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 :	Engineering English 5th Aug 2021 Shift 2
Subject Name :	Engineering (English)
Creation Date :	2021-08-05 19:11:08
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Ruler Required? :	No
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Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
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Show Watermark on Console? :	Yes
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Auto Save on Console? :	Yes

Engineering (English)

Group Number :	1
Group Id :	3426044
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

Mathematics

Section Id :	34260410
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
Sub-Section Number :	1
Sub-Section Id :	34260410
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 342604481 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let $f(x)=\frac{1}{2}-\tan\left(\frac{\pi x}{2}\right), -1<x<1$ and $g(x)=\sqrt{3+4x-4x^2}$ then the domain $(f+g)$ is

Options :

1. ✖ $\left[\frac{1}{2},1\right)$

2. ✖ $\left[\frac{-1}{2},\frac{1}{2}\right)$

3. ✔ $\left[-\frac{1}{2},1\right)$

4. ✖ $\left[-\frac{1}{2},-1\right]$

Question Number : 2 Question Id : 342604482 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let $a>1$ be a constant. If $f:A\to A$ and $(x,y)\in f$ satisfy $a^x+a^y=a$, then $A=$

Options :

1. ✖ $(0,\ a]$

2. ✖ $[0,\ a]$

3. ✔ $(-\infty,\ 1)$

4. ✖ $(-\infty, a+1)$

Question Number : 3 Question Id : 342604483 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\frac{1}{1\cdot5}+\frac{1}{5\cdot9}+\frac{1}{9\cdot13}+\ldots \text{to} n \text{ terms} = \frac{27}{109}$ then $n=$

Options :

1. ✖ 21

2. ✔ 27

3. ✖ 63

4. ✖ 189

Question Number : 4 Question Id : 342604484 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let $B=\begin{bmatrix}1 & 2\\ 0 & 1\end{bmatrix}$ and A be a 2×2 matrix satisfying $\left(A^T\right)^{-1}=A$.

If $X=ABA^T$, then $A^TX^{2021}A=$

Options :

1. ✖ $\begin{bmatrix}1 & 2^{2021}\\ 0 & 1\end{bmatrix}$

2. ✖ $\begin{bmatrix}1 & 2021\\ 0 & 1\end{bmatrix}$

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

4. ✔ $\begin{bmatrix}1 & 4042\\ 0 & 1\end{bmatrix}$

Question Number : 5 Question Id : 342604485 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If A is a 3×3 matrix such that $|A|=27$, Adj $A=k\,A^T$, then $k^2-3k+5=$

Options :

1. ✔

5

2. ✖ 3

3. ✖ 0

4. ✖ 2

Question Number : 6 Question Id : 342604486 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the system of equations $2x+9y+5z=8,\ 2x+3y-z=-4,\ x-2z=-5$ have infinite number of solutions $x=-5+at,\ y=2+bt,\ z=ct, t\in\mathbb{R}$ then a, b, c respectively are

Options :

1. ✖ 1, 1, 1

2. ✖ 2, 1, 1

3. ✖ −2, −1, 1

4. $2, -1, 1$ ✔

Question Number : 7 Question Id : 342604487 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\left(\sqrt{3}+i\right)^8-\left(\sqrt{3}-i\right)^8=\alpha+i\beta$, then $\alpha-\frac{\sqrt{3}}{2}\beta=$

Options :

1. 256 ✖

2. $384\sqrt{3}$ ✖

3. 384 ✔

4. $256\sqrt{3}$ ✖

Question Number : 8 Question Id : 342604488 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If α, β are the roots of the equation $1+x+x^2=0$, then $(2-\alpha)(2-\beta)(2-\alpha^{10})(2-\alpha^{20})=$

Options :

1. ✖ 36

2. ✖ 64

3. ✔ 49

4. ✖ 81

Question Number : 9 Question Id : 342604489 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For $n \in \mathbb{N}$, $\left(\frac{1+\cos\theta+i\sin\theta}{1+\cos\theta-i\sin\theta}\right)^n =$

Options :

1. ✖ $\cos(n\theta)-i\sin n\theta$

2. ✖ $-\cos(n\theta)+i\sin(n\theta)$

3. ✔ $\cos(n\theta)+i\sin n\theta$

4. ✖ $-\cos(n\theta)-i\sin n\theta$

Question Number : 10 Question Id : 342604490 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$f(x)=ax^2-bx-a$ is a quadratic expression. If K is the least real number such that $f(x)\le K\ \forall x\in\mathbb{R}$, then

Options :

1. ✖ $K=0$

2. ✖ $K<-2$

3. ✔ $K>0$

4. ✖ $-1<K<0$

Question Number : 11 Question Id : 342604491 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Assertion (A): The maximum value of $-x^2+3x+1$ is $\frac{11}{4}$

Reason (R): If $a<0$, the maximum value of ax^2+bx+c exist at $x=\frac{-b}{2a}$

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 : 12 Question Id : 342604492 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $f(x) \equiv x^2 + ax + 2 = 0$ and $g(x) \equiv x^2 + 2x + a = 0$ have only one real common root, then sum of the roots of $f(x) + g(x) = 0$ is

Options :

1. $\frac{-1}{2}$ ✖

2. 0 ✖

3. $\frac{1}{2}$ ✔

4. 1 ✖

Question Number : 13 Question Id : 342604493 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the roots of the equation $3x^3 - 26x^2 + 52x - 24 = 0$ are in geometric progression, then the sum of two of its roots is

Options :

1. $\frac{8}{3}$ ✔

2. ✖

$\frac{10}{3}$

3. ✖ 9

4. ✖ 10

Question Number : 14 Question Id : 342604494 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $x = 16_{c_5} + 12_{c_4}$, $y = \sum_{r=1}^{3}(20-r)_{c_4}$, $z = \sum_{k=1}^{4}(16-k)_{c_3}$, then $x+y+z =$

Options :

1. ✖ $19 \times 17 \times 45$

2. ✖ $19 \times 17 \times 15$

3. ✖ $19 \times 17 \times 16$

4. ✔ $19 \times 17 \times 48$

Question Number : 15 Question Id : 342604495 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The number of five digit numbers greater than 50000 that can be formed by using all the digits 0, 1, 3, 5, 9 only once is

Options :

1. ✖ 24

2. ✔ 48

3. ✖ 150

4. ✖ 30

Question Number : 16 Question Id : 342604496 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In the Binomial expansion of $(1+x)^{2k}$, if its middle term is the only numerically greatest term, then x lies in the interval

Options :

1. ✖ $(-2k\ 2k)$

2. ✔ $\left(-\frac{k+1}{k} \quad \frac{k+1}{k}\right)$

3. ✖ $(-k \quad k)$

4. ✖ $(-(k+1) \ (k+1))$

Question Number : 17 Question Id : 342604497 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Sum of the coefficients of $x^r (r = 0,1,2,3,...15)$ in the expansion of $(3x-1)^{15}$ is equal to the sum of the binomial coefficients of which of the following expansions?

(a) $(1+x)^{15}$ (b) $(1+x)^{16}+(1-x)^{16}$ (c) $(1+x)^{16}-(1-x)^{16}$

Options :

1. ✔ (a), (b) and (c)

2. ✖ (a) and (c) only

3. ✖ (b) and (c) only

(a) and (b) only

4. ✖

Question Number : 18 Question Id : 342604498 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The 13^{th} term in the expansion of $(1-4x)^{-4}$ is

Options :

1. ✖ $15_{C_4} 4^{12} x^{12}$

2. ✖ $728\,x^{12}$

3. ✔ $15_{C_3} 4^{12} x^{12}$

4. ✖ $1092\,x^{12}$

Question Number : 19 Question Id : 342604499 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The partial fraction decomposition of $\frac{9x-7}{(x+3)(x^2+1)}$ is

Options :

1. ✖ $\frac{17}{5(x+3)}-\frac{(17x-6)}{5(x^2+1)}$

2. ✖ $\frac{-17}{5(x+3)}-\frac{(17x-6)}{5(x^2+1)}$

3. ✖ $\frac{17}{5(x+3)}+\frac{(17x-6)}{5(x^2+1)}$

4. ✔ $\frac{-17}{5(x+3)}+\frac{(17x-6)}{5(x^2+1)}$

Question Number : 20 Question Id : 342604500 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\cos\frac{7\pi}{8}+\cos\frac{\pi}{4}+\cos\left(\frac{-\pi}{8}\right)-1=$$

Options :

1. ✖ $4\cos\frac{\pi}{16}\cos\frac{3\pi}{4}\cos\frac{5\pi}{8}$

2. ✖ $4\cos\frac{\pi}{16}\cos\frac{\pi}{8}\sin\frac{5\pi}{8}$

3. $4\cos\frac{\pi}{16}\cos\frac{3\pi}{8}\cos\frac{9\pi}{16}$

4. $-4\cos\frac{\pi}{16}\cos\frac{5\pi}{8}\cos\frac{\pi}{16}$

Question Number : 21 Question Id : 342604501 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\frac{2\sin\alpha}{1+\cos\alpha+\sin\alpha}=x$, then $\frac{1-\cos\alpha-\sin\alpha}{\cos\alpha}=$

Options :

1. $\frac{1}{x}$

2. $-x$

3. $1-x$

4. $1+x$

Question Number : 22 Question Id : 342604502 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\frac{\cot^2 15^\circ - 1}{\cot^2 15^\circ + 1} =$$

Options :

1. $\frac{1}{2}$ ✖

2. $\frac{\sqrt{3}}{2}$ ✔

3. $\frac{3\sqrt{3}}{4}$ ✖

4. $\frac{\sqrt{3}}{4}$ ✖

Question Number : 23 Question Id : 342604503 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $A + B + C = 4S$, then $\cos(2S-A) + \cos(2S-B) - \cos(2S-C) - \cos 2S =$

Options :

1. ✖

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

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

2. ✖

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

3. ✖

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

4. ✔

Question Number : 24 Question Id : 342604504 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The number of values of x satisfying $\sin 4x = \cos 3x$ and $\frac{-\pi}{6} < x < \frac{\pi}{2}$, is

Options :

0

1. ✖

1

2. ✖

3. ✔

2

3

4. ✖

Question Number : 25 Question Id : 342604505 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\text{If } f(n)=\tan\left[\text{Tan}^{-1}\frac{1}{1+2}+\text{Tan}^{-1}\frac{1}{1+6}+\text{Tan}^{-1}\frac{1}{1+12}+....+\text{Tan}^{-1}\frac{1}{1+n(n+1)}\right]$$

$$\text{then } f(2021)=$$

Options :

$$\frac{2020}{2022}$$

1. ✖

$$\frac{2022}{2024}$$

2. ✖

$$\frac{2021}{2023}$$

3. ✔

4. ✖

$$\frac{2019}{2021}$$

Question Number : 26 Question Id : 342604506 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $y = \log_2 \sin x$, then the minimum value of $\cos h\, y$ is

Options :

1. ✖ 2

2. ✖ $\frac{2}{e}$

3. ✖ $\frac{e}{2}$

4. ✔ 1

Question Number : 27 Question Id : 342604507 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In a ΔABC, if $\angle C = 90^\circ$, $\frac{a^2+b^2}{a^2-b^2}\sin(A-B) = 1$ and $0 < B < 45^\circ$, then

Options :

1. $a > b > c$ ✖

2. $c > a > b$ ✔

3. $c > b > a$ ✖

4. $a < b < c$ ✖

Question Number : 28 Question Id : 342604508 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In a triangle ABC, if $rr_2 = r_1 r_3$, then $\cos 2B =$

Options :

1. -1 ✔

2. 1 ✖

3. ✖

0

4. ✖ $\frac{1}{2}$

Question Number : 29 Question Id : 342604509 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the sides of a triangle are 3, 4 and 5 then the circumradius of the triangle is

Options :

1. ✖ 2

2. ✖ $\frac{3}{2}$

3. ✔ $\frac{5}{2}$

4. ✖ $\frac{7}{2}$

Question Number : 30 Question Id : 342604510 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In a ΔABC, $\dfrac{\cos^2\left(\dfrac{B-C}{2}\right)}{(b+c)^2}+\dfrac{\sin^2\left(\dfrac{B-C}{2}\right)}{(b-c)^2}=$

Options :

1. $1/a^2$ ✔

2. $2/a^2$ ✖

3. $3/a^2$ ✖

4. $4/a^2$ ✖

Question Number : 31 Question Id : 342604511 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the collinear points A, B and C have position vectors respectively $(1, x, 3)$, $(3, 4, 7)$ and $(y, -2, -5)$, then $x + y =$

Options :

1. ✔

-1

2. ✖ 1

3. ✖ -5

4. ✖ 5

Question Number : 32 Question Id : 342604512 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The two lines $L_1 : \bar{r} = \left(\bar{i} + 5\bar{j} + 5\bar{k}\right) + t\left(4\bar{i} - 4\bar{j} + 5\bar{k}\right)$ and $L_2 : \bar{r} = \left(2\bar{i} + 4\bar{j} + 5\bar{k}\right) + s\left(8\bar{i} - 3\bar{j} + \bar{k}\right)$ are such that

Options :

1. ✖ both are parallel

2. ✖ both are perpendicular

3. ✔ both are Skew lines

both are non-Skew lines, non-parallel, non-perpendicular

4. ✖

Question Number : 33 Question Id : 342604513 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$\bar{a}, \bar{b}, \bar{c}$ are non-coplanar vectors. If the position vector of the point of intersection of the line $\bar{r} = \bar{a} + 2\bar{b} + p(\bar{a} - 2\bar{c})$ and the plane $\bar{r} = 3\bar{a} - q(\bar{c} - \bar{b}) + K(\bar{a} - \bar{b} + \bar{c})$ is $\bar{r} = x\bar{a} + y\bar{b} + z\bar{c}$, then $xyz =$

Options :

-8

1. ✔

8

2. ✖

12

3. ✖

-12

4. ✖

Question Number : 34 Question Id : 342604514 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let $\bar{a}, \bar{b}, \bar{c}$ be unit vectors such that $2\bar{a}+3\bar{b}+4\bar{c}=\bar{0}$. Then $\left|\bar{b}\times\bar{c}\right|=$

Options :

1. ✔ $\frac{\sqrt{15}}{8}$

2. ✖ $\frac{\sqrt{15}}{16}$

3. ✖ $\frac{\sqrt{15}}{4}$

4. ✖ $\frac{\sqrt{15}}{2}$

Question Number : 35 Question Id : 342604515 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The shortest distance between the Skew lines $\bar{r}=\left(3\bar{i}+4\bar{j}-2\bar{k}\right)+\lambda\left(-\bar{i}+2\bar{j}+\bar{k}\right)$ and $\bar{r}=\left(\bar{i}-7\bar{j}-2\bar{k}\right)+\mu\left(\bar{i}+3\bar{j}+2\bar{k}\right)$ is

Options :

1. ✖

$\frac{26}{5\sqrt{5}}$

$\sqrt{45}$

2. ✖

$\sqrt{35}$

3. ✔

$\frac{36}{5\sqrt{5}}$

4. ✖

Question Number : 36 Question Id : 342604516 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\bar{b}=2\bar{i}-\bar{j}-\bar{k}$, $\bar{a}=3\bar{i}+4\bar{j}-5\bar{k}$ and $\bar{b}\times\left(\bar{a}\times\bar{b}\right)=\frac{\bar{a}-k\bar{b}}{l}$ then $\frac{k}{l\left|\bar{b}\right|}$ is

Options :

the orthogonal projection of $\bar{b}$ on $\bar{a}$ and equal to $\frac{7}{\sqrt{50}}$

1. ✖

the orthogonal projection of $\bar{a}$ on $\bar{b}$ and equal to $\frac{7}{\sqrt{6}}$

2. ✔

3. ✖ the orthogonal projection of $\bar{b}$ in the direction perpendicular to $\bar{a}$ and equal to $\frac{5}{3}$

4. ✖ the orthogonal projection of $\bar{a}$ in the direction perpendicular to $\bar{b}$ and equal to $\frac{752}{3}$

Question Number : 37 Question Id : 342604517 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If M_1 and M_2 are the mean deviations from mean and median of the first 15 even integers then $M_1 + M_2 =$

Options :

1. ✖ $\frac{112}{15}$

2. ✔ $\frac{224}{15}$

3. ✖ $\frac{56}{15}$

4. ✖

$\frac{28}{15}$

Question Number : 38 Question Id : 342604518 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A box contains 8 red, 3 white and 9 blue balls. If 3 balls are drawn from the box at random one after the other without replacement, then the probability that they are 2 red balls and 1 white ball is

Options :

1. ✔ $\frac{7}{95}$

2. ✖ $\frac{13}{95}$

3. ✖ $\frac{7}{36}$

4. ✖ $\frac{11}{36}$

Question Number : 39 Question Id : 342604519 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A bag B contains 4 white balls and 2 black balls. Another bag C contains 3 white balls and 5 black balls. If one ball is drawn randomly from each bag, then the probability that the two balls drawn are both white is

Options :

1. ✔ $\frac{1}{4}$

2. ✖ $\frac{5}{24}$

3. ✖ $\frac{13}{24}$

4. ✖ $\frac{3}{4}$

Question Number : 40 Question Id : 342604520 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

From $3n$ consecutive integers three integers are selected at random. The probability that their sum is divisible by 3 is

Options :

1. ✖

$$\frac{3 \cdot n_{C_3} + n^2}{3n_{C_3}}$$

$$\frac{2 \cdot n_{C_3} + n^3}{3n_{C_3}}$$

2. ✖

$$\frac{3n^2 - 3n + 2}{(3n-1)(3n-2)}$$

3. ✔

$$\frac{3n^2 - 3n + 2}{(3n+1)(3n+2)}$$

4. ✖

Question Number : 41 Question Id : 342604521 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A die is rolled 5 times. Getting an odd number in one trail is considered as a success. The variance of the distribution of successes is

Options :

1. ✖ $\frac{8}{3}$

2. ✖ $\frac{3}{8}$

3. ✖ $\frac{4}{5}$

4. ✔ $\frac{5}{4}$

Question Number : 42 Question Id : 342604522 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Face masks are supplied to a junior college in packets of 100. If there is a chance that 1 in 500 face masks is defective, then the number of packets containing no defective face masks in a consignment of 10,000 packets is

Options :

1. ✔ $\frac{10,000}{e^{0.2}}$

2. ✖ $(10,000)e^{0.2}$

3. ✖ $(10,000)e^{-0.02}$

4. ✖ $\frac{(10,000)e^{0.002}}{2!}$

Question Number : 43 Question Id : 342604523 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A (1, 0), B (0, 2) and C (1, 2) are three points on XY-plane. If a point P(x, y) which moves such that the area of triangle PAB is twice the area of the triangle ABC, then the locus of the point P is

Options :

1. ✖ $4x^2 - 4xy + y^2 - 8x + 4y = 0$

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

3. ✖ $4x^2 - 4xy + y^2 - 8x + 4y - 12 = 0$

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

Question Number : 44 Question Id : 342604524 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The angle by which axes are to be rotated without changing the origin so that the transformed equation of $x^2 + 4xy - y^2 = 0$ in new coordinates (X, Y) does not contain XY term is

Options :

1. $\frac{1}{2}\text{Tan}^{-1}(2)$ ✔

2. $\text{Tan}^{-1}(2)$ ✖

3. $\frac{\pi}{8}$ ✖

4. $\frac{\pi}{4}$ ✖

Question Number : 45 Question Id : 342604525 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A straight line passing through origin O intersects the lines $10x-8y-10=0$ and $\frac{x}{4}-\frac{y}{5}+1=0$ at right angles and at the points P and Q respectively. Then the ratio in which O divides the line segment PQ is

Options :

1. $1:2$ ✖

2. $1:4$ ✔

3. ✖ $1:1$

4. ✖ $3:4$

Question Number : 46 Question Id : 342604526 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Consider the lines $L_1 \equiv 4x+5y-6=0$, $L_2 \equiv 2x+3y-4=0$, $L_3 \equiv 3x-y+2=0$. If the line $L_1=0$ intersects the lines $L_2=0$ and $L_3=0$ at the points A and B respectively, then the combined equation of OA and OB is

Options :

1. ✔ $26x^2+17xy+2y^2=0$

2. ✖ $x^2-2xy+y^2=0$

3. ✖ $3x^2+17xy+2y^2=0$

4. ✖ $26x^2+2xy+17y^2=0$

Question Number : 47 Question Id : 342604527 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$x-y=0$ and $\frac{x}{2}+\frac{y}{2}=1$ are respectively the perpendicular bisectors of the sides AB and AC of a triangle ABC. If the vertex is A (2, 3), then the equation of the side BC is

Options :

1. $x-2y+1=0$ ✔

2. $x+2y-3=0$ ✖

3. $2x+y-3=0$ ✖

4. $x-2y=-4$ ✖

Question Number : 48 Question Id : 342604528 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In an isosceles right angled triangle, if the equation of the hypotenuse and its opposite vertex are $3x+4y=4$ and (2, 2), then the slopes of the remaining two sides are

Options :

1. ✔

$\frac{1}{7}, -7$

2. $\frac{-1}{7}, 7$ ✖

3. $\frac{1}{7}, 7$ ✖

4. $\frac{-1}{7}, -7$ ✖

Question Number : 49 Question Id : 342604529 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The product of the length of perpendiculars from origin to the pair of lines $x^2+3y^2+4xy-4x-10y+3=0$ is

Options :

1. $\frac{3}{\sqrt{20}}$ ✔

2. $\frac{9}{\sqrt{20}}$ ✖

3. ✖ $\frac{3}{\sqrt{15}}$

4. ✖ $\frac{3}{\sqrt{5}}$

Question Number : 50 Question Id : 342604530 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $ax^2+2hxy+by^2+2gx+2fy+c=0$ represents a pair of lines, which of the following statements is true?

Options :

1. ✔ If the slope of one line is negative of the slope of another line, then $h=0$

2. ✖ If the two lines are parallel then $2f(gh+af)=0$

3. ✖ If the two lines intersect at origin then $g=f=0$ and $h^2=ab$

4. ✖ The x- coordinate of the point of intersection of the lines is positive when $hf-bg>0$

Question Number : 51 Question Id : 342604531 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the line $y = mx + C$ is a tangent to the circle $x^2 + y^2 = 16$ then $m =$

Options :

1. ✖ $\pm\frac{1}{4}\sqrt{C-16}$

2. ✔ $\pm\frac{1}{4}\sqrt{C^2-16}$

3. ✖ $\pm\frac{1}{C}\sqrt{C^2+16}$

4. ✖ $\pm\frac{1}{16}\left(C^2-16\right)$

Question Number : 52 Question Id : 342604532 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the points $(2,3)$ and $(K,-2)$ are conjugate with respect to the circle $x^2 + y^2 - 2x + 4y - 2 = 0$ then $K =$

Options :

1. ✔

8

6

2. ✖

4

3. ✖

3

4. ✖

Question Number : 53 Question Id : 342604533 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The number of common tangents that can be drawn to the circles $x^2+y^2-2x-2y-23=0$ and $x^2+y^2-4x-4y-1=0$ is

Options :

0

1. ✔

1

2. ✖

2

3. ✖

4. ✖

3

Question Number : 54 Question Id : 342604534 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A point that lies on the common tangent to the circles $x^2+y^2-2x+18y+78=0$ and $x^2+y^2+8x-6y-200=0$ among the following options is

Options :

1. ✖ $\left(0, \frac{139}{12}\right)$

2. ✖ $\left(\frac{-137}{5}, \frac{-1}{6}\right)$

3. ✖ $\left(31, \frac{-4}{3}\right)$

4. ✔ $\left(\frac{-2}{5}, \frac{-47}{4}\right)$

Question Number : 55 Question Id : 342604535 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The length of the common chord of the circles $x^2+y^2+2x+3y+1=0$ and $x^2+y^2+4x+3y+2=0$ is

Options :

1. ✖ $\sqrt{2}$

2. ✔ $2\sqrt{2}$

3. ✖ 2

4. ✖ 4

Question Number : 56 Question Id : 342604536 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The parametric equations of the parabola $x^2-8x+12y+15=0$ are

Options :

1. ✔ $x=4+6t, y=\frac{1}{12}-3t^2$

2. ✖ $x=\frac{1}{12}-3t^2, y=4+6t$

3. $x = 3t^2, y = 6t$ ✖

4. $x = 6t, y = 3t^2$ ✖

Question Number : 57 Question Id : 342604537 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The equation of the directrix of the parabola $(2x-3y-5)^2 = 20(3x+2y+1)$ is

Options :

1. $3x+2y+1+5\sqrt{3}=0$ ✔

2. $3x+2y+5=0$ ✖

3. $2x-3y+1+5\sqrt{3}=0$ ✖

4. $2x-3y+5=0$ ✖

Question Number : 58 Question Id : 342604538 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Given the ellipse (E) $4x^2+9y^2-36=0$, the circle (C) $x^2+y^2-9=0$ and two points A(1, 2), B(2, 1), which of the following is correct?

Options :

1. ✖ B lies inside C but outside E

2. ✖ B lies outside both C and E

3. ✖ A lies inside both C and E

4. ✔ A lies inside C, but outside E

Question Number : 59 Question Id : 342604539 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If a circle $(x-1)^2+y^2=r^2$ touches the ellipse $x^2+4y^2=16$ internally, then $r=$

Options :

1. ✔ $\sqrt{\frac{11}{3}}$

2. ✖

$\frac{11}{3}$

3. ✖ $\sqrt{\frac{15}{2}}$

4. ✖ 2

Question Number : 60 Question Id : 342604540 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the latus rectum of a hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ subtends an angle of 60° at the other focus, then the eccentricity of the hyperbola is

Options :

1. ✖ 2

2. ✖ $\frac{\sqrt{3}+1}{2}$

3. ✖ $2\sqrt{3}$

$\sqrt{3}$

4. ✔

Question Number : 61 Question Id : 342604541 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The centroid of a triangle with vertices A(3, 4, 5), B(6, 7, 2) and C(x, y, z) is (3, 2, 3) then $x+y+z=$

Options :

-3

1. ✔

7

2. ✖

3

3. ✖

-7

4. ✖

Question Number : 62 Question Id : 342604542 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $(2,-1,2)$ and $(K,-3,-5)$ are the triads of direction ratios of two lines and the angle between the lines is 60°, then

Options :

1. ✖ $K^2-56K-208=0$

2. ✖ $5K^2-110K+112=0$

3. ✔ $7K^2-112K-110=0$

4. ✖ $7K^2-112K+110=0$

Question Number : 63 Question Id : 342604543 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A point on the plane determined by the points A (1, 1, −1), B (2, −1, 0) and C (−1, 0, 2) among the following is

Options :

1. ✔ $(1, 2, -2)$

2. ✖ $(2, 1, -3)$

$(2, -2, 2)$

3. ✖

$(2, 1, 2)$

4. ✖

Question Number : 64 Question Id : 342604544 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $f(x) = -(\sin^2 x + \cos^5 x)$, then $\lim_{x \to 0} \frac{1}{x} f'(x)$

Options :

exist and is equal to 0

1. ✖

exist and is equal to 7

2. ✖

exist and is equal to 3

3. ✔

does not exist

4. ✖

Question Number : 65 Question Id : 342604545 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let a, b, c be three real numbers. If the function

$$f(x)=\begin{cases}\cos(2x+\pi) & \text{if} \quad x\le 0\\ ax^2+b & \text{if} \quad 0<x<1\\ cx+4 & \text{if} \quad 1\le x\le 2\\ 3a+1 & \text{if} \quad x\ge 2\end{cases}$$

is continuous everywhere, then $b^2-bc+c^2=$

Options :

1. ✔ 133

2. ✖ 157

3. ✖ 43

4. ✖ 31

Question Number : 66 Question Id : 342604546 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\underset{n\to\infty}{Lt}\ P\left(1+\frac{r}{100n}\right)^{tn}=$$

Options :

1. ✖

P

2. ✖ $P\left(1+\frac{r}{100}\right)^t$

$Pe^{\frac{rt}{100}}$

3. ✔

$Pe^{\frac{r}{100}}$

4. ✖

Question Number : 67 Question Id : 342604547 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $f:\mathbb{R}\to\mathbb{R}$ is a differentiable function at $a\in\mathbb{R}$ such that $f'(a)=af(a)$, then $\underset{x\to a}{Lt}\frac{xf(a)-af(x)}{x-a}=$

Options :

1. ✔ $(1-a^2)f(a)$

2. ✖ $\frac{f(a)}{a}$

$af(a)$

3. ✖

$\frac{f(a)}{1-a^2}$

4. ✖

Question Number : 68 Question Id : 342604548 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $x = a(t - \sin t)$ and $y = a(1 - \cos t)$ then $\frac{d^2y}{dx^2} =$

Options :

$\frac{1}{4a\sin^4\left(\frac{t}{2}\right)}$

1. ✖

$\frac{-1}{4a\sin^4\left(\frac{t}{2}\right)}$

2. ✔

$\frac{1}{4a\cos^4\left(\frac{t}{2}\right)}$

3. ✖

4. ✖

$$\frac{-1}{4a\cos^4\left(\frac{t}{2}\right)}$$

Question Number : 69 Question Id : 342604549 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $y = \text{Cos}^{-1}(\tanh x) + \sinh(\sin 6x)$, then $\frac{dy}{dx} =$

Options :

1. ✔ $\frac{-1}{\cosh x} + 6\cos 6x \cosh(\sin 6x)$

2. ✖ $\frac{1}{\cosh x} - 6\cos 6x \cosh(\sin 6x)$

3. ✖ $\frac{-1}{\cosh x} - 6\cos 6x \cosh(\sin 6x)$

4. ✖ $\frac{1}{\cosh x} + 6\cos 6x \cosh(\sin 6x)$

Question Number : 70 Question Id : 342604550 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $y = x^{\sqrt{x}}$, then $\frac{dy}{dx} =$

Options :

1. ✖ $\frac{\ln x}{2\sqrt{2}}$

2. ✖ $\frac{x^{\sqrt{x}}}{\sqrt{x}}$

3. ✖ $\frac{y \ln x}{2\sqrt{x}}$

4. ✔ $\frac{y(\ln x + 2)}{2\sqrt{x}}$

Question Number : 71 Question Id : 342604551 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let $\mathbb{R}^* = \mathbb{R} - \left\{(2k-1)\frac{\pi}{2} \middle/ k \in I\right\}$. The function $f : \mathbb{R}^* \to \mathbb{R}$ is defined as $f(x) = \tan x - x$, then $f(x)$ is

Options :

1. an increasing function ✔

2. a decreasing function ✖

3. minimum at $x = 0$ ✖

4. periodic function ✖

Question Number : 72 Question Id : 342604552 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the tangent to the curve $xy + ax + by = 0$ at $(1,1)$ makes an angle $\text{Tan}^{-1} 2$ with X-axis, then $\frac{a+b}{ab} =$

Options :

1. 0 ✖

2. $\frac{1}{2}$ ✔

3. ✖

$\frac{-1}{2}$

2

4. ✖

Question Number : 73 Question Id : 342604553 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The volume of a spherical balloon is increasing at the rate of 2 cm^3 / sec. When its radius is 4 cm, the rate of change of its surface area (in cm^2/sec) is

Options :

1

1. ✔

2

2. ✖

3

3. ✖

4

4. ✖

Question Number : 74 Question Id : 342604554 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If a cubic function $f(x)=ax^3+bx^2-\frac{18}{5}x+\frac{19}{10}$ has maximum value 10 at $x=-3$ and has minimum value $\frac{-5}{2}$ at $x=2$, then $f(1)=$

Options :

1. -10 ✖

2. $\frac{-6}{5}$ ✔

3. 6 ✖

4. $\frac{28}{5}$ ✖

Question Number : 75 Question Id : 342604555 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $\int\frac{1}{(x-2)^5(x-1)^4}dx=\sum_{r=-4}^{-1}A_r\left(\frac{x-2}{x-1}\right)^r+\sum_{r=1}^{3}A_r\left(\frac{x-2}{x-1}\right)^r+Bf(x)$, then $f(x)=$

Options :

1. ✔ $log(x-2)-log(x-1)$

2. ✖ $\left(\frac{x-2}{x-1}\right)+log\,x$

3. ✖ $x+log\left(\frac{x-2}{x-1}\right)$

4. ✖ $log\,x$

Question Number : 76 Question Id : 342604556 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $f(x)+K$ is obtained by evaluating $\int\frac{x^3}{(1+x^2)^3}dx$ using the substitution $x=\tan\theta$ and $g(x)+C$ is obtained by evaluating $\int\frac{x^3}{(1+x^2)^3}dx$, using the substitution $x^2+1=Z$, then $f(x)-g(x)+K-C=$

Options :

1. ✖ $\frac{1}{4}$

2. ✔ any constant

3. ✖ any function of x

4. ✖ $\frac{x}{1+x^2}$

Question Number : 77 Question Id : 342604557 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For $-1<x<1$ and $y>1$, if $\int \frac{x}{\sqrt{1+x}+\sqrt{1-x}}dx+\int \frac{y}{\sqrt{y+1}+\sqrt{y-1}}dy=$

$A(1+x)^{3/2}+B(1-x)^{3/2}+f(y)(y+1)^{3/2}+g(y)(y-1)^{3/2}+C$, then $Af(y)+Bg(y)=$

Options :

1. ✖ $\frac{2y}{15}$

2. ✔ $\frac{-4}{45}$

3. ✖ $\frac{-4}{15}$

4. ✖ $\frac{3y+2}{45}$

Question Number : 78 Question Id : 342604558 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let $\{x\}$ denotes the fractional part of a real number x. Then $\int_0^2 \{x\}\,dx =$

Options :

1. ✔ 1

2. ✖ 2

3. ✖ 3

4. ✖ 0

Question Number : 79 Question Id : 342604559 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\int_0^2 \left|1-x^2\right| dx =$$

Options :

1 ✖

2 ✔

3 ✖

$\frac{1}{2}$

4 ✖

Question Number : 80 Question Id : 342604560 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the solution of $\frac{dy}{dx} = (3x+y+4)^2$ is $\frac{1}{\sqrt{3}}\left(\text{Tan}^{-1} f(x,y)\right) - x = K$ then $f(1,2) =$

Options :

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

1 ✖

2. ✖ 3

3. ✔ $3\sqrt{3}$

4. ✖ $2\sqrt{3}$

Physics

Section Id :	34260411
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
Sub-Section Number :	1
Sub-Section Id :	34260411
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 342604561 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statement is correct?

Options :

1. ✖ Electromagnetic force is short ranged

2. ✖ Relative strength of gravitational force is higher than that of weak nuclear force

3. ✔ Range of the weak nuclear force is smaller than that of strong nuclear force

4. ✖ Relative strength of strong nuclear force may or may not be higher than that of electromagnetic force

Question Number : 82 Question Id : 342604562 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If ε_0 and μ_0, represent the permittivity and permeability of free space respectively, then the dimension of the product $\varepsilon_0 \mu_0$ is,

Options :

1. ✔ $M^{\circ} L^{-2} T^{2}$

2. ✖ $M^{\circ} L^{2} T^{-2}$

3. ✖

$M^{\circ} L T^{-1}$

$M^{\circ} L^{-1} T$

4. ✖

Question Number : 83 Question Id : 342604563 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Two balls are released from the same position at a height of 500 m above ground, one after the other, with an interval of 1s. What is the distance between the two balls when the first hits ground?
(Acceleration due to gravity g = 10 m/s^2)

Options :

1. ✔ 95 m

2. ✖ 65 m

3. ✖ 130 m

4. ✖ 175 m

Question Number : 84 Question Id : 342604564 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A cyclist traversed half the distance of a linear track with a velocity 10 m/s. The remaining part of the track was covered with a velocity $\vec{v}_1$ for half the time and a velocity $\vec{v}_2$ for the other half of the time. If $\vec{v}_1 + \vec{v}_2 = 20$ m/s, then the average velocity of the cyclist during the completion of the journey through the track is

Options :

1. ✖ 30 m/s

2. ✖ 20 m/s

3. ✔ 10 m/s

4. ✖ 15 m/s

Question Number : 85 Question Id : 342604565 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A projectile is thrown at a speed which is twice its speed at its maximum height. If R and H are its range and maximum height respectively then the ratio $\frac{R}{H}$ is

Options :

1. ✔ $\frac{4}{\sqrt{3}}$

2. ✖

$\frac{\sqrt{3}}{8}$

3. ✖ 2

4. ✖ $2\sqrt{3}$

Question Number : 86 Question Id : 342604566 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A particle is moving in xy-plane crosses the origin at time t = 0. The equation of motion of the particle is $y = 4x^2$. If the velocity of the particle is $\vec{v} = \left(2\hat{i} + 2\hat{j}\right)$ m/s and acceleration is $\vec{a} = \left(a\hat{j}\right)$ m/s^2 then the magnitude of a is

Options :

1. ✖ 8

2. ✖ 16

3. ✖ $8\sqrt{2}$

4. ✔ 32

Question Number : 87 Question Id : 342604567 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A person is managing to be at rest between two vertical walls by pressing one wall by his hands and feet and second wall with his back. The coefficient of friction is 0.5 between his body and the wall. If the force with which the person pushes the wall is 500 N, then the mass of the person is
(Take $g = 10\ m/s^2$)

Options :

1. ✖ 80 kg

2. ✖ 40 kg

3. ✖ 75 kg

4. ✔ 50 kg

Question Number : 88 Question Id : 342604568 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

An object A of mass 20 kg and travelling at 20 m/s crashes into another object B of mass 200 kg and travelling at 10 m/s, in the same direction. After the collision, object A bounces back in opposite direction at a speed of 10 m/s. The speed of the object B after the collision is

Options :

1. ✔ 13 m/s

2. ✖ 12 m/s

3. ✖ 14 m/s

4. ✖ 20 m/s

Question Number : 89 Question Id : 342604569 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A water pump rated 600 W, has an efficiency of 95 %. If it is used to raise water through vertical distance of 60 m. The volume of water drawn in 20 minutes, is
[Use density of water = 1000 kg m^{-3}, g = 10 m/s^2]

Options :

1. ✔ 1.14 m^3

2. ✖ 2.24 m^3

3. $11.4\ m^3$ ✖

4. $22.4\ m^3$ ✖

Question Number : 90 Question Id : 342604570 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Ball P of mass m moving with velocity 'v' collides with another ball Q of mass 2 m, at rest. If v_P and v_Q are the final velocities of P and Q respectively, after collision, then

(Assume the coefficient of restitution is $\frac{1}{3}$)

Options :

1. $\frac{v_Q}{v_P} = 4$ ✔

2. $\frac{v_P}{v_Q} = 4$ ✖

3. $\frac{v_Q}{v_P} = 2$ ✖

4. ✖

$$\frac{\nu_P}{\nu_Q} = 2$$

Question Number : 91 Question Id : 342604571 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A wheel undergoes a constant angular acceleration from time t = 0 to t = 20 s and thereafter angular acceleration is zero. If angular velocity at t = 2 s is found to be 5 rad/s, then the number of revolutions made by the wheel in time interval t = 0 s to t = 50 s is

Options :

1. $1000 / \pi$ ✔

2. $600\ \pi$ ✖

3. $1500 / \pi$ ✖

4. $2000 / \pi$ ✖

Question Number : 92 Question Id : 342604572 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A circular hoop of radius 50 cm and mass 1 kg rotating with an angular velocity ω_0 is placed on a rough horizontal surface. The initial velocity of the centre of the hoop is zero. Let 'v' be the velocity of the centre of the hoop when it ceases to slip. The ratio v/ω_0 will be

Options :

1. ✖ 10 cm

2. ✖ 50 cm

3. ✔ 25 cm

4. ✖ 12.5 cm

Question Number : 93 Question Id : 342604573 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A simple harmonic oscillator has an amplitude of 0.5 m and a time period of 2 seconds. What is the magnitude of acceleration when it is displaced from the mean position by 0.25 m?

Options :

1. ✖ $\pi^2\ m/s^2$

2. ✖

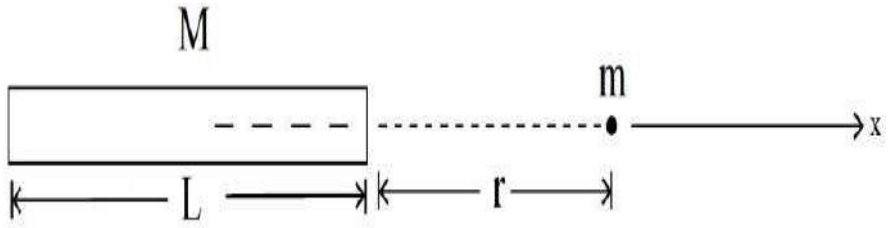
$\frac{\pi^2}{2}\ \mathrm{m/s^2}$

3. ✔ $\frac{\pi^2}{4}\ \mathrm{m/s^2}$

4. ✖ $\frac{\pi^2}{8}\ \mathrm{m/s^2}$

Question Number : 94 Question Id : 342604574 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A point mass 'm' is located at a distance r from a uniform thin rod of mass M and length L as shown in the figure. The magnitude of gravitational force of attraction is



Options :

1. ✖ $\frac{GMm}{r^2}$

2. ✖ $\frac{GMm}{(r+L)^2}$

3. ✔ $\frac{GMm}{r(r+L)}$

4. ✖ $\frac{GMm}{\left(r+\frac{L}{2}\right)^2}$

Question Number : 95 Question Id : 342604575 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Consider a fluid in a container. Let the density of the fluid at the surface and at depth H be ρ_0 and ρ respectively. The bulk modulus of the fluid is B_0. If $\rho=\frac{\rho_0}{1+\alpha\rho_0 gH}$ then the constant α is

$\left(\text{Assume } \frac{\rho-\rho_0}{\rho_0}<<1\right)$

Options :

1. ✖ B_0

2. ✖ $\frac{1}{B_0}$

3. ✖ $-B_0$

4. $\frac{-1}{B_0}$ ✔

Question Number : 96 Question Id : 342604576 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Liquid A rises to a height of 10 cm in a capillary tube and liquid B falls to a depth of 2 cm in the same tube. The density of A and B are 1 g/cm^3 and 10 g/cm^3 respectively. The contact angle of A and B with the tube is 0° and 135° respectively. If the surface tension of A and B are S_A and S_B then the ratio $\frac{S_B}{S_A}$ is

Options :

1. $\sqrt{2}$ ✖

2. $2\sqrt{2}$ ✔

3. $\frac{1}{\sqrt{2}}$ ✖

4. $\frac{1}{2\sqrt{2}}$ ✖

Question Number : 97 Question Id : 342604577 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A wooden block of density 0.5 g/cc is tied to a string. The other end of the string is fixed to the bottom of a tank. The tank is filled with a liquid of density 1 g/cc. If the tension of the string is 20 N, then the mass of the block is
(Take $g = 10\ m/s^2$)

Options :

1. ✖ 1 kg

2. ✔ 2 kg

3. ✖ 3 kg

4. ✖ 0.5 kg

Question Number : 98 Question Id : 342604578 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The wavelength of the radiation emitted by a black body is 6 mm and Wein's constant is 3×10^{-3} mK. Then temperature of black body is

Options :

1. ✖ 5 K

2. ✖ 3 K

3. ✔ 0.5 K

4. ✖ 50 K

Question Number : 99 Question Id : 342604579 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Thermopile Bolometer is used to detect

Options :

1. ✖ Ultraviolet radiation

2. ✖ X – rays

3. ✖ Gamma radiation

4. ✔ Infrared radiation

Question Number : 100 Question Id : 342604580 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

An ideal monoatomic gas of volume V is adiabatically expanded to a volume 3 V at 27 °C. The final temperature in Kelvins is

(use $\frac{C_P}{C_V} = \frac{5}{3}$)

Options :

1. ✔ 144.2

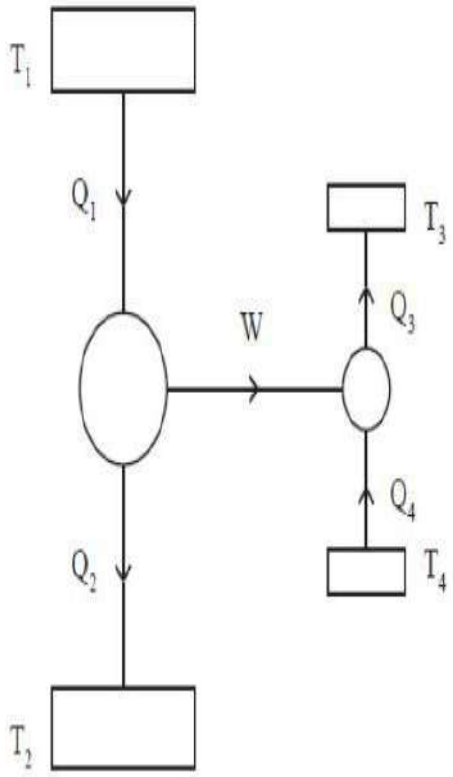
2. ✖ 170.3

3. ✖ 50.4

4. ✖ 100.2

Question Number : 101 Question Id : 342604581 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The following figure shows a Carnot engine that works between temperatures $T_1 = 400$ K and $T_2 = 200$ K and drives a Carnot refrigeration that works between temperatures $T_3 = 350$ K and $T_4 = 250$ K. The quantity $\frac{Q_3}{Q_1}$ will be



Options :

1. ✖ 1.5

2. ✖ 2.0

3. ✖ 2.25

4. ✔ 1.75

Question Number : 102 Question Id : 342604582 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Two non-reactive monoatomic ideal gases have their atomic masses in the ratio 3 : 4. The ratio of their partial pressures when enclosed in a vessel kept at a constant temperature is 2 : 3. The ratio of their densities is

Options :

1. 1.1 ✖

2. 2.0 ✖

3. 0.9 ✖

4. 0.5 ✔

Question Number : 103 Question Id : 342604583 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Which of the following is not a transverse wave?

Options :

1. Light waves ✖

2. ✔ Sound waves

3. ✖ Waves on a violin string

4. ✖ Water waves

Question Number : 104 Question Id : 342604584 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A point source is located at a distance of 20 cm from the front surface of a symmetrical glass biconvex lens with equal radii of curvature 5 cm. The distance at which image formed from the rear surface of this lens is
[Given refractive index of the glass is 1.5]

Options :

1. ✔ $\frac{20}{3}$ cm

2. ✖ $\frac{10}{3}$ cm

3. ✖ 5 cm

4. ✖ 10 cm

Question Number : 105 Question Id : 342604585 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The fringe widths are found to be ω_1 and ω_2 respectively if a Young's double slit experiment is performed in medium of refractive index n_1 and n_2 respectively. The correct statement is

Options :

1. ✖ $\omega_1 > \omega_2$ if $n_1 > n_2$

2. ✔ $\omega_1 > \omega_2$ if $n_1 < n_2$

3. ✖ $\omega_1 = \omega_2$ if $n_1 < n_2$

4. ✖ $\frac{\omega_1}{\omega_2} = \frac{n_1}{n_2}$

Question Number : 106 Question Id : 342604586 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A particle of mass m and charge q is thrown perpendicular to an electric field of intensity E with an initial velocity v. The particle moves a distance x perpendicular to the field and a distance y along the direction of the field. If $y = \alpha x^2$ then the α is given by

Options :

1. ✖ $\frac{qE}{m}$

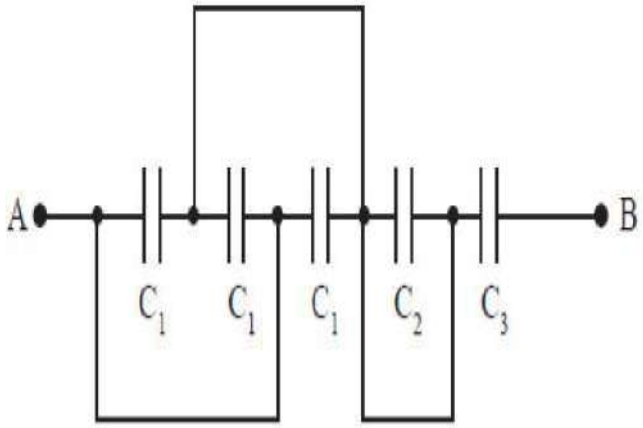
2. ✖ $\frac{qEv^2}{m}$

3. ✖ $\frac{2qE}{mv^2}$

4. ✔ $\frac{qE}{2mv^2}$

Question Number : 107 Question Id : 342604587 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A circuit is shown in the following figure for which $C_1 = (3 \pm 0.011)\ \mu F$, $C_2 = (5 \pm 0.01)\ \mu F$ and $C_3 = (1 \pm 0.01)\ \mu F$. If C is the equivalent capacitance across AB, then C is given by



Options :

1. ✖ $(0.9 \pm 0.114)\ \mu F$

2. ✖ $(0.9 \pm 0.01)\ \mu F$

3. ✔ $(0.9 \pm 0.023)\ \mu F$

4. ✖ $(0.9 \pm 0.09)\ \mu F$

Question Number : 108 Question Id : 342604588 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In a meter bridge experiment, the balance point from left is 37.5 cm. The ratio of the right gap resistance to the left gap resistance is

Options :

1. ✔ $\frac{5}{3}$

2. ✖ $\frac{8}{5}$

3. ✖ $\frac{4}{5}$

4. ✖ $\frac{3}{2}$

Question Number : 109 Question Id : 342604589 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Given the fact that
A) Magnetic field exerts force only on a moving charge
B) Electric field exerts force on both stationary and moving charge
C) Magnetic field exerts force on charge moving parallel to the direction of the field.
Which of the following is true?

Options :

1. ✖ A and C

2. ✔ A and B

3. ✖ B and C

4. ✖ A, B and C

Question Number : 110 Question Id : 342604590 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A galvanometer coil has a resistance of 10 Ω and the meter shows full scale deflection for a current of 2 mA. What resistance needs to be connected to convert the meter into a voltmeter of range 0 to 18 V?

Options :

1. ✖ 8880 Ω

2. ✔ 8990 Ω

3. ✖ 9000 Ω

4. ✖ 9010 Ω

Question Number : 111 Question Id : 342604591 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A magnetic dipole is placed horizontally with the north pole pointing towards north. The horizontal component of earth's magnetic field is 20 μT. If the neutral point is found at a distance of 20 cm in the plane bisecting the dipole then the magnetic moment of the dipole is
(Assume $\mu_0 = 4\pi \times 10^{-7}$ S.I. units)

Options :

1. ✖ $1.2\ Am^2$

2. ✖ $2.2\ Am^2$

3. ✖ $1.4\ Am^2$

4. ✔ $1.6\ Am^2$

Question Number : 112 Question Id : 342604592 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An infinitely long cylinder is kept parallel to an uniform magnetic field B directed along the positive z–axis. The direction of induced current as seen from the z–axis will be

Options :

1. ✔ zero

along the magnetic field

2. ✖

clockwise of the +ve z–axis

3. ✖

anti-clockwise of the +ve z–axis

4. ✖

Question Number : 113 Question Id : 342604593 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A resistor of 20 Ω and a capacitor are connected in series with an AC current source of 50 Hz. What should be the capacitance to produce a phase difference of 30° between the voltage and current?

Options :

$\frac{1}{\sqrt{2}\pi}$ mF

1. ✖

$\frac{\sqrt{3}}{2\pi}$ mF

2. ✔

$\sqrt{3}$ mF

3. ✖

4. ✖

$\frac{\sqrt{2}}{\pi}$ mF

Question Number : 114 Question Id : 342604594 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A laser beam has intensity 17.7×10^{14} W/m^2. The amplitude of the electric field is

[Use $\varepsilon_0 = 8.85 \times 10^{-12} \frac{C^2}{N - M^2}$]

Options :

1. ✖ $\frac{10}{\sqrt{3}} \times 10^9$ N/C

2. ✖ $10^{10} \frac{N}{C}$

3. ✖ $\frac{\sqrt{3}}{2} \times 10^9$ N/C

4. ✔ $\frac{2}{\sqrt{3}} \times 10^9$ N/C

Question Number : 115 Question Id : 342604595 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A light bulb of power 100 W is placed at the centre of a hollow sphere of radius 10 cm. If the 66 % of the energy is converted into light, then the pressure exerted by the light on the surface of the sphere will be
(Assume the surface of sphere to be perfectly absorbing)

Options :

1. ✖ $1.0\times10^{-5}\,\mathrm{N/m^2}$

2. ✖ $1.5\times10^{-7}\,\mathrm{N/m^2}$

3. ✔ $1.75\times10^{-6}\,\mathrm{N/m^2}$

4. ✖ $7.5\times10^{-5}\,\mathrm{N/m^2}$

Question Number : 116 Question Id : 342604596 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A hydrogen atom emits a photon corresponding to an electron transition from n = 5 to n = 1. If R is the Rydberg constant, then the wavelength of emitted photon is

Options :

1. ✔

$\frac{25}{24R}$

2. ✖ $\frac{24R}{25}$

3. ✖ $\frac{4}{5R}$

4. ✖ $\frac{5R}{4}$

Question Number : 117 Question Id : 342604597 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If 5 mg of ^{235}U is completely destroyed in an atom bomb, then approximate total energy released is
(given that the energy released per fission is 200 MeV)

Options :

1. ✔ $4\times10^{8}\,J$

2. ✖ $6\times10^{9}\,J$

3. ✖ $5\times10^{7}\,J$

4. ✖ $3\times10^{10}\,\mathrm{J}$

Question Number : 118 Question Id : 342604598 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In an intrinsic semi conductor at room temperature number of electrons and holes are

Options :

1. ✔ equal

2. ✖ zero

3. ✖ unequal

4. ✖ electrons more than holes

Question Number : 119 Question Id : 342604599 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Identify the logic gate for which the output is 0, when any of the inputs is 1

Options :

1. ✔ NOR

2. ✖ NAND

3. ✖ AND

4. ✖ OR

Question Number : 120 Question Id : 342604600 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A carrier wave of peak voltage 15 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. ✖ 10 V

3. ✖ 11 V

4. ✔ 12 V

Chemistry

Section Id :	34260412
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
Sub-Section Number :	1
Sub-Section Id :	34260412
Question Shuffling Allowed :	Yes

Question Number : 121 Question Id : 342604601 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The ratio of the highest to the lowest wavelength of Lyman series is

Options :

1. ✔ $4:3$

2. ✖ $9:8$

3. ✖ $27:5$

4. ✖ $16 : 5$

Question Number : 122 Question Id : 342604602 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The relation between the stopping potential (V_0) and frequency (ν) is correctly represented in [ϕ = Work function]

Options :

1. ✖ $V_0 = \frac{\phi}{e} - \frac{h\nu^2}{e}$

2. ✖ $V_0 = \frac{he}{\nu} + \frac{\phi}{e}$

3. ✔ $V_0 = \frac{h\nu}{e} - \frac{\phi}{e}$

4. ✖ $V_0 = \frac{h\nu}{e^2}$

Question Number : 123 Question Id : 342604603 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The correct increasing order of the electronegativity is

Options :

1. $B < C < S < Cl$ ✔

2. $B < S < C < Cl$ ✖

3. $B < C < Cl < S$ ✖

4. $C < B < S < Cl$ ✖

Question Number : 124 Question Id : 342604604 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The alkaline earth metal sulphate, which has its hydration enthalpy greater than its lattice energy is

Options :

1. $BeSO_4$ ✔

2. $BaSO_4$ ✖

$CaSO_4$

3. ✖

$SrSO_4$

4. ✖

Question Number : 125 Question Id : 342604605 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A pair of molecules with see-saw shape and linear shape, respectively, is

Options :

CH_4 and SO_3

1. ✖

XeF_4 and CS_2

2. ✖

SF_4 and C_2H_2

3. ✔

CCl_4 and CO_2

4. ✖

Question Number : 126 Question Id : 342604606 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following species is a radical?

Options :

1. CO_2 ✖

2. NO ✔

3. NO_2^- ✖

4. CN^- ✖

Question Number : 127 Question Id : 342604607 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

1 L each of gases A and B diffused through a membrane in 15 and 30 minutes, respectively, under identical conditions. What is the ratio of molecular weight of A and B?

Options :

1. $1 : 2$ ✖

2. ✖

2 : 1

4 : 1

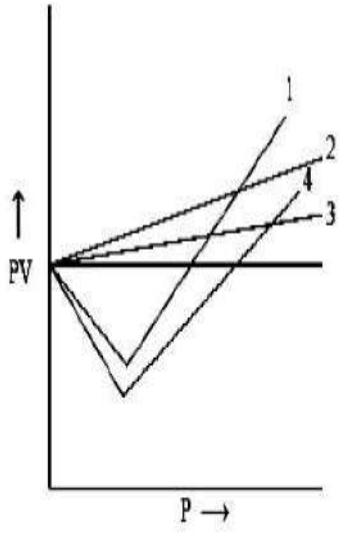
3. ✖

1 : 4

4. ✔

Question Number : 128 Question Id : 342604608 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The figure represents PV vs P relation for CO, CH_4, H_2 and He gases under identical conditions. Which curve, shown in the figure, represents He gas?



Options :

1

1. ✖

2. ✖

2

3

3. ✔

4

4. ✖

Question Number : 129 Question Id : 342604609 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

An organic compound contains 60 % C; 4.48 % H and 35.5 % O. Its empirical formula is

Options :

1. $C_9H_8O_4$ ✔

2. $C_5H_4O_2$ ✖

3. $C_5H_4O_4$ ✖

4. $C_9H_7O_6$ ✖

Question Number : 130 Question Id : 342604610 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The number of sodium ions present in 0.5 mole of sodium ferrocynide is?

Options :

1. 2×10^{23} ✖

2. 0.5×10^{23} ✖

3. 12×10^{23} ✔

4. 4×10^{23} ✖

Question Number : 131 Question Id : 342604611 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

How many times the volume of a diatomic gas should be increased reversibly and adiabatically in order to reduce its RMS velocity to half of its initial value.

Options :

1. 4 ✖

8

2. ✖

16

3. ✖

32

4. ✔

Question Number : 132 Question Id : 342604612 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The correct decreasing order of the basic strength is

Options :

1. ✖ $HS^- > CH_3^- > NH_2^- > CN^-$

2. ✖ $HS^- > CN^- > NH_2^- > CH_3^-$

3. ✔ $CH_3^- > NH_2^- > CN^- > HS^-$

4. ✖ $NH_2^- > CN^- > CH_3^- > HS^-$

Question Number : 133 Question Id : 342604613 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The equilibrium constant for the reaction is $P_4(s)+5O_2(g)\rightleftharpoons P_4O_{10}(s)$

Options :

1. ✖ $K_c = \sqrt{5O_2}$

2. ✖ $K_c = [P_4O_{10}] / [P_4][O_2]^5$

3. ✖ $K_c = [O_2]^5$

4. ✔ $K_c = \frac{1}{[O_2]^5}$

Question Number : 134 Question Id : 342604614 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The sum of the total number of neutrons present in protium, deuterium and tritium is

Options :

1. ✖

5

3

2. ✔

4

3. ✖

6

4. ✖

Question Number : 135 Question Id : 342604615 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A metal 'M' readily gives MSO_4, which is soluble in water. It forms its oxide MO which is amphoteric. It forms an insoluble hydroxide $M(OH)_2$, which is soluble in NaOH solution. The M is

Options :

Be

1. ✔

Ba

2. ✖

3. ✖

Ca

Mg

4. ✖

Question Number : 136 Question Id : 342604616 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Which one of the following oxide dissolves in both hydrochloric acid and sodium hydroxide?

Options :

MgO

1. ✖

Na_2O

2. ✖

Al_2O_3

3. ✔

BaO

4. ✖

Question Number : 137 Question Id : 342604617 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the given atoms has the greatest electron affinity?

Options :

1. ✖ F

2. ✔ Cl

3. ✖ P

4. ✖ Al

Question Number : 138 Question Id : 342604618 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The indicator used during the estimation of COD of a water sample is

Options :

1. ✖ EBT

2. ✔ $K_2Cr_2O_7$

Ferroin

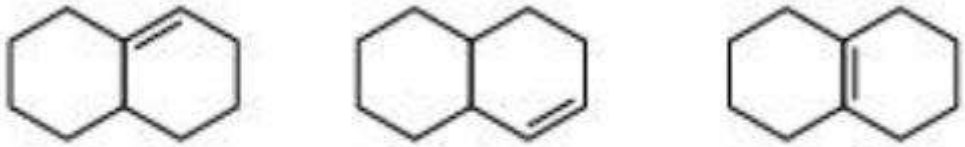
3. ✖

Phenopthalene

4. ✖

Question Number : 139 Question Id : 342604619 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The stability order of the given alkenes is



(I) (II) (III)

Options :

(I) > (II) > (III)

1. ✖

(I) > (III) > (II)

2. ✖

(III) > (II) > (I)

3. ✖

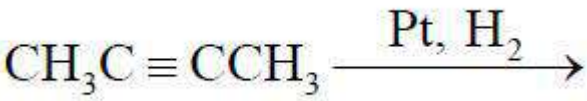
4. ✔

(III) > (I) > (II)

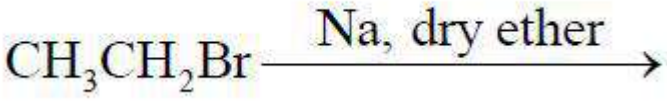
Question Number : 140 Question Id : 342604620 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

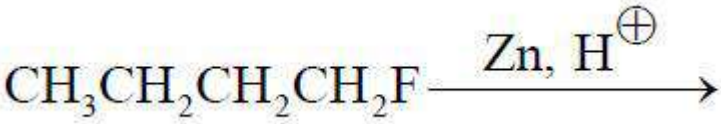
Among the following reactions, the reaction that "does not" give alkane product is

Options :

1.  ✖

2.  ✖

3.  ✖

4.  ✔

Question Number : 141 Question Id : 342604621 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Hex–1 –yne on reaction with Br_2 (excess)/ CCl_4, gives

Options :

1. ✖ 1, 1, 3, 3 – Tetrabromohexane

2. ✖ 2, 2, 3, 3 – Tetrabromohexane

3. ✖ 1, 1, 1, 2 – Tetrabromohexane

4. ✔ 1, 1, 2, 2 – Tetrabromohexane

Question Number : 142 Question Id : 342604622 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The number of voids in 1 mole of a compounds forming a hcp structure are

Options :

1. ✔ 1.8×10^{24}

2. ✖ 3.6×10^{24}

3. ✖ 6.0×10^{23}

4. ✖

7.2×10^{24}

Question Number : 143 Question Id : 342604623 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A 3 ml of solution was made by dissolving 20 mg of protein at 0 °C. The osmotic pressure of the resulting solution is 3.8 torr. The molecular weight of the protein is approximately (in g / mol)

Options :

1. 300 ✖

2. 3×10^5 ✖

3. 3×10^4 ✔

4. 3×10^3 ✖

Question Number : 144 Question Id : 342604624 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

When salt is added to water, which of the following statement is true?

Options :

1. ✖ Boiling point decreases

2. ✔ Boiling point increases

3. ✖ Boiling point remain constant

4. ✖ Freezing point increases

Question Number : 145 Question Id : 342604625 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Given $\lambda^{\circ}_{Mg^{2+}} = 106\ S\ cm^2\ mole^{-1}$, $\lambda^{\circ}_{SO_4^{2-}} = 160\ S\ cm^2 mole^{-1}$. The value of $\lambda^{\circ}_{MgSO_4}$ $(in\ S\ cm^2\ mole^{-1})$ is

Options :

1. ✖ 271.6

2. ✔ 266

390

3. ✖

126

4. ✖

Question Number : 146 Question Id : 342604626 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For a first order reaction $t_{1/2}$ is 1200 s. The specific rate constant in s^{-1} is

Options :

1. ✔ 5.8×10^{-4}

2. ✖ 5.8×10^{-5}

3. ✖ 0.58×10^{-6}

4. ✖ 0.58×10^{-5}

Question Number : 147 Question Id : 342604627 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Which of the following statements is false during adsorption of gas molecule on a metal surface?

Options :

1. ✔ Enthalpy change is positive

2. ✖ Entropy change is negative

3. ✖ Both enthalpy and entropy simultaneously decreases

4. ✖ Free energy change is negative

Question Number : 148 Question Id : 342604628 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Give the correct characteristic colours of the products (P, Q, R, S) formed in the following reactions.

A) $NO + NO_2 \xrightarrow{< 250\ K} P$

B) $2NO_2 \longleftrightarrow Q$

C) $Pb(NO_3)_2 \xrightarrow{673K} R + PbO$

D) $HNO_3 + P_4O_{10} \longrightarrow S + 4HPO_3$

Options :

P	Q	R	S
Blue	Colourless	Brown	Colourless

1. ✔

P	Q	R	S
Colourless	Blue	Colourless	Brown

2. ✖

P	Q	R	S
Colourless	Colourless	Blue	Brown

3. ✖

P	Q	R	S
Brown	Blue	Colourless	Colourless

4. ✖

Question Number : 149 Question Id : 342604629 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The neutral oxide among the following is

Options :

1. SO_2 ✖

2. CO ✔

3. CO_2 ✖

4. CaO ✖

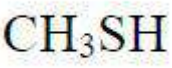
Question Number : 150 Question Id : 342604630 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

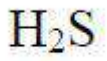
Mustard gas among the following is

Options :

1. CCl_3NO_2 ✖

2.  ✔

3.  ✖

4.  ✖

Question Number : 151 Question Id : 342604631 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The reaction of aqueous $\left[Ni(H_2O)_6\right]^{2+}$ is performed by the addition of a bidentate ligand ethane-1, 2, diamine (en)

Match the following

$\left[Ni(H_2O)_6\right]^{2+}$: en molar ratio		Colour of the product	
A)	1 : 1	I)	Pale blue
B)	1 : 2	II)	Blue / Purple
C)	1 : 3	III)	Violet
		IV)	Green

The correct match is

Options :

A	B	C
I	II	III

1. ✔

A	B	C
II	III	IV

2. ✖

A	B	C
III	I	II

3. ✖

A	B	C
IV	I	III

4. ✖

Question Number : 152 Question Id : 342604632 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The number of bridged CO ligands present in $Fe_2(CO)_9$ and $CO_2(CO)_8$, respectively, are

Options :

1. 2, 1 ✖

2. 2, 2 ✖

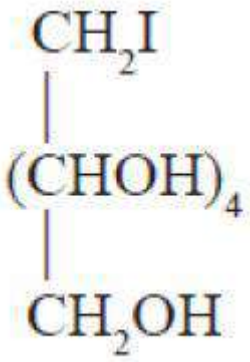
3. 2, 3 ✖

4. 3, 2 ✔

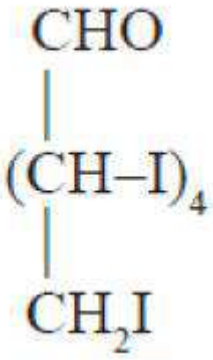
Question Number : 153 Question Id : 342604633 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Glucose on prolonged heating with HI, gives product P. The product P is

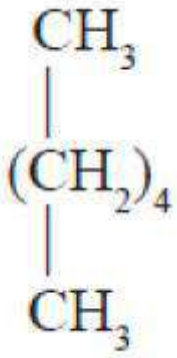
Options :



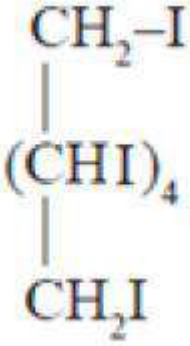
1. ✖



2. ✖



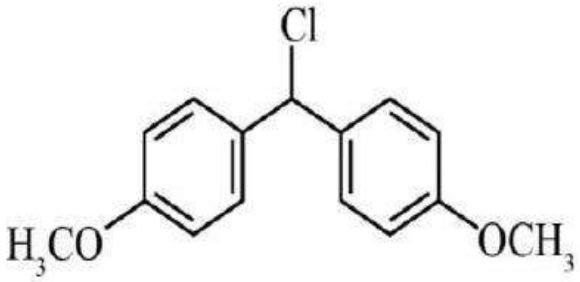
3. ✔



4. ✖

Question Number : 154 Question Id : 342604634 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

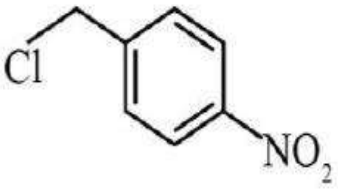
The most reactive molecules towards S_N^1 reaction is



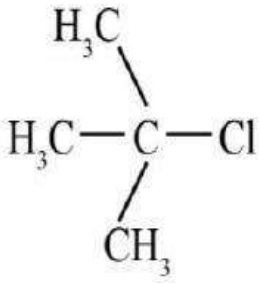
(I)



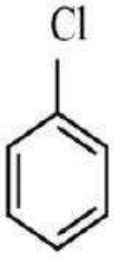
(II)



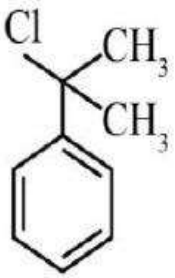
(III)



(IV)



(V)



(VI)

Options :

(I), (IV) and (VI)

1. ✔

(I), (II) and (IV)

2. ✖

(II), (III) and (V)

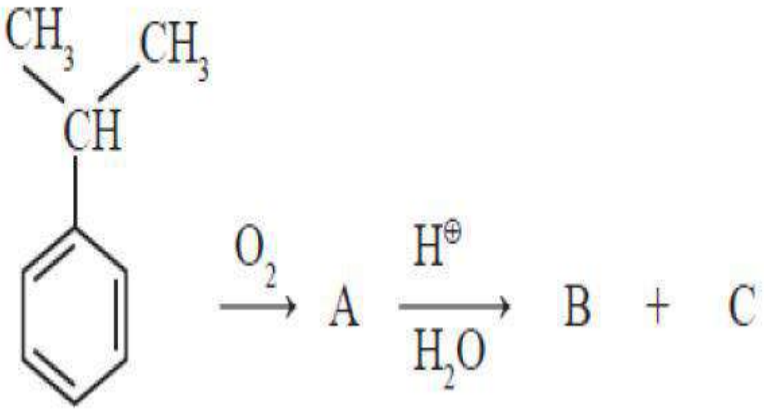
3. ✖

(IV), (V) and (VI)

4. ✖

Question Number : 155 Question Id : 342604635 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

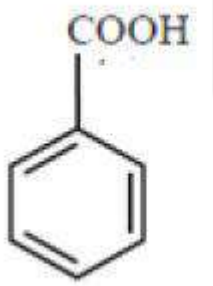
Identify A, B and C, respectively, in the following reaction sequence are



Options :

1. ✖

A



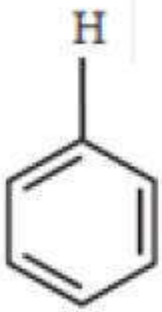
B



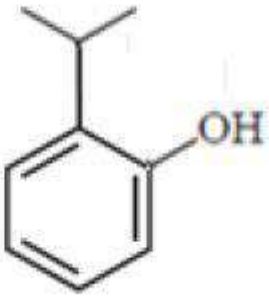
C



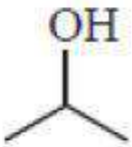
A



B

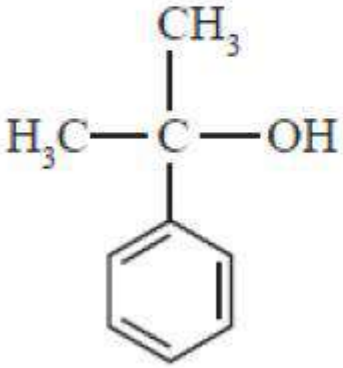


C

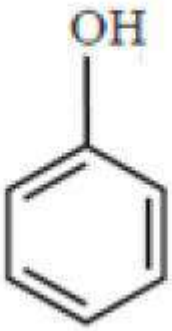


2. ✖

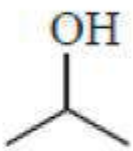
A



B



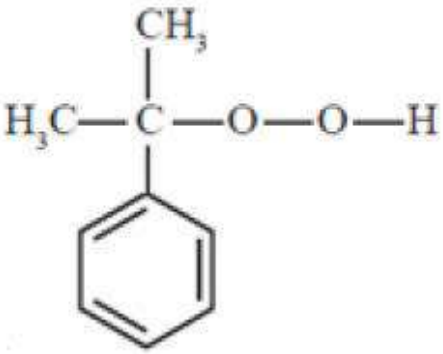
C



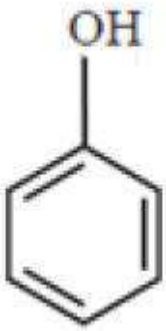
3. ✖

4. ✔

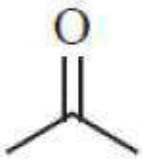
A



B



C



Question Number : 156 Question Id : 342604636 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The reaction used for the synthesis of ether is

Options :

1. ✔ Williamson's synthesis

2. ✖ Reimer- Tiemann reaction

3. ✖ Sandmeyer reaction

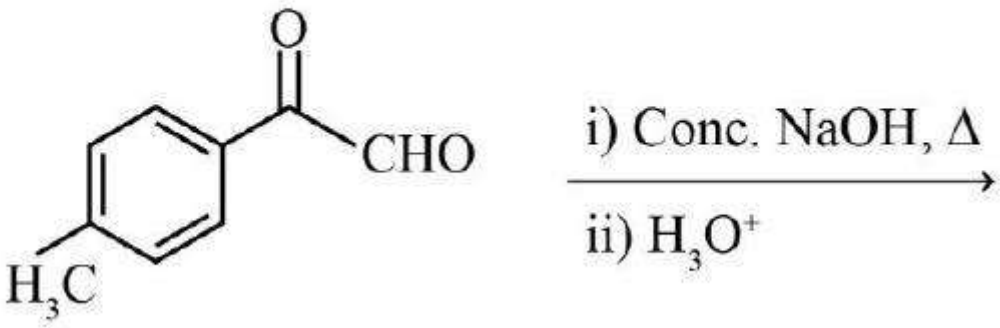
4. ✖ Finkelstein reaction

Question Number : 157 Question Id : 342604637 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

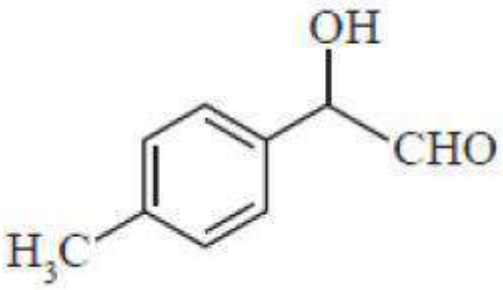
Correct Marks : 1 Wrong Marks : 0

The major product of the following reaction is

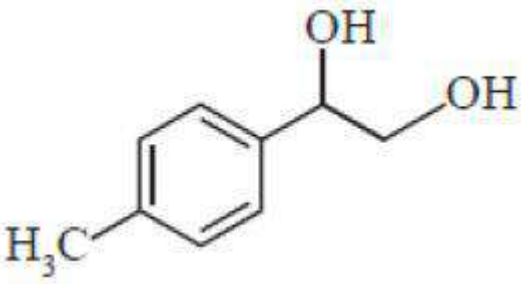


Options :

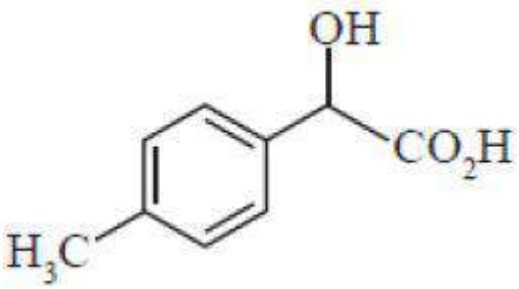
1. ✖



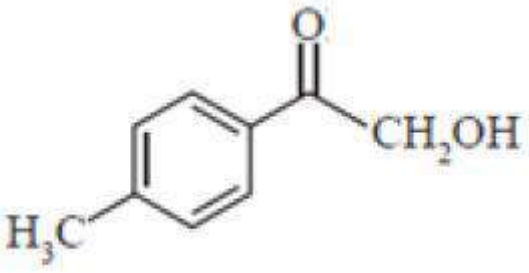
2. ✖



3. ✔

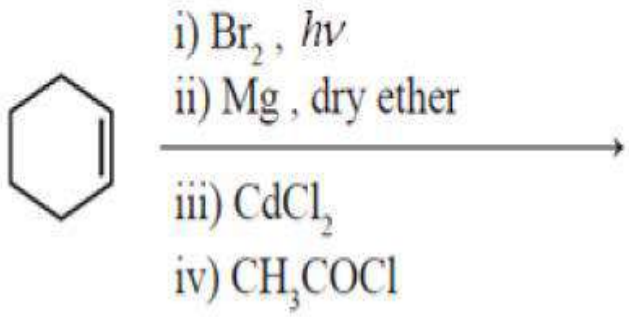


4. ✖

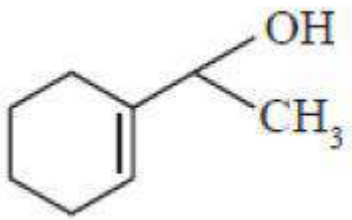


Question Number : 158 Question Id : 342604638 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

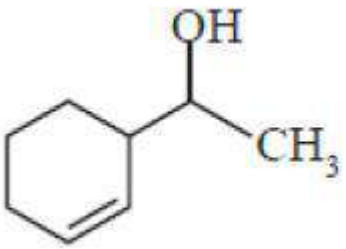
The major product formed in the following reaction scheme is



Options :

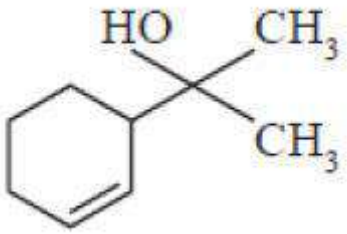


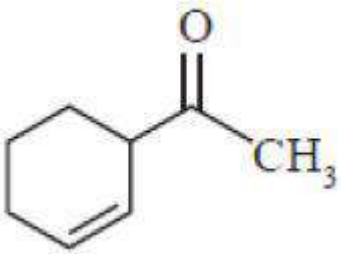
1. ✖



2. ✖

3. ✖



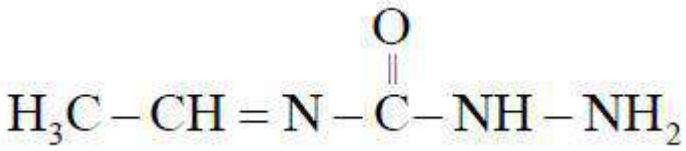


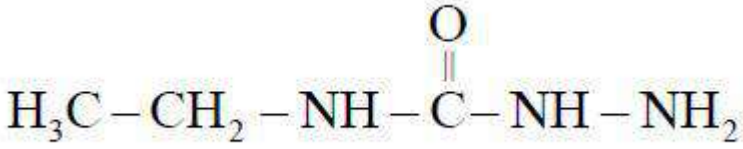
4. ✔

Question Number : 159 Question Id : 342604639 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

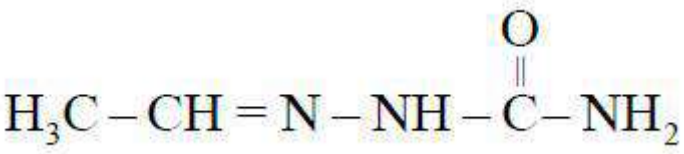
Which among the following is correct structure of the semicarbazone formed when ethanal reacts with semicarbazide?

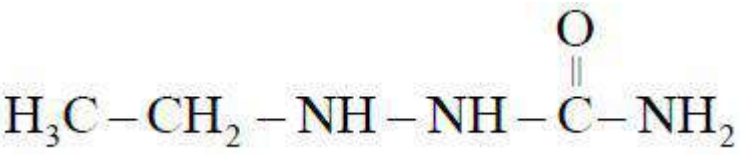
Options :

1. ✖ 

2. ✖ 

3. ✔





4. ✖

Question Number : 160 Question Id : 342604640 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A 90 g of ethyl amine on reaction with methyl chloride produced a tertiary amine as an exclusive product. The amount of methyl chloride required is
[Given mass in amu : H = 1, C = 12, N = 14, Cl = 35.5]

Options :

1. 50.5 g ✖

2. 101 g ✖

3. 202 g ✔

4. 303 g ✖