Question Number : 31 Question Id : 105615991 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 the points $2\bar{i}+3\bar{j}+8\bar{k}$ and $\bar{i}+6\bar{j}+4\bar{k}$. Let P be a plane passing through $-5\bar{i}+19\bar{j}-14\bar{k}$ and parallel to the vectors $\bar{i}-\bar{j}+\bar{k}$ and $\bar{i}-2\bar{j}+3\bar{k}$. If L meets the plane P at a point A, then the position vector of A, is

Options :

1. ✖ $-\bar{i}-12\bar{j}+4\bar{k}$

2. ✔ $-\bar{i}+12\bar{j}-4\bar{k}$

3. ✖ $\bar{i}-12\bar{j}-4\bar{k}$

4. ✖ $\bar{i}+12\bar{j}+4\bar{k}$

Question Number : 32 Question Id : 105615992 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 $\bar{a}, \bar{b}, \bar{c}$ be three unit vectors satisfying $\left|\bar{a}-\bar{b}\right|^2+\left|\bar{a}-\bar{c}\right|^2=10$. Then

Statement (I) : $\left|\bar{a}+2\bar{b}\right|^2+\left|2\bar{a}+\bar{c}\right|^2=2$.

Statement (II) : $\left|2\bar{a}+3\bar{b}\right|^2+\left|3\bar{a}+2\bar{c}\right|^2=10$.

Which of the above statements is(are) true?

Options :

Statement I is true, but Statement II is false

1. ✖

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 : 33 Question Id : 105615993 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 $\bar{r}\cdot\left(2\bar{i}+3\bar{j}+4\bar{k}\right)=5$, $\bar{r}\cdot\left(\bar{i}+\bar{j}-\bar{k}\right)=7$ are two planes and (16, –9, 0) is a point common to both the planes then the vector equation of the line of intersection of the planes is $\bar{r}=$

Options :

$(16+7\lambda)\bar{i}+(6\lambda+9)\bar{j}+\lambda\bar{k}$

1. ✖

$(16-7\lambda)\bar{i}+(6\lambda-9)\bar{j}-\lambda\bar{k}$

2. ✔

$16\bar{i}-9\bar{j}+\lambda(\bar{i}-7\bar{j}+6\bar{k})$

3. ✖

$16\bar{i}-9\bar{j}+\lambda(6\bar{i}-\bar{j}-7\bar{k})$

4. ✖

Question Number : 34 Question Id : 105615994 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 ABC be a triangle. Let a point P divide AB in the ratio 1 : 2 internally and a point Q divide BC in the ratio 1 : 2 internally. Let D be the point of intersection of AQ and CP. If the area of the triangle ABC is k square units then the area of the triangle BCD in sq. units is

Options :

1. ✔ $\frac{4k}{7}$

2. ✖ $\frac{2k}{7}$

3. ✖ $\frac{7k}{2}$

$\frac{7k}{4}$

4. ✖

Question Number : 35 Question Id : 105615995 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 10 is the mean deviation of 'n' observations $x_1, x_2, x_3, ..., x_n$ then the mean deviation of the observations $\frac{2x_1+5}{3}, \frac{2x_2+5}{3}, \frac{2x_3+5}{3}, ..., \frac{2x_n+5}{3}$ is

Options :

$\frac{25}{3}$

1. ✖

$\frac{40}{9}$

2. ✖

$\frac{20}{3}$

3. ✔

$\frac{15}{}$

4. ✖

Question Number : 36 Question Id : 105615996 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 bag contains 9 identical black balls numbered 1 to 9 and 4 identical white balls numbered 1 to 4. If 3 balls are drawn at a time randomly from that bag then the probability of getting at least one white ball is

Options :

$\frac{101}{143}$

1. ✔

$\frac{7}{143}$

2. ✖

$\frac{72}{143}$

3. ✖

$\frac{42}{143}$

4. ✖

Question Number : 37 Question Id : 105615997 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 probabilities of two persons to hit a target are $\frac{1}{4}$ and $\frac{1}{5}$ respectively. The probability that the target is being hit when both of them attempt independently is

Options :

$\frac{1}{2}$

1. ✖

$\frac{3}{5}$

2. ✖

$\frac{2}{5}$

3. ✔

$\frac{7}{10}$

4. ✖

Question Number : 38 Question Id : 105615998 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 3 dice are thrown at a time, the sum of the numbers appeared on 3 dice was found to be 15. Then the probability that the number 5 does not appear on any one of the dice is

Options :

$\frac{3}{16}$

1. ✖

$\frac{3}{10}$

2. ✔

$\frac{4}{15}$

3. ✖

$\frac{2}{5}$

4. ✖

Question Number : 39 Question Id : 105615999 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 probability distribution of a random variable X is given by

$X = x$	0	2	4	6	8	10
$P(X = x)$	0	k	2k	$5k^2$	$2k^2$	3k

then the mean of X is

Options :

$\frac{384}{121}$

1. ✖

2. ✖ $\frac{60}{13}$

3. ✖ $\frac{163}{25}$

4. ✔ $\frac{326}{49}$

Question Number : 40 Question Id : 1056151000 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 probability of getting a success in a trail is five times that of a failure. The probability of getting at most one success in 5 trails, is

Options :

1. ✖ $\frac{25}{6^5}$

2. ✔ $\frac{26}{6^5}$

3. ✖ $\left(\frac{5}{6}\right)^5$

4. ✖ $2\left(\frac{5}{6}\right)^5$

Question Number : 41 Question Id : 1056151001 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

$B(2,3), C(5,-2), D(1,-1)$ are three points. If A is a variable point such that the area of the quadrilateral ABCD is 10 sq. units, then the locus of A is

Options :

1. ✖ $(x-4y+42)(x-4y+2)=0$

$(x-4y-42)(x-4y-2)=0$

2. ✖

$(4x-y+42)(4x-y+2)=0$

3. ✖

$(4x-y-42)(4x-y-2)=0$

4. ✔

Question Number : 42 Question Id : 1056151002 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 line makes intercepts 5 and 7 on the coordinate axes. The axes are rotated through an angle θ in the positive direction about the origin so that the line makes equal intercepts on the new axes, then $|\tan\theta| =$

Options :

6

1. ✖

2. ✔ $\frac{1}{6}$

3. ✖ $\frac{12}{35}$

4. ✖ $\frac{35}{12}$

Question Number : 43 Question Id : 1056151003 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

$L \equiv 7x - y + 8 = 0$ is one of the diagonals of a square for which $(-4,5),(3,4)$ are two vertices. Then the coordinates of the two vertices lying on the diagonal L = 0 are

Options :

1. ✔ $(0,8), (-1,1)$

$(-1,1),(0,8)$

2. ✔

$(-2,-6),(1,15)$

3. ✖

$(1,3),(-2,6)$

4. ✖

Note: For this question, ambiguity is found in question/answer. Candidate will get full marks for this question if any of the correct options are chosen.

Question Number : 44 Question Id : 1056151004 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 locus of the image of a variable point $(\alpha, 2\alpha-1)$ with respect to the line $3x-2y+4=0$, is

Options :

$22(13x+36)=19(13y-11)$

1. ✔

$$30(13x+36)=19(13y+37)$$

2. ✖

$$22(13x+36)=7(13y+11)$$

3. ✖

$$22(13x-36)=30(13y-11)$$

4. ✖

Question Number : 45 Question Id : 1056151005 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 M be the foot of the perpendicular drawn from the point $(5,-7)$ to the line $3x-5y+1=0$. Then the perpendicular distance from M to the line $2x+5y-3=0$ is

Options :

$$\frac{1}{2\sqrt{29}}$$

1. ✔

2. ✖ $\frac{9}{2\sqrt{29}}$

3. ✖ $\frac{13}{2\sqrt{29}}$

4. ✖ $\frac{3}{2\sqrt{29}}$

Question Number : 46 Question Id : 1056151006 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 P is a point equidistant from all the vertices $A(-1,3), B(3,5), C(5,7)$ of a triangle ABC then PA =

Options :

1. ✖ 11

2. ✖ $\sqrt{140}$

3. ✖ 13

4. ✔ $\sqrt{130}$

Question Number : 47 Question Id : 1056151007 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

4 different pairs of lines are given in List I and the cosine of the angle between every pair of lines is given in List II.

Match the following:

List-I		List-II	
A)	$5x^2+2\sqrt{7}xy-y^2=0$	I)	$\frac{\sqrt{3}}{2}$
B)	$x^2+\sqrt{11}xy+2y^2=0$	II)	$\left(\frac{1}{2\sqrt{3}}\right)$
C)	$x^2+2\sqrt{2}xy+y^2=0$	III)	$\frac{1}{2}$
D)	$3x^2+4\sqrt{2}xy+y^2=0$	IV)	$\left(\frac{2}{3}\right)$
		V)	$\frac{1}{\sqrt{2}}$

The correct match is

Options :

A	B	C	D
III	I	V	II

1. ✖

A	B	C	D
III	I	IV	V

2. ✖

A	B	C	D
III	I	V	IV

3. ✔

A	B	C	D
III	V	II	IV

4. ✖

Question Number : 48 Question Id : 1056151008 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 $ax^2 + 6xy - 2y^2 = 0$ represents a pair of perpendicular lines and $9x^2 + 2hxy + 4y^2 = 0$ $(h > 0)$ represents a pair of coincident lines then $h =$

Options :

1. ✔ $3a$

2. ✖ $2a$

3. ✖ a

4. ✖ $4a$

Question Number : 49 Question Id : 1056151009 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 line $x+2y=k$ meets the curve $2x^2-2xy+3y^2+2x-y-1=0$ at two points A and B. Let O be the origin. If the line segments OA and OB are perpendicular to each other, then $k=$

Options :

1. ✔ ± 1

2. ✖ ± 2

3. ✖ ± 3

4. ✖ 4

Question Number : 50 Question Id : 1056151010 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 centre of the circle S = 0 lie on the line $x+y-5=0$ and also lie in the first quadrant. If this circle touches both the lines $x-2=0$ and $y-5=0$, then the area of the circle is

Options :

1. π sq. units ✔

2. 2π sq. units ✖

3. 4π sq. units ✖

4. $\frac{1}{4}\pi$ sq. units ✖

Question Number : 51 Question Id : 1056151011 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 straight line $x+2y=1$ cuts the X-axis at A and Y-axis at B. A circle is drawn through A, B and the origin. The sum of the perpendicular distances from A, B on to the tangent drawn at origin to the circle S is

Options :

equal to the radius of the circle S

1. ✖

equal to the diameter of the circle S

2. ✔

equal to twice the diameter of the circle S

3. ✖

equal to $\sqrt{5}$ times the radius of the circle S

4. ✖

Question Number : 52 Question Id : 1056151012 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 and Q be two external points of the circle $S \equiv x^2 + y^2 - a^2 = 0$. Let the chord of contact of the point P with respect to the circle $S = 0$ pass through Q. If l_1 and l_2 are the lengths of the tangents drawn from P and Q to the circle $S = 0$, then PQ =

Options :

1. $\sqrt{l_1 + l_2}$ ✖

2. $\frac{l_1 + l_2}{2}$ ✖

3. $\sqrt{l_1^2 + l_2^2}$ ✔

4. $\sqrt{l_1^2 - 2l_1 + l_2^2 - 2l_2}$ ✖

Question Number : 53 Question Id : 1056151013 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

$A(x_1, y_1)$ is the internal centre of similitude and $B(x_2, y_2)$ is the external centre of similitude of two circles C_1 and C_2 whose centres are $P(\alpha, \beta)$ and $Q(\gamma, \delta)$ respectively. If PA = 3, AB = 5, QB = 2, then ratio of the radii of the two circles is

Options :

1. ✖ 2 : 3

2. ✖ 3 : 2

3. ✔ 1 : 1

4. ✖ 5 : 2

Question Number : 54 Question Id : 1056151014 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 direct common tangent of the circles $x^2+y^2-6x-4y-23=0$ and $x^2+y^2+2x+2y+1=0$ is

Options :

1. ✖ $6x-4y+1=0$

2. ✖ $3x-4y+6=0$

3. ✔ $4x+3y+12=0$

4. ✖ $2x-4y+3=0$

Question Number : 55 Question Id : 1056151015 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 length of the common chord of the two circles $x^2+y^2-4x-8y+4=0$ and $x^2+y^2-8x-12y+16=0$ is

Options :

1. ✔ $\sqrt{46}$

2. ✖ $\sqrt{15}$

3. ✖ $\sqrt{55}$

4. ✖ 3

Question Number : 56 Question Id : 1056151016 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 focal chord drawn through the point (1, 2) to the parabola $y^2 = 8x$ meets this parabola in (x_1, y_1) and (x_2, y_2) then $x_1 + x_2 =$

Options :

1. ✖ 4

2. ✖ 5

3. ✔ 6

4. ✖ 8

Question Number : 57 Question Id : 1056151017 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 $\left(2t^2, 4t\right)$ is a point on the parabola $y^2 = 8x$ such that its focal distance is 3, then $t =$

Options :

1. ✖ ± 1

2. ✖ $\pm \frac{1}{2}$

3. ✖ $\pm \frac{1}{\sqrt{3}}$

4. ✔ $\pm \frac{1}{\sqrt{2}}$

Question Number : 58 Question Id : 1056151018 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 length of the latus rectum of an ellipse is 6 units and the distance between a focus and its nearest vertex on the major axis is $\frac{5}{3}$ units. If e is the eccentricity of this ellipse, then e satisfies the equation

Options :

1. $25x^2 - 40x + 16 = 0$ ✔

2. $25x^2 + 40x - 16 = 0$ ✖

3. $25x^2 - 40x - 16 = 0$ ✖

4. $25x^2 + 40x - 32 = 0$ ✖

Question Number : 59 Question Id : 1056151019 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 $2x - 3y + 4 = 0$ cuts the ellipse $x = 3\cos\theta$, $y = 5\sin\theta$ in A and B and (α, β) is the midpoint of $\overline{AB}$, then $3\beta - 2\alpha =$

Options :

1. ✖ -4

2. ✔ 4

3. ✖ -5

4. ✖ 5

Question Number : 60 Question Id : 1056151020 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 e_1 be the eccentricity of a hyperbola for which distance between its focii is 2 times the distance between its directrices and e_2 be the eccentricity of another hyperbola for which the length of its transverse axis is twice the length of its the conjugate axis. Then $e_1e_2 =$

Options :

1. ✖ 1

2. ✔ $\frac{\sqrt{10}}{2}$

3. ✖ $\sqrt{5}$

4. ✖ $\frac{\sqrt{5}}{2}$

Question Number : 61 Question Id : 1056151021 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 distance between the points $p\left(\frac{\pi}{4}\right)$ and $p\left(\frac{\pi}{3}\right)$ on the hyperbola $9x^2+16y^2=9$ is $\frac{1}{2\sqrt{2}}\sqrt{66-33\sqrt{2}-9\sqrt{3}}$

Reason(R) : $x=a\cosh t, y=b\sinh t$ are the parametric equations of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$

The correct option among the following is

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

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

(A) is false but (R) is true

4.

Question Number : 62 Question Id : 1056151022 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(1, 1, 1), B(1, –4, 3), C(2, –2, 0) and D(8, 1, 4) are the vertices of a tetrahedron. G_1, G_2, G_3 and G_4 are the centroids of the faces ABC, BCD, CDA and DAB. Then the centroid of the tetrahedron having G_1, G_2, G_3, G_4 as its vertices is

Options :

(12, –4, 8)

1. ✖

$\left(4, \frac{-4}{3}, \frac{8}{3}\right)$

2. ✖

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

3. ✖

$(3, -1, 2)$

4. ✔

Question Number : 63 Question Id : 1056151023 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 $A(2, 3, -1), B(4, 1, 0), C(-1, -1, 11)$ be the vertices of a triangle ABC. Let D be the point where the bisector of $\angle BAC$ meet the side BC. Then the direction ratios of AD are

Options :

$(35, -19, 49)$

1. ✖

$(17, -14, 49)$

2. ✖

$(17, -38, 49)$

3. ✔

$(17, -38, 23)$

4. ✖

Question Number : 64 Question Id : 1056151024 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 plane passing through the points (2, 3, 0), (0, –5, 2) and (–2, 0, 3) meets the X, Y, Z-axes in A, B, C respectively then A =

Options :

$\left(\frac{3}{7}, 0, 0\right)$

1. ✖

$\left(\frac{7}{3}, 0, 0\right)$

2. ✔

$\left(\frac{21}{13}, 0, 0\right)$

3. ✖

$(21, 0, 0)$

4. ✖

Question Number : 65 Question Id : 1056151025 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 $[x]$ denote the greatest integer less than or equal to x and $f(x) = 2x - [2x]$. If $\lim_{x \to 2^-} f(x) = l_1$ and $\lim_{x \to 2^+} f(x) = l_2$ then $l_1 + l_2 =$

Options :

1

1. ✔

2

2. ✖

0

3. ✖

4

4. ✖

Question Number : 66 Question Id : 1056151026 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

$$\lim_{x\to 0}\frac{\left(2^x-1\right)\left(1+\sin x\right)^{\frac{2}{\sin x}}}{\log\left(1+2x\right)}=$$

Options :

1. $e^2\log 4$ ✖

2. $e\log\sqrt{2}$ ✖

3. $e^2\log 2$ ✖

4. $e^2\log\sqrt{2}$ ✔

Question Number : 67 Question Id : 1056151027 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 $f(x)$ be a differentiable function such that $f(0)=0$ and $f'(0)=20$. For $x\in\left(0,\frac{\pi}{2}\right]$, if $A(x)=2f(x)\operatorname{cosec}\,4x+4f(x)\left(\cos^2 x+1\right)-4\cos^2 x$ then $\lim\limits_{x\to 0}A(x)=$

Options :

0

1. ✖

4

2. ✖

6

3. ✔

8

4. ✖

Question Number : 68 Question Id : 1056151028 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 $f(x)=\frac{e^{-x}\sin x}{\log_e x}$ and $f'(x)=f(x)\cdot g(x)$, then $g'(e)=$

Options :

$e^{-2}-\cos ec^2(e)$

1. ✖

$2e^2-\cos ec^2(e)$

2. ✖

$2e^{-2}-\cos ec^2(e)$

3. ✔

$2e^{-2}+\cos ec^2(e)$

4. ✖

Question Number : 69 Question Id : 1056151029 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 $y = \frac{e^{\sin x} + \sin h^3 x}{\cos h\, x - \tan x}$, then $y'(0) =$

Options :

1. ✖ 0

2. ✖ 1

3. ✖ -1

4. ✔ 2

Question Number : 70 Question Id : 1056151030 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 approximate value of $\sqrt[3]{28}$ rounded up to 3 decimal places is

Options :

1. ✖ 3.012

2. ✔ 3.037

3. ✖ 3.025

4. ✖ 3.033

Question Number : 71 Question Id : 1056151031 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

$y = x^2$ is the given curve. Imagine that this curve is dragged along the positive X-axis to a distance of 'a' units. If the acute angle between the curves at two positions is θ then

Options :

1. ✖ $\theta = \frac{\pi}{2}$

$$\tan\theta = \frac{2|a|}{|1-a^2|}$$

2. ✔

$$\cos\theta = \frac{2|a|}{|1-a^2|}$$

3. ✖

$$\theta = 0$$

4. ✖

Question Number : 72 Question Id : 1056151032 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 and y are two positive integers such that $x+2y=10$ and x^2y^3 is maximum then $x^2+2y^3=$

Options :

34

1. ✖

137

2. ✖

43

3. ✖

70

4. ✔

Question Number : 73 Question Id : 1056151033 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 $\frac{3\pi}{4} < x < \frac{7\pi}{4}$ then $\int\left(2^x - \sqrt{1+\sin 2x} + \frac{1}{x^2} - \frac{1}{x}\right)dx =$

Options :

$\frac{2^x}{\log 2} - \sin x + \cos x - \frac{1}{x} - \log x + c$

1. ✖

$$2^x \log 2 + \sin x - \cos x - \frac{1}{x} + \frac{1}{x^2} + c$$

2. ✖

$$\frac{2^x}{\log 2} + \sin x - \cos x - \frac{1}{x} - \log x + c$$

3. ✔

$$2^x \log 2 - \sin x + \cos x - \frac{1}{x} + \frac{1}{x^2} + c$$

4. ✖

Question Number : 74 Question Id : 1056151034 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 $\tan\alpha = \frac{4}{3}$, then $\int \frac{1}{3\cos x - 4\sin x} dx =$

Options :

1. ✖ $\frac{1}{5}\log\left|\tan\left(\frac{x}{2}+\frac{\alpha}{2}\right)\right|+c$

2. ✔ $\frac{1}{5}\log\left|\tan\left(\frac{\pi}{4}+\frac{x}{2}+\frac{\alpha}{2}\right)\right|+c$

3. ✖ $\frac{1}{5}\log\left|\tan\left(\frac{\pi}{4}-\frac{x}{2}-\frac{\alpha}{2}\right)\right|+c$

4. ✖ $\frac{1}{5}\log\left|\tan\left(\sec x+\tan x\right)\right|+c$

Question Number : 75 Question Id : 1056151035 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 $x \neq (2n+1)\frac{\pi}{2}$, then $\int \frac{\cos^3 x}{(1+\sin x)^4} dx =$

Options :

1. ✖ $-\frac{\cos^4 x}{(1+\sin x)^3} + c$

2. ✖ $-\frac{\cos^3 x}{(1+\sin x)^3} + c$

3. ✖ $-\frac{\cos^4 x}{(1+\sin x)^4} + c$

4. ✔ $-\frac{\cos^4 x}{4(1+\sin x)^4} + c$

Question Number : 76 Question Id : 1056151036 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 $\lim_{n\to\infty}\frac{1}{n}\sum_{r=1}^{np} f\left(\frac{r}{n}\right)=\int_0^p f(x)dx$. If $f:\mathbb{R}\to\mathbb{R}$ is defined by $f(x)=x^2+2$, then

$$\lim_{n\to\infty}\frac{3}{n}\left[f\left(\frac{7}{n}\right)+f\left(\frac{14}{n}\right)+f\left(\frac{21}{n}\right)+\ldots+f(7)\right]=$$

Options :

1. ✔ 55

2. ✖ 57

3. ✖ 104

4. ✖ 7

Question Number : 77 Question Id : 1056151037 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 $f(x)=\begin{vmatrix} 2\cos^2 x & \sin 2x & \sin x \\ \sin 2x & 2\sin^2 x & -\cos x \\ \sin x & -\cos x & 0 \end{vmatrix}$ then $\int_0^{\frac{\pi}{4}} \left(2|f(x)|+5f'(x)\right)dx =$

Options :

1. 0 ✖

2. $\frac{\pi}{4}$ ✖

3. $\frac{\pi}{2}$ ✖

4. π ✔

Question Number : 78 Question Id : 1056151038 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 arbitrary constants that appear in the general solution of the differential equation $\left(\frac{d^4y}{dx^4}+\frac{d^2y}{dx^2}\right)^{3/2}=5\frac{d^3y}{dx^3}$ is

Options :

1. ✔ 4

2. ✖ 3

3. ✖ 2

4. ✖ 5

Question Number : 79 Question Id : 1056151039 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 degree of the differential equation $y'' + 2xy' + \log_e\left(\frac{dy}{dx}\right) = 0$ is 2.

Reason (R) : The degree of a differential equation is the highest degree of the highest order derivative occurring in the equation, after the equation is expressed in the form of a polynomial in differential coefficients.

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 : 80 Question Id : 1056151040 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 S be the family of curves given by the general solution of the differential equation $\frac{y^2 e^{-1/y}}{\sqrt{x}}dx - 2\sec\sqrt{x}\,dy = 0$. Then the equation of the curve belonging to S and passing through $(\pi^2, 1)$ is

Options :

1. ✖ $\sin\sqrt{x} + e^{1/y} = 1 + e$

2. ✖ $\cos\sqrt{x} + e^{y} = e - 1$

3. ✔ $\sin\sqrt{x} + e^{1/y} = e$

4. ✖ $\cos\sqrt{x} + e^{y} = e$

Physics

Section Id :	10561520
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 :	10561520
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 1056151041 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 statements is true?

Options :

1. ✔ The range for weak nuclear force is shortest among all four forces

2. ✖ The range for electromagnetic force is smaller than that for gravitation force

The relative strength of gravitational force is higher than that for weak nuclear force

3. ✖

The relative strength for weak nuclear force is larger than that for strong nuclear force

4. ✖

Question Number : 82 Question Id : 1056151042 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 velocity of light C, the gravitational constant G and Planck's constant h are chosen as the fundamental units, the dimension of density in the new system is

Options :

$C^3 G^{-2} h^1$

1. ✖

$C^5 G^{-2} h^{-1}$

2. ✔

$C^{-3/2} G^{-1/2} h^{1/2}$

3. ✖

$C^{9/2} G^{-1/2} h^{-1/2}$

4. ✖

Question Number : 83 Question Id : 1056151043 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 projected up passes the same height H at 2 s and 10 s. The value of H is
[Use g = 9.8 m/s^2]

Options :

102 m

1. ✖

100 m

2. ✖

98 m

3. ✔

9.8 m

4. ✖

Question Number : 84 Question Id : 1056151044 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 towns X and Y are connected by a regular bus service. A bus leaves in either direction at every $t = T$ minutes. A man moving with some speed in the direction X to Y finds that a bus goes past him every $t = t_1$ minutes in the direction of his motion, and every $t = t_2$ minutes in the opposite direction. Then T is given by

Options :

$\frac{2t_1t_2}{t_1+t_2}$

1. ✔

$\frac{(t_1-t_2)t_1}{t_1+t_2}$

2. ✖

$\frac{2t_2(t_1+t_2)}{|t_1-t_2|}$

3. ✖

$$\frac{t_1 t_2}{|t_1 - t_2|}$$

4. ✖

Question Number : 85 Question Id : 1056151045 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) : An object subjected to velocities $\vec{v_1}$ and $\vec{v_2}$ has a resultant velocity with magnitude $|\vec{v}| = |\vec{v_1}| + |\vec{v_2}|$.

Statement (II) : The magnitude of displacement is either less or equal to the path length of an object between two points.

Statement (III) : The instantaneous acceleration is the limiting value of the average acceleration as the time interval approaches zero.

Which of the following is correct?

Options :

Statements I, II, III are true

1. ✖

Statements I, II are true, but statement III is false

2. ✖

Statements II, III are true, but statement I is false

3. ✔

Statements I, II, III are false

4. ✖

Question Number : 86 Question Id : 1056151046 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 a projectile if α is the angle of projection, R is the range, h is the maximum height, T is the time of flight then

Options :

$$\tan\alpha = \frac{R}{2h},\ h = \frac{gT^2}{8}$$

1. ✖

$$\tan\alpha = \frac{R}{4h},\ h = \frac{gT^2}{8}$$

2. ✖

$$\tan\alpha = \frac{4h}{R},\ h = \frac{gT^2}{8}$$

3. ✔

$$\tan\alpha = \frac{4h}{R},\ h = \frac{gT^2}{4}$$

4. ✖

Question Number : 87 Question Id : 1056151047 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 time t = 0, a force $F = \alpha t$, where t is time in seconds, is applied to a body of mass 1 kg, resting on a smooth horizontal plane. If the direction of the force makes an angle of 45° with the horizontal, then the velocity of the body at the moment of its breaking off the plane is

Options :

1. ✖ $\frac{100}{\alpha}$ m/s

2. ✔ $\frac{50\sqrt{2}}{\alpha}$ m/s

3. ✖ $\frac{50\alpha}{\sqrt{2}}$ m/s

4. ✖ $\frac{50}{\alpha}$ m/s

Question Number : 88 Question Id : 1056151048 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) : The slope of kinetic energy-displacement curve of a body in motion will be directly proportional to its acceleration.

Statement (II) : From a height of 15 m a ball is projected vertically upwards with a velocity of 30 m/s. If the ball rises to the same height after hitting the ground, the loss of its energy on hitting the ground is 30 %.

Statement (III) : The velocity acquired by a body of mass 'm' after travelling a fixed distance from rest under the action of a constant force is directly proportional to mass 'm'.

Which of the following is correct?

Options :

Statements I, II, III are true

1. ✖

Statements I, III are true, but statement II is false

2. ✖

Statement I is true, but statements II and III are false

3. ✔

Statements I, II are true, but statement III is false

4. ✖

Question Number : 89 Question Id : 1056151049 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 is moving in a straight line under the influence of a source of constant power. If v and t are velocity and time respectively, then

Options :

1. ✖ $v \propto t^2$

2. ✔ $v \propto t^{\frac{1}{2}}$

3. ✖ $v \propto t$

4. ✖ $v \propto t^{\frac{3}{2}}$

Question Number : 90 Question Id : 1056151050 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 solid spherical ball is rolled up an inclined plane of angle of inclination 30° with an initial speed of 4 m/s at the bottom of the inclination. How far will the ball go up the plane.
(Use g = 10 m/s^2)

Options :

1. ✔ 56 cm

2. ✖ 112 cm

3. ✖ 225 cm

4. ✖ 120 cm

Question Number : 91 Question Id : 1056151051 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 performs Simple harmonic motion with a time period of 16s. At a time t = 2s, the particle passes through the origin and at t = 4s its velocity is 4 m/s. The amplitude of the motion is

Options :

1. $\frac{32\pi}{\sqrt{2}}$ ✖

2. $\frac{32\sqrt{2}}{\pi}$ ✔

3. 32π ✖

4. 32 ✖

Question Number : 92 Question Id : 1056151052 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 escape speed of an object on the earth's surface be V_0. The object is projected out with speed $5V_0$. The speed of the object far away from the earth will be

Options :

1. $2\sqrt{6}V_0$ ✔

2. $4V_0$ ✖

3. $2\sqrt{3}V_0$ ✖

4. $3\sqrt{2}V_0$ ✖

Question Number : 93 Question Id : 1056151053 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

One end of a steel rod of radius 10.0 mm and length 50.0 cm is clamped on a horizontal table. The other end of the rod is pulled with a force of magnitude 10.0 $\times\pi$ kN. This force is uniform across the flat surface of the rod and is perpendicular to it. The change in the length of the rod due to this applied force is
(Use Young's modulus = 2.0×10^{11} N/m^2)

Options :

1. ✔ 0.25 mm

2. ✖ 0.75 mm

3. ✖ 0.50 mm

4. ✖ 1.0 mm

Question Number : 94 Question Id : 1056151054 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 venturimeter has a pipe diameter of 4 cm and a throat diameter of 2 cm. Velocity of water in the pipe section is 10 m/s. The pressure drop, between pipe section and the throat section is
[use density of water = 1000 Kg/m^3]

Options :

1. 1.5×10^5 Pa ✖

2. 7.5×10^5 Pa ✔

3. 75×10^5 Pa ✖

4. 4.5×10^5 Pa ✖

Question Number : 95 Question Id : 1056151055 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 soap bubble of initial radius R is to be blown up. The surface tension of the soap film is T. The surface energy needed to double the diameter of the bubble is

Options :

1. ✖ $12\pi R^2T$

2. ✖ $4\pi R^2T$

3. ✖ $16\pi R^2T$

4. ✔ $24\pi R^2T$

Question Number : 96 Question Id : 1056151056 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 metal rods A and B each of length 50 cm and diameter 4.0 mm are joined together at temperature $30\,^{\circ}C$. What is the change in length of the combined rod at $230\,^{\circ}C$?

[Given linear expansion coefficients of rods A and B are respectively, $2.0\times10^{-5}/^{\circ}C$ and $1.0\times10^{-5}/^{\circ}C$]

Options :

4 mm

1. ✖

2 mm

2. ✖

3 mm

3. ✔

1 mm

4. ✖

Question Number : 97 Question Id : 1056151057 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

Find the difference in temperature between the water at the top and the bottom of 20 m high waterfall assuming 10 % of the energy of fall is spent in heating the water
[Use specific heat capacity of water = 4000 J kg^{-1} k^{-1} and g = 10 m/s^2]

Options :

1. 0.002 °C ✖

2. 0.004 °C ✖

3. 0.005 °C ✔

4. 0.006 °C ✖

Question Number : 98 Question Id : 1056151058 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 zeroth law of thermodynamics leads to the concept of temperature.

Reason (R) : The zeroth law states that two systems in thermal equilibrium with a third system are in thermal equilibrium with each other.

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 : 99 Question Id : 1056151059 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 a gas expands adiabatically, its volume is doubled while its absolute temperature is decreased by a factor of 2. The value of the adiabatic constant is

Options :

1. ✖ 1

2. ✖ 5/3

3. ✔ 2

4. ✖ 7/5

Question Number : 100 Question Id : 1056151060 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 amount of 700 J of heat is transferred to a diatomic gas allowing it to expand with the pressure held constant. The work done on the gas is

Options :

200 J

1. ✔

100 J

2. ✖

300 J

3. ✖

500 J

4. ✖

Question Number : 101 Question Id : 1056151061 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 wave has the largest wave speed?

Options :

$y(x,t) = 2\sin(2x - 2t)$

1. ✖

$y(x,t)=3\sin(2x-3t)$

2. ✔

$y(x,t)=2\sin(3x-2t)$

3. ✖

$y(x,t)=3\sin(5x-2t)$

4. ✖

Question Number : 102 Question Id : 1056151062 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 refractive index of the material of a double convex lens having radii of curvature of 5 cm and 10 cm and focal length of $\frac{20}{3}$ cm

Options :

1. 5

1. ✔

2.0

2. ✖

2.4

3. ✖

2.6

4. ✖

Question Number : 103 Question Id : 1056151063 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 interference pattern of Young's double slit experiment, at a point we observe the 12^{th} order maximum for a monochromatic light source with wavelength $6000\ \mathring{A}$. What order will be visible here if the source is replaced by a light of wavelength $4800\ \mathring{A}$?

Options :

15

1. ✔

10

2. ✖

8

3. ✖

18

4. ✖

Question Number : 104 Question Id : 1056151064 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 charges are $+10\,\mu C$ and $-10\,\mu C$ are separated by 10 cm. The magnitude of force acting on another charge $5\,\mu C$ placed at the midpoint of the line joining the two charges will be

[Use $\frac{1}{4\pi\varepsilon_0} = 9\times10^9$ in SI unit]

Options :

360 N

1. ✔

0 N

2. ✖

320 N

3. ✖

380 N

4. ✖

Question Number : 105 Question Id : 1056151065 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 sphere '1' with radius R has charge q. Sphere '2' with radius 3R is far from sphere '1' and is initially uncharged. If the two spheres are now connected with a thin conducting wire, then the ratio $\frac{\sigma_1}{\sigma_2}$ of the surface charge densities is

Options :

2.0

1. ✖

2.5

2. ✖

3.0

3. ✔

9.0

4. ✖

Question Number : 106 Question Id : 1056151066 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 : Specific resistance depends on nature of material and independent of temperature of the material.

Statement II : A wire of resistance 6 Ω is drawn out so that its new length is four times its original length. The resistance of the new wire is 48 Ω.

Statement III : Drift velocity is the average constant velocity acquired by free electrons inside a metal by the application of an electric field which results in current.

Which of the following is correct?

Options :

Statements I, II and III are true

1. ✖

Statement I is true, but, Statements II, III is false

2. ✖

Statement III is true, but Statements I, II are false

3. ✔

Statements II, III are true but Statement I is false

4. ✖

Question Number : 107 Question Id : 1056151067 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

Find the mobility of electron in a wire, if its average collision time is 9.1×10^{-15} s.
(charge of electron = 1.6×10^{-19} C and mass of electron = 9.1×10^{-31}kg)

Options :

$9.1\times10^{-3}\,m^2/\,V\text{-}s$

1. ✖

$1.6\times10^{-3}\ m^2/V\text{-}s$

2. ✔

$1.75\times10^{-3}\ m^2/V\text{-}s$

3. ✖

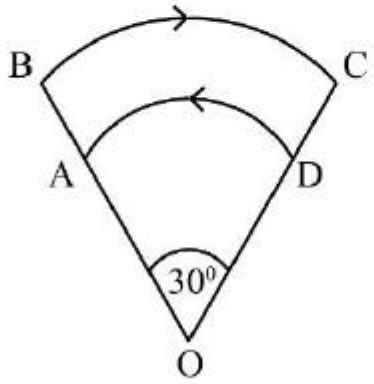
$1\times10^{-3}\ m^2/V\text{-}s$

4. ✖

Question Number : 108 Question Id : 1056151068 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 current carrying loop ABCD has two circular arcs AD and BC with radius 1 cm and 2 cm respectively as shown in the figure. The two arcs AD and BC subtend a common angle 30° at the centre O. If the current flowing in the loop is $\frac{1.2}{\pi}$ A ,then the magnitude of net magnetic field at O is (Given $\mu_0 = 4\pi \times 10^{-7}$)



Options :

0.5 μT

1. ✖

3 μT

2. ✖

1 μT

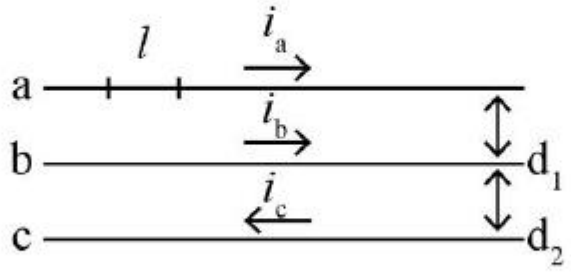
3. ✔

$1.5\ \mu T$

4. ✖

Question Number : 109 Question Id : 1056151069 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 parallel wires a, b and c carrying currents i_a, i_b and i_c as shown in the figure are placed next to each other.



The magnitude force on a length l of the wire a, if $d_2=2d_1$, $i_b = i_a$ and $i_c = 4i_a$ is

Options :

$\frac{\mu_0}{6\pi d_1} i_a^2 l$

1. ✔

$$\frac{\mu_0}{2\pi d_1} i_a^2 l$$

2. ✖

$$\frac{\mu_0}{4\pi d_1} i_a^2 l$$

3. ✖

$$\frac{\mu_0}{3\pi d_1} i_a^2 l$$

4. ✖

Question Number : 110 Question Id : 1056151070 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 iron bar having a cross sectional area of 2×10^{-5} m^2 and magnetising field of 2400 A/m produce a magnetic flux of 2.4 π × 10^{-5} Wb. What will be the value of permeability (μ) and susceptibility (χ) of the bar (Given $\mu_0 = 4\pi\times10^{-7}$)

Options :

$$\mu = 5\times10^{-4}, \chi = 1249\pi$$

1. ✖

$\mu = 5\pi \times 10^{-4}, \chi = 1249\pi$

2. ✖

$\mu = 5\pi \times 10^{-4}, \chi = 1249$

3. ✔

$\mu = 5 \times 10^{-4}, \chi = 1249$

4. ✖

Question Number : 111 Question Id : 1056151071 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 disc of radius 30 cm rotates with a constant angular velocity $\omega = 100$ rad/s about its axis. Find the magnitude of potential difference between the centre and the rim of the disc of the external uniform magnetic field of induction B = 4 mT is directed perpendicular to the disc.

Options :

15 m V

1. ✖

18 m V

2. ✔

22 m V

3. ✖

20 m V

4. ✖

Question Number : 112 Question Id : 1056151072 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 capacitor of capacitance 100 μF and a coil of resistance 20 Ω and inductance 12.5 mH are connected in series with a 220 V, $\frac{200}{\pi}$ Hz AC source. The maximum value of instantaneous current in the circuit is

Options :

20 A

1. ✖

10 A

2. ✖

11 A

3. ✔

15 A

4. ✖

Question Number : 113 Question Id : 1056151073 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 a particular day, the sun delivers an average power of $\left(\frac{6}{\pi}\times10^{3}\right)\frac{\text{W}}{\text{m}^2}$ to the top of Earth's atmosphere. Find the amplitude of magnetic field for the electromagnetic waves above atmosphere.
(Take $\mu_0 = 4\pi\times10^{-7}$ SI unit)

Options :

5×10^{-5} T

1. ✖

4×10^{-6} T

2. ✔

6×10^{-6} T

3. ✖

3×10^{-5} T

4. ✖

Question Number : 114 Question Id : 1056151074 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 : By increasing the potential difference between cathode and anode continuously in a photoelectric experiment, the photo current always increases continuously.

Statement II : If two photons A and B of energies 2.5 eV and 3.5 eV respectively fall on a metal surface of work function 2.0 eV, then the ratio of maximum kinetic energies emitted between A and B is 3.

Statement III : The maximum energy needed by an electron to come out from a metal surface is called the work function of the metal.

Which of the following is correct?

Options :

Statements I, II and III are true

1. ✖

Statements I, II true, but statement III is false

2. ✖

Statements II, III are true, but statement I is false

3. ✖

Statements I, II and III are false

4. ✔

Question Number : 115 Question Id : 1056151075 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 has the largest de Broglie wavelength?

Options :

a bullet of mass 0.02 kg moving with speed 1 km/s

1. ✖

a ball of mass 0.06 kg moving with speed 10 m/s

2. ✖

a particle of mass 0.01 kg moving with speed 100 m/s

3. ✖

a ball of mass 0.03 kg moving with speed 1 m/s

4. ✔

Question Number : 116 Question Id : 1056151076 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 energy of an electron in the fourth excited state of the hydrogen atom is

Options :

1. -0.85 eV ✔

2. -1.70 eV ✖

3. 0 ✖

4. -0.425 eV ✖

Question Number : 117 Question Id : 1056151077 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

Estimate the approximate volume of aluminium nucleus (A = 27)

Use $\begin{pmatrix} R_0 \simeq 1.0\times10^{-15}\,m \\ \pi \simeq 3 \end{pmatrix}$

Options :

1. $1\times10^{-13}\left(\mathring{A}\right)^3$ ✔

2. $1\times10^{-10}\left(\mathring{A}\right)^3$ ✖

3. $1\times10^{-15}\left(\mathring{A}\right)^3$ ✖

4. $1\times10^{-17}\left(\mathring{A}\right)^3$ ✖

Question Number : 118 Question Id : 1056151078 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 p – n junction is fabricated from a semiconductor with band gap of 2.8 eV. What approximate wavelength it cannot detect?
[use h = 6 $\times 10^{-34}$ m^2 kg/s]

Options :

100 nm

1. ✖

200 nm

2. ✖

400 nm

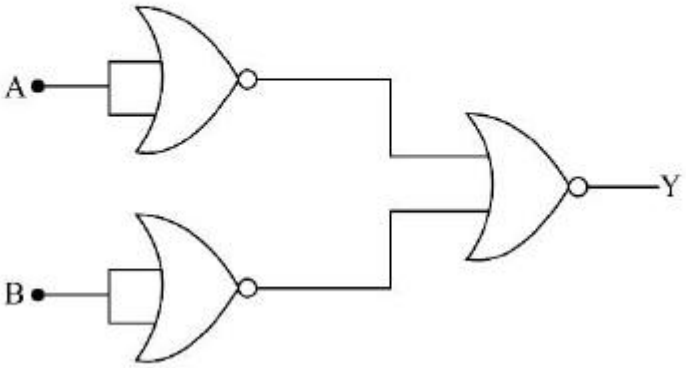
3. ✖

600 nm

4. ✔

Question Number : 119 Question Id : 1056151079 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 logic operation performed by the following circuit.



Options :

OR

1. ✖

AND

2. ✔

NOT

3. ✖

NAND

4. ✖

Question Number : 120 Question Id : 1056151080 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 carrier wave of peak voltage 10 V is used to transmit a message signal. What should be the peak voltage of the modulating signal in order to have a modulation index of 80%

Options :

1. ✔ 8 V

2. ✖ 8.8 V

3. ✖ 5 V

4. ✖ 12.5 V

Chemistry

Section Id : 10561521
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 :	10561521
Question Shuffling Allowed :	Yes

Question Number : 121 Question Id : 1056151081 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 maximum number of orbitals present in n = 4 energy level of an atom and the maximum number of electrons with spin value $+\frac{1}{2}$ in the same orbitals are_____, respectively.

Options :

1. ✖ 16, 5

2. ✖ 16, 7

3. ✖ 16, 9

4. ✔ 16, 16

Question Number : 122 Question Id : 1056151082 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 approximate ratio of the speed of light in vacuum to that of an electron in the first Bohr orbit of hydrogen atom is

Options :

1. ✖ 100 : 1

2. ✔ 137 : 1

3. ✖ 157 : 1

4. ✖ 191 : 1

Question Number : 123 Question Id : 1056151083 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 species are isoelectronic species?

a) O^{2-} b) F^{-} c) Na^{+} d) Mg^{2+}

Options :

1. ✖ a, b, and c only

2. ✖ a, c and d only

3. ✖ c and d only

4. ✔ a, b, c and d

Question Number : 124 Question Id : 1056151084 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

Arrange the following in increasing order of ionic radii
O^{2-}, Na^{+}, F^{-}, Mg^{2+}

Options :

1. ✔ $Mg^{2+} < Na^{+} < F^{-} < O^{2-}$

2. ✖ $Mg^{2+} < F^{-} < Na^{+} < O^{2-}$

3. ✖ $O^{2-} < F^{-} < Na^{+} < Mg^{2+}$

4. ✖ $O^{2-} < Mg^{2+} < F^{-} < Na^{+}$

Question Number : 125 Question Id : 1056151085 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 molecules among the following with zero dipole moment is
CCl_4, BF_3, $CHCl_3$, CS_2, NH_3, 1, 4–dichlorobenzene, CO_2

Options :

1. ✖ CO_2, CS_2, BF_3, NH_3, $CHCl_3$ only

2. ✔ CCl_4, BF_3, CO_2, CS_2, 1, 4–dichlorobenzene only

CO_2, CS_2, 1, 4–dichlorobenzene only

3. ✖

CO_2, CS_2 only

4. ✖

Question Number : 126 Question Id : 1056151086 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 which are not isostructural is

Options :

PF_6^- and SF_6

1. ✖

IO_3^- and XeO_3

2. ✖

BH_4^- and NH_4^+

3. ✖

BrF_5 and XeF_4

4. ✔

Question Number : 127 Question Id : 1056151087 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 rate of diffusion of methane at 1.0 atm pressure is twice than that of another gas 'X' kept at 1.45 atm. The molecular mass of the gas 'X' is
[T kept constant]

Options :

1. ✔ 44

2. ✖ 32

3. ✖ 28

4. ✖ 21

Question Number : 128 Question Id : 1056151088 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 gases has the maximum van der Waal's constant 'a'?

Options :

H_2

1. ✖

He

2. ✖

CO_2

3. ✖

NH_3

4. ✔

Question Number : 129 Question Id : 1056151089 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

Electrolysis of aqueous Na_2SO_4 was carried out by passing a current of 3 ampere for 10 min. The volume of the gas (L) at STP at the anode of the cell is approximately

Options :

0 .19

1. ✖

2.1

2. ✖

0.10

3. ✔

0.15

4. ✖

Question Number : 130 Question Id : 1056151090 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

Magnetite can be reduced with CO to yield iron metal and carbon dioxide. Calculate the mass of magnetite (in kg) needed to obtain 4 kg of iron if the process is 80 % efficient.
[Atomic weight of Fe and O are 56 g and 16 g, respectively]

Options :

15.5

1. ✖

5.5

2. ✖

17.0

3. ✖

6.9

4. ✔

Question Number : 131 Question Id : 1056151091 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 reaction $H_2O(l) \rightarrow H_2O(s)$ at 0 °C and 1 atm, the internal energy change is –41 kJ/mol. What will be the value of molar enthalpy change?

Options :

–41 kJ/ mol

1. ✔

41 kJ/ mol

2. ✖

30 kJ/ mol

3. ✖

–30 kJ/ mol

4. ✖

Question Number : 132 Question Id : 1056151092 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 the formation of ammonia from its constituent elements (1 mole of N_2 and 3 moles of H_2) in a closed vessel of volume V(L), the value of K_C is [units of $K_C = mol^{-2}L^2$]

Options :

1. $\frac{3x^2V^2}{9(1-x)^4}$ ✖

2. $\frac{4xV^2}{9(1-x)^3}$ ✖

3. $\frac{4x^2V^2}{27(1-x)^4}$ ✔

4. $\frac{x^2V^2}{27(1-x)^3}$ ✖

Question Number : 133 Question Id : 1056151093 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

How many of the following are diprotic acids?

Citric acid, Chromic acid, Oxalic acid, Pyrosulfuric acid, Sulfurous acid

Options :

1. ✖ 2

2. ✖ 5

3. ✔ 4

4. ✖ 3

Question Number : 134 Question Id : 1056151094 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

Deionized water is obtained by passing hard water through

Options :

1. ✖ Zeolite

2. ✖ Cationic exchanger only

3. ✖ Anionic exchanger only

4. ✔ Both cationic and anionic exchanger one after the other

Question Number : 135 Question Id : 1056151095 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

Unknown inorganic compound 'A' is used for water softening. 'A' reacts with Na_2CO_3 to generate an alkaline compound 'B' whose pH = 14. 'A' on reaction with CO_2 gives cloudy ppt. 'B' + CaO reacts with unknown organic compound 'C' to give C_6H_6. A, B and C, respectively, are

Options :

1. ✖ $Ca(OH)_2, Na_2CO_3, C_6H_5COOH$

$Ca(OH)_2, NaOH, C_6H_5CH_2COOH$

2. ✖

$Ca(OH)_2, NaOH, C_6H_5COOH$

3. ✔

Ca, $NaOH, C_6H_5COOH$

4. ✖

Question Number : 136 Question Id : 1056151096 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) : $[B(OH_2)_6]^{3+}$ and $[B(OH)_4]^-$ form octahedral and tetrahedral structures.

Reason (R) : Being electron deficient, boron readily reacts with Lewis bases like H_2O, OH^-

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 : 137 Question Id : 1056151097 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 "$\Delta_f H^\circ$" values of Diamond (I), Graphite (II) and Fullerene (III) is

Options :

I > II > III

1. ✖

II > I > III

2. ✖

III > I > II

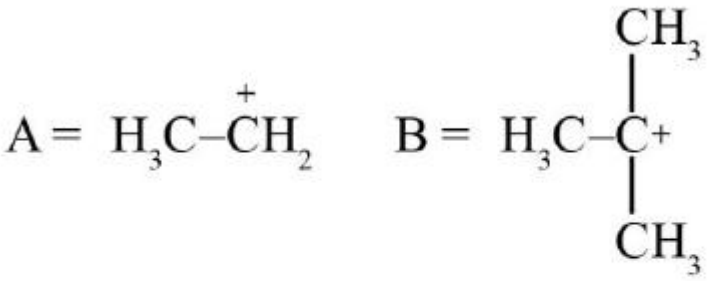
3. ✔

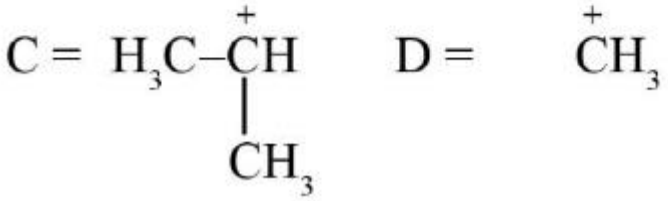
III > II > I

4. ✖

Question Number : 138 Question Id : 1056151098 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 lacks hyperconjugative stability?





Options :

B

1. ✖

A

2. ✖

D

3. ✔

C

4. ✖

Question Number : 139 Question Id : 1056151099 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 organic compound 5–allylcyclohex–3–ene–1–ol is reacted with cold, dilute, aqueous solution of $KMnO_4$. The total number of hydroxyl group(s) (–OH) present in the product is

Options :

1

1. ✖

2

2. ✖

3

3. ✖

5

4. ✔

Question Number : 140 Question Id : 1056151100 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 molecular formula of the product formed when benzene is reacted with excess of chlorine molecules under ultra-violet light is

Options :

C_6Cl_6

1. ✖

$C_6H_3Cl_3$

2. ✖

$C_6H_2Cl_4$

3. ✖

$C_6H_6Cl_6$

4. ✔

Question Number : 141 Question Id : 1056151101 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

KBr has rock salt type structural arrangements and has a density of 3.70 g/cm^3. The edge length of the unit cell is approximately [molecular weight of KBr =120 g/mol]

Options :

3×10^{-8} cm

1. ✖

12×10^{-8} cm

2. ✖

9×10^{-8} cm

3. ✖

6×10^{-8} cm

4. ✔

Question Number : 142 Question Id : 1056151102 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 mixture is an ideal solution, if

a) It obeys ideal gas equation
b) It obeys Raoult's law at all concentrations
c) Solute – solute, solute – solvent and solvent – solvent interactions are similar

Options :

1. a only ✖

2. a, b only ✖

3. b, c only ✔

4. c only ✖

Question Number : 143 Question Id : 1056151103 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 equimolal aqueous solution will be highest for

Options :

1. ✖ $C_6H_5-NH\overset{+}{N}H_3\,\overset{-}{Cl}$

2. ✖ $Ba(NO_3)_2$

3. ✖ $LaCl_3$

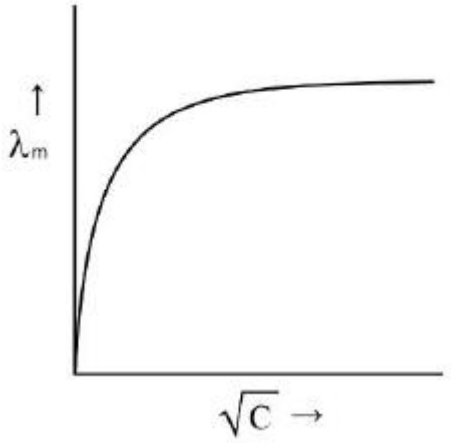
4. ✔ $C_6H_{12}O_6$

Question Number : 144 Question Id : 1056151104 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

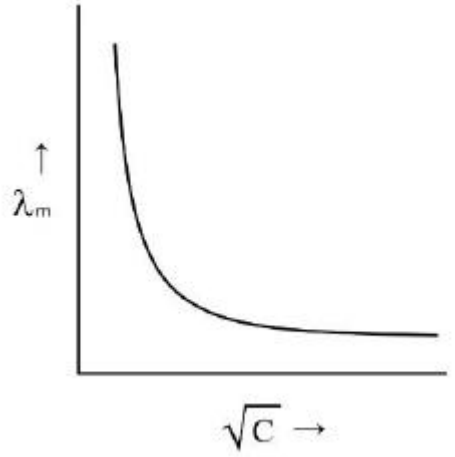
The variation of λ_m of acetic acid with concentration is correctly represented as

Options :

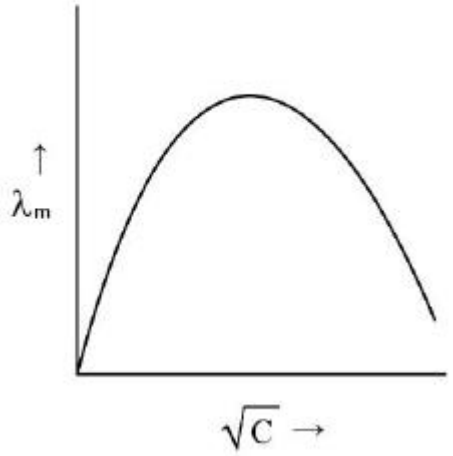
1. ✖



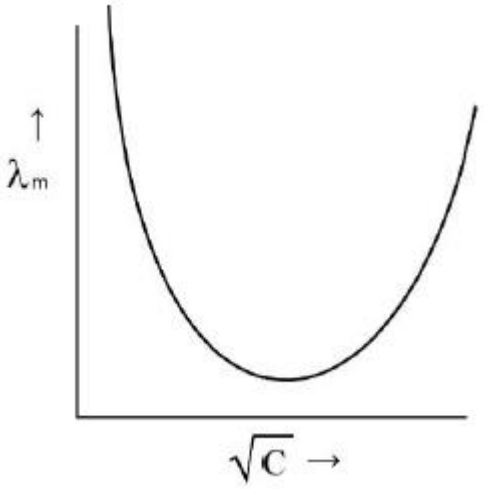
2. ✔



3. ✖



4. ✖



Question Number : 145 Question Id : 1056151105 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

Rate constants in the following reaction are

Reaction 1: $A \xrightarrow{\text{catalyst 1}} P_1,\ k_1 = 1\ s^{-1}$

Reaction 2: $A \xrightarrow{\text{catalyst 2}} P_2,\ k_2 = 0.1\ L\,mol^{-1}s^{-1}$

Reaction 3: $A \xrightarrow{\text{catalyst 3}} P_3,\ k_3 = 0.01\ L^2\,mol^{-2}s^{-1}$

The correct relations between the rate of the reactions at 1 M of A are

Options :

1. ✖ $r_1 = \frac{r_3}{100},\ r_2 = \frac{r_3}{10}$

2. ✖ $r_1 = \frac{r_2}{10},\ r_2 = \frac{r_3}{10}$

3. ✖ $r_1 = 100\,r_3,\ r_2 = \frac{r_3}{10}$

$r_1 = 10 r_2,\ r_3 = \frac{r_2}{10}$

4. ✔

Question Number : 146 Question Id : 1056151106 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

10 g of a gas is adsorbed on 500 g of solid at 10 bar. If the pressure is increased at 20 bar, 14 g of the gas is adsorbed by the same solid at the same temperature. What is the slope of Freundlich adsorption isotherm?

Options :

1. 1.0 ✖

2. $\frac{4}{3}$ ✖

3. 3 ✖

4. 0.5 ✔

Question Number : 147 Question Id : 1056151107 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 minimum temperature required for a non catalytic reaction between N_2 and O_2 is

Options :

1. 3000 K ✖

2. 2000 K ✔

3. 1000 K ✖

4. 500 K ✖

Question Number : 148 Question Id : 1056151108 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 rhombic and monoclinic Sulphur have S_8 molecules.

Reason (R) : They have planar structure.

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 : 149 Question Id : 1056151109 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) : Hydrogen fluoride has higher boiling point than other hydrogen halides.

Reason (R) : Hydrogen fluoride exhibits strong hydrogen bonding.

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 : 150 Question Id : 1056151110 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 chemical structures of XeO_3 and $XeOF_4$, respectively, are

Options :

Planar; Trigonal bipyramidal

1. ✖

Pyramidal; Square pyramidal

2. ✔

Planar; Square pyramidal

3. ✖

Pyramidal; Square planar

4. ✖

Question Number : 151 Question Id : 1056151111 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 elements with full d^{10} electronic configuration in their "+2" oxidation state are

Options :

Cu, Ni, Zn

1. ✖

Ni, Au, Cd

2. ✖

Au, Hg, Pd

3. ✖

Zn, Cd, Hg

4. ✔

Question Number : 152 Question Id : 1056151112 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 pair in which both the species have same magnetic moment (spin only) is

Options :

1. ✖ $[CoCl_4]^{2-}, [Fe(H_2O)_6]^{2-}$

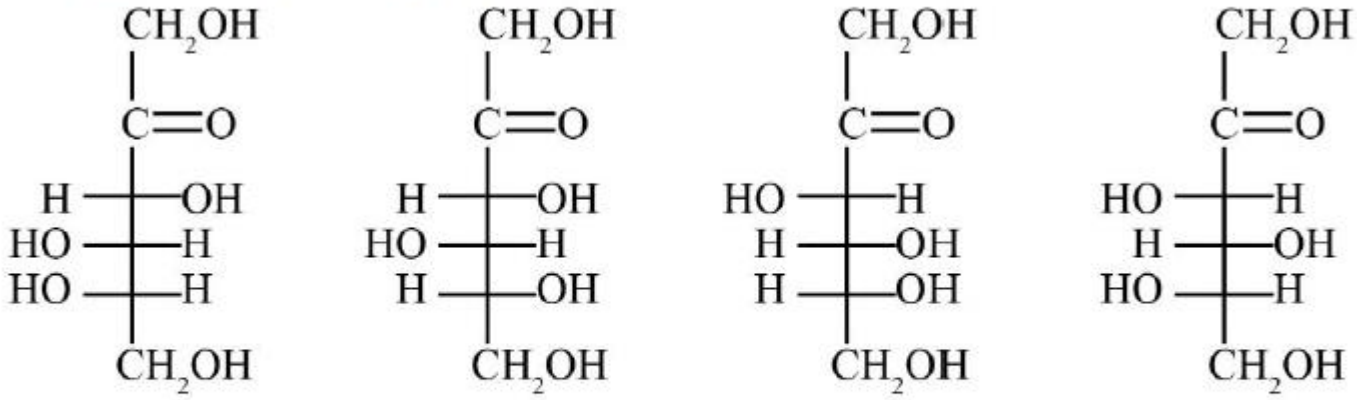
2. ✖ $[Mn(H_2O)_6]^{2+}, [Cr(H_2O)_6]^{2+}$

3. ✔ $[Cr(H_2O)_6]^{2+}, [Fe(H_2O)_6]^{2+}$

4. ✖ $[Cr(H_2O)_6]^{2+}, [CoCl_4]^{2-}$

Question Number : 153 Question Id : 1056151113 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 following structures



I II III IV

Which of the pairs represent D and L-fructose, respectively?

Options :

II and I

1. ✖

I and III

2. ✖

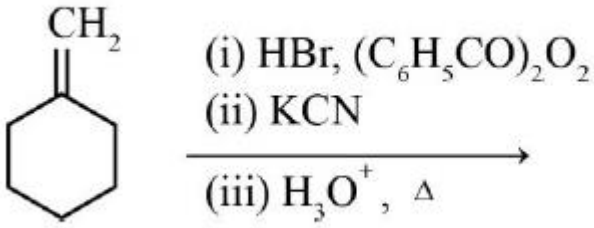
III and IV

3. ✔

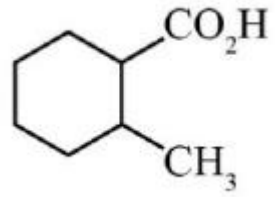
4. ✖ II and IV

Question Number : 154 Question Id : 1056151114 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

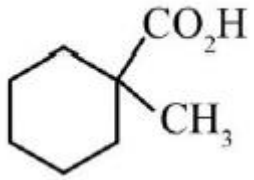
The major product in the following reaction is



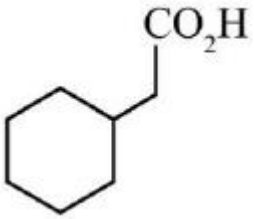
Options :

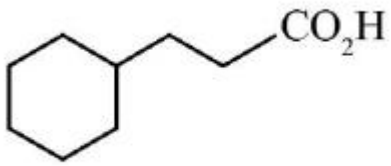


1. ✖



2. ✖

3. ✔ 

4. ✖ 

Question Number : 155 Question Id : 1056151115 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 intramolecular hydrogen bonding is present in

Options :

1. ✖ phenol

2. ✖ Benzoic acid

para-Nitrophenol

3. ✖

2-Hydroxybenzoic Acid

4. ✔

Question Number : 156 Question Id : 1056151116 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) : Tertiary alcohols produce turbidity immediately with Lucas reagent.

Reason (R) : Lucas reagent is a 1 : 1 mixture of conc. HNO_3 and anhydrous $ZnCl_2$.

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

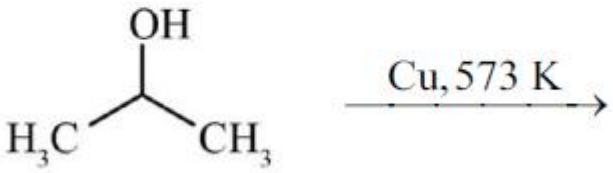
3. ✔

(A) is false but (R) is true

4. ✖

Question Number : 157 Question Id : 1056151117 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 reaction is



Options :

$CH_3CH_2CH_3$

1. ✖

$CH_3CH = CH_2$

2. ✖

$CH_3C \equiv CH$

3. ✖

CH_3COCH_3

4. ✔

Question Number : 158 Question Id : 1056151118 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) : Ammonia and its derivatives of the form $H_2N–Z$ undergo condensation reaction with carbonyl compounds (aldehydes and ketones).

Reason (R) : This reaction is an example of irreversible reaction.

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 : 159 Question Id : 1056151119 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 pK_a of the following is

CCl_3COOH	CF_3COOH	NO_2CH_2COOH	$NCCH_2COOH$
I	II	III	IV

Options :

1. (I) < (II) < (III) < (IV) ✖

2. (III) < (II) < (I) < (IV) ✖

3. (II) < (I) < (III) < (IV) ✔

4. (II) < (III) < (I) < (IV) ✖

Question Number : 160 Question Id : 1056151120 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)	Amide	I)	Carbylamine reaction
B)	Nitrile	II)	Hinsberg's reagent
C)	$C_6H_5SO_2Cl$	III)	Hofmann's bromamide reaction
D)	1°–Amine	IV)	$LiAlH_4$

The correct match is

Options :

1. ✖

A	B	C	D
I	II	III	IV

2. ✔

A	B	C	D
III	IV	II	I

3. ✖

A	B	C	D
III	II	IV	I

A	B	C	D
I	III	II	IV

4. ✖