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 6th Aug 2021 Shift 1
Subject Name :	Engineering (English)
Creation Date :	2021-08-06 12:56:38
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

Engineering (English)

Group Number :	1
Group Id :	3426046
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 :	34260416
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 :	34260416
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 342604801 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$f:[-2,2]\to[-2,2]$, $g:[-2,2]\to[0,4]$ are two functions defined as

$f(x)=\begin{cases}-2, & -2\le x\le 0\\ x^2-2, & 0\le x\le 2\end{cases}$ and $g(x)=|f(x)|+f(|x|)$, then

Options :

f and g are injective mappings

1. ✖

f and g are surjective mappings

2. ✔

f is bijective mapping and g is injective mapping

3. ✖

f is not bijective mapping and g is surjective mapping

4. ✖

Question Number : 2 Question Id : 342604802 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The domain of the function $f(x)=\frac{1}{\sqrt{|x|-x}}$ is

Options :

$\mathbb{R}$

1. ✖

$(-\infty,0)$

2. ✔

$(0, \infty)$

3.

$(-\infty, 1)$

4. ✖

Question Number : 3 Question Id : 342604803 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For any $n \in \mathbb{N}$, $4^n + 15n - 1$ is divisible by

Options :

2

1. ✖

9

2. ✔

5

3. ✖

6

4. ✖

Question Number : 4 Question Id : 342604804 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $P=\begin{pmatrix}1 & \alpha & 3\\ 1 & 3 & 3\\ 2 & 4 & 4\end{pmatrix}$ is the adjoint of a 3×3 matrix A and $\det(A)=4$, then $\alpha=$

Options :

1. 22 ✖

2. 11 ✔

3. 3 ✖

4. 4 ✖

Question Number : 5 Question Id : 342604805 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\begin{vmatrix} \alpha & \beta & \gamma \\ a & b & c \\ l & m & n \end{vmatrix} = (-1)^K \begin{vmatrix} m & n & l \\ b & c & a \\ \beta & \gamma & \alpha \end{vmatrix}$, then the least value of K is

Options :

1.

2

2. 3 ✔

3. 4 ✖

4. 5 ✖

Question Number : 6 Question Id : 342604806 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 $x+y+z=1,\ x+2y+4z=K,\ x+4y+10z=K^2$ is consistent then $K=$

Options :

1. $1,-2$ ✖

✖

$-1, 2$

2.

$1, \ 2$

3.

$-1, -2$

4. ✖

Question Number : 7 Question Id : 342604807 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The locus of $z = x + iy$ such that $\text{Im}\left(\frac{z-3i}{iz+4}\right) = 0$ is

Options :

$x^2 - y^2 + 7y - 12 = 0$

1. ✖

$x^2 + y^2 - 7y + 12 = 0$

2. ✖

$x^2 + y^2 - 7y + 12 = 0$ and $(x, y) \neq (0, 4)$

3. ✔

$x^2 - y^2 + 7y - 12 = 0$ and $(x, y) \neq (0, 4)$

4. ✖

Question Number : 8 Question Id : 342604808 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If ω is a complex cube root of unity, then $\cos\left[\left(\omega^{1234}+\omega^{2021}\right)\pi-\frac{\pi}{4}\right]=$

Options :

1. $\frac{1}{\sqrt{2}}$ ✖

2. $\frac{1}{2}$ ✖

3. $\frac{\sqrt{3}}{2}$ ✖

4. $\frac{-1}{\sqrt{2}}$ ✔

Question Number : 9 Question Id : 342604809 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If z_1 and z_2 are the roots of the equation $x^2+2x+2=0$, then $\frac{-2^{11}(z_1+1+3i)^{11}}{2^5(z_2+1-3i)^{11}}=$

Options :

64

1.

32

2. ✖

$16\sqrt{2}$

3. ✖

$8\sqrt{2}$

4. ✖

Question Number : 10 Question Id : 342604810 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let $f(x)=ax^2+bx+c$ and GCD of a, b, c is 1. If $\frac{-7+\sqrt{11}i}{6}$ is a root of $f(x)=0$ and $f\left(\frac{x}{k}\right)-\mathrm{L}=(x+4)(3x-5)$ then k and L are respectively

Options :

$1, -15$

1. ✖

$1, 25$

2. ✔

$7, -15$

3.

$7, 25$

4. ✖

Question Number : 11 Question Id : 342604811 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For $\forall x \in \mathbb{R}$ the minimum value $\frac{1}{3}$ and the maximum value 3 of $\frac{x^2+x+1}{x^2-x+1}$ exist at l and m respectively, then $l+m=$

Options :

-22

1. ✖

0

2. ✔

17

3. ✖

-7

4. ✖

Question Number : 12 Question Id : 342604812 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 and 3 are the two roots of the equation $2x^3+mx^2-13x+n=0$, then the values of m, n are respectively

Options :

1. $-5, -30$ ✖

2. $-5, 30$ ✔

3. $5, 30$ ✖

4. $5, -30$ ✖

Question Number : 13 Question Id : 342604813 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $-1+i$ is a root of the equation $x^4+4x^3+5x^2+2x-2=0$, then the real roots of this equation are

Options :

✖

$-1 \pm \sqrt{3}$

1.

2.

$-1 \pm \sqrt{2}$

$\sqrt{2} \pm 3$

3. ✖

$\sqrt{3} \pm \sqrt{2}$

4. ✖

Question Number : 14 Question Id : 342604814 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

By using the non-zero digits, the number of 5 digit numbers that can be formed so that each number has largest digit in its middle place and the digits in the number are different is

Options :

1. ✖ $\sum_{r=4}^{9} {}^{r}P_4$

2. ✖ $\sum_{r=4}^{8} {}^{r}P_4 - \sum_{r=4}^{8} {}^{r}P_3$

3. $\sum_{r=4}^{8} {}^{r}P_3$

4.

$$\sum_{r=4}^{8} {}^{r}P_4$$

Question Number : 15 Question Id : 342604815 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

T_m denotes the number of triangles that can be formed with the vertices of a regular polygon of m sides. If $T_{m+1} - T_m = 15$, then $m =$

Options :

1. 3 ✖

2. 6 ✔

3. 9 ✖

4. 12 ✖

Question Number : 16 Question Id : 342604816 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The term independent of x in the expansion of $\left(x-\frac{2}{\sqrt{x}}\right)^{21}$ is

Options :

1. $21_{C_{15}}(-2)^{15}$ ✖

2. $21_{C_{14}}2^{14}$ ✔

3. $-21_{C_7}(2)^7$ ✖

4. $-21_{C_7}2^{14}$ ✖

Question Number : 17 Question Id : 342604817 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 set of all values of x for which the expansion of $(7-5x)^{-2/3}$ valid is equal to $(-a\ \ a)$, then $5a+7=$

Options :

✔

1.

2. ✖ 21

3. ✖ 0

4. ✖ 12

Question Number : 18 Question Id : 342604818 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The coefficient of x^3 in the expansion of $\left(1-\frac{3}{4}x\right)^{\frac{1}{2}}$ is

Options :

1. ✖ $\frac{27}{1024}$

2. ✔ $\frac{-27}{1024}$

$$\frac{81}{1024}$$

3.

4.

$$\frac{-81}{1024}$$

Question Number : 19 Question Id : 342604819 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

If $\frac{32x^2+186x}{(x^2+1)(x+5)}=\frac{37x+1}{x^2+1}+\frac{\lambda}{x+5}$, then $\frac{\lambda}{2}=$

Options :

1. -5 ✖

2. $\frac{-7}{2}$ ✖

3. $\frac{-3}{2}$ ✖

4. $\frac{-5}{2}$

Question Number : 20 Question Id : 342604820 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The period of $\tan ky + \sin ky$, where $k = 1+4+9+.....20$ terms, is

Options :

1. ✔ $\frac{\pi}{1435}$

2. ✖ $\frac{2\pi}{1435}$

3. ✖ π

4. ✖ 2π

Question Number : 21 Question Id : 342604821 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

If $\cot A = \frac{11}{60}$, $\cos B = \frac{7}{25}$ and neither A nor B is in the first quadrant, then $\left(A + \frac{B}{2}\right)$ lies in the quadrant

Options :

I

1.

II

2. ✖

III

3. ✖

IV

4. ✖

Question Number : 22 Question Id : 342604822 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 Δ ABC, if $\cos A+\cos B+\cos C=a+b\sin\frac{A}{2}\sin\frac{B}{2}\sin\frac{C}{2}$, then $a+b=$

Options :

3

1. ✖

0

2. ✖

✖

1

3.

5

4.

Question Number : 23 Question Id : 342604823 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\sqrt{3}\,\text{cosec}\ 20^\circ - \sec\ 20^\circ =$$

Options :

1. 1 ✖

2. 2 ✖

3. 3 ✖

4. 4 ✔

Question Number : 24 Question Id : 342604824 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The common solution set of the equations $2\sin^2 x + \sin^2 2x = 2$ and $\sin 2x + \cos 2x = \tan x$ is

Options :

1. $\left\{x \in \mathbb{R} / x=(2n+1)\frac{\pi}{4}, n \in \mathbb{Z}\right\}$ ✔

2. $\left\{x \in \mathbb{R} / x=(3n+1)\frac{\pi}{4}, n \in \mathbb{Z}\right\}$ ✖

3. $\left\{x \in \mathbb{R} / x=(4n+1)\frac{\pi}{8}, n \in \mathbb{Z}\right\}$ ✖

4. $\left\{x \in \mathbb{R} / x=(4n-1)\frac{\pi}{8}, n \in \mathbb{Z}\right\}$ ✖

Question Number : 25 Question Id : 342604825 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$2\,\mathrm{Tan}^{-1}\left(\frac{1}{3}\right)+\mathrm{Tan}^{-1}\left(\frac{1}{7}\right)=$$

Options :

$$\mathrm{Tan}^{-1}\left(\frac{49}{29}\right)$$

1.

2.

$\frac{\pi}{2}$

0

3. ✖

$\frac{\pi}{4}$

4. ✔

Question Number : 26 Question Id : 342604826 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\cosh 2x = 241$, then $\coth x =$

Options :

$\frac{7}{\sqrt{30}}$

1. ✖

$\frac{11}{\sqrt{30}}$

2. ✖

$$\frac{7}{2\sqrt{30}}$$

3.

4.

$$\frac{11}{2\sqrt{30}}$$

Question Number : 27 Question Id : 342604827 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 $a+c=5b$ then $\cot\frac{A}{2}\cot\frac{C}{2}=$

Options :

1. ✖ 2

2. ✖ $\frac{1}{2}$

3. ✔ $\frac{3}{2}$

4. ✖ $\frac{2}{3}$

Question Number : 28 Question Id : 342604828 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 $a\cos^2\frac{C}{2}+c\cos^2\frac{A}{2}=\frac{3b}{2}$, then

Options :

1. $2b=a+c$ ✔

2. $b^2=ac$ ✖

3. $b^2=\frac{2ac}{a+c}$ ✖

4. $a+b+c=1$ ✖

Question Number : 29 Question Id : 342604829 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In ΔABC, if $B+C=72°$, then $\left(1+\frac{a}{c}+\frac{b}{c}\right)\left(1+\frac{c}{b}-\frac{a}{b}\right)=$

Options :

1. $2+\sqrt{5}$ ✖

2. ✖ $\frac{\sqrt{5}+1}{2\sqrt{2}}$

3. ✖ $\frac{\sqrt{5}-2}{4}$

4. ✔ $\frac{5-\sqrt{5}}{2}$

Question Number : 30 Question Id : 342604830 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, r_1, r_2, r_3 respectively denote the radius of excircles opposite to the vertices A, B, C and r denote the radius of the incircle. If p_1, p_2, p_3 respectively are the altitudes of the triangle from the vertices A, B, C then $\left(\frac{1}{p_1}+\frac{1}{p_2}+\frac{1}{p_3}\right)^2 =$

Options :

1. ✖ $\left(\frac{1}{r_1}+\frac{1}{r_2}+\frac{1}{r_3}\right)^2 r^2$

$$\frac{1}{r}\left(\frac{1}{r_1}+\frac{1}{r_2}+\frac{1}{r_3}\right)$$

2.

3. $\left(\frac{r}{r_1}+\frac{r}{r_2}+\frac{r}{r_3}\right)^2$

4. $rr_1+rr_2+rr_3$

Question Number : 31 Question Id : 342604831 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 and y are real numbers such that, $\bar{i}+\bar{j}+\bar{k}$, $-2\bar{i}+3\bar{j}+2\bar{k}$, $x\bar{i}-5\bar{j}+3\bar{k}$, $\bar{i}+y\bar{j}-\bar{k}$ are the position vectors of four coplanar points, then the locus of P(x, y) is

Options :

1. $x^2+y^2+3x+5y=0$

2. $(x+5)(y+3)=60$

3. $(x+3)^2=5(y+5)$

$$(x+3)(y+5)=45$$

4.

Question Number : 32 Question Id : 342604832 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The direction cosines of the supporting line of the vector $\bar{i}+\bar{j}-2\bar{k}$ are

Options :

1. ✔ $\left(\frac{1}{\sqrt{6}},\frac{1}{\sqrt{6}},\frac{-2}{\sqrt{6}}\right)$

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

3. ✖ $\left(\frac{1}{\sqrt{6}},\frac{1}{\sqrt{6}},\frac{2}{\sqrt{6}}\right)$

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

Question Number : 33 Question Id : 342604833 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The perpendicular distance from the point P $(3, 5, 2)$ to the line L passing through the point $2\bar{i}+\bar{j}$ and parallel to the vector $\bar{i}+5\bar{j}+2\bar{k}$ is

Options :

1.

$\frac{1}{\sqrt{6}}$

$\frac{2}{\sqrt{6}}$

2. ✖

$\frac{\sqrt{6}}{\sqrt{5}}$

3. ✖

$7\sqrt{6}$

4. ✖

Question Number : 34 Question Id : 342604834 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

Suppose ABCDE is a pentagon. The resultant vector of the vectors $\overline{AB}, \overline{AE}, \overline{BC}, \overline{DC}, \overline{ED}$ and $\overline{AC}$ is

Options :

$3\overline{AC}$

1. ✔

$\overline{3AD}$

2.

3.

$\overline{3AE}$

$\overline{2AB}$

4. ✖

Question Number : 35 Question Id : 342604835 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\bar{a}=\bar{i}+\bar{j}+\bar{k}$, $\bar{c}=\bar{j}-\bar{k}$, $\bar{a}\times\bar{b}=\bar{c}$ and $\bar{a}\cdot\bar{b}=3$, then $\bar{b}$ =

Options :

1. ✔ $\frac{1}{3}\left(5\bar{i}+2\bar{j}+2\bar{k}\right)$

2. ✖ $\frac{1}{3}\left(2\bar{i}+5\bar{j}+2\bar{k}\right)$

3. ✖ $\frac{1}{3}\left(2\bar{i}+2\bar{j}+5\bar{k}\right)$

4.

Question Number : 36 Question Id : 342604836 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 cartesian equation of the plane passing through the point $\bar{i}+2\bar{j}+\bar{k}$ and parallel to the vectors $2\bar{i}+3\bar{j}+\bar{k}$ and $-\bar{i}+2\bar{j}-3\bar{k}$ is $ax+by+cz=1$ then $18(a+b+c)=$

Options :

1. -3 ✖

2. 3 ✔

3. 4 ✖

4. -4 ✖

Question Number : 37 Question Id : 342604837 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The mean deviation about the median of the discrete data 12, 15, 7, 4, 4, 15, 23, 14 is

Options :

1. 5

$\frac{8}{}$

2. ✖

$\frac{13}{}$

3. ✖

$\frac{10}{}$

4. ✖

Question Number : 38 Question Id : 342604838 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 college 40% students attend Mathematics class, 30% students attend physics class and 20% students attend both the classes. If a student is chosen at random from the college, the probability that the student chosen attend only one class is

Options :

$\frac{3}{10}$

1. ✔

$\frac{1}{3}$

2. ✖

$\frac{2}{3}$

3.

$\frac{1}{4}$

4. ✖

Question Number : 39 Question Id : 342604839 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A and B are the two groups of books. Group A consists of 8 science and 5 engineering books and the group B consists of 6 science and 7 engineering books. When an unbiased die is rolled, if 2 or 5 turns up, a book is selected at random from the group A, otherwise a book is selected at random from the B group. When an unbiased die is rolled, the probability of selecting a science book is

Options :

$\frac{13}{24}$

1. ✖

$\frac{34}{35}$

2. ✖

✔

$$\frac{20}{39}$$

3.

4.

Question Number : 40 Question Id : 342604840 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Two friends A and B meet every weekend either at a party or at a Sports Club. The probability that they meet at Sports Club is $\frac{4}{9}$. The probability that they will dine together at a party and at the Club are respectively $\frac{1}{3}$ and $\frac{2}{5}$. On a certain weekend the probability that they disperse without dine together

Options :

1. $\frac{86}{135}$

2. $\frac{10}{27}$

3. $\frac{17}{27}$

$$\frac{56}{135}$$

4.

Question Number : 41 Question Id : 342604841 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The probability function of a discrete random variable X is given by $P(X=r)=Kr^2$, where $r=-2,-1,0,1,2,3$ and K is a constant. The sum of the variance of X and the square of the mean of X is

Options :

1. ✖ $\frac{81}{19}$

2. ✖ $\frac{27}{19}$

3. ✖ $\frac{18}{19}$

4. ✔ $\frac{115}{19}$

Question Number : 42 Question Id : 342604842 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 random variable X denotes the number that appears on the upper face of a die when it is rolled, then $\frac{\text{Variance of X}}{\text{Mean of X}} =$

Options :

1. $\frac{7}{2}$ ✖

2. $\frac{35}{12}$ ✖

3. $\frac{5}{6}$ ✔

4. $\frac{9}{2}$ ✖

Question Number : 43 Question Id : 342604843 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let S be the set of points on X-axis lying at a distance of d units from (3,4). Which of the following is true?

Options :

1.

S is an empty set if $d < 4$

S contains infinitely many points if $d < 4$

2. ✖

S contains at least two points if $d = 4$

3. ✖

S contains exactly three points for any $d > 4$

4. ✖

Question Number : 44 Question Id : 342604844 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 coordinate axes are rotated in positive direction by 45° without changing the origin, then the transformed equation of $3x^2+3y^2+2xy-2=0$ is

Options :

$2X^2+Y^2=1$

1. ✔

✖

2. $X^2 + 2Y^2 = 1$

3. $X^2 - 2Y^2 = 1$

$2X^2 - Y^2 = 1$

4. ✖

Question Number : 45 Question Id : 342604845 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 equation of a line parallel to $3x-2y+5=0$ and at a distance of 5 units from it is $3x-2y+C=0$, then C =

Options :

1. ✖ $5\left(\frac{1\pm\sqrt{13}}{\sqrt{13}}\right)$

2. ✔ $5\left(\pm\sqrt{13}+1\right)$

3. ✖ $5\left(\sqrt{13}\pm1\right)$

4. $5\left(\frac{-1\pm\sqrt{13}}{\sqrt{13}}\right)$

Question Number : 46 Question Id : 342604846 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 line L passes through the point of intersection of the lines $2x+3y+1=0$ and $x+y-3=0$ and the angle made by the line L with X-axis measured in positive direction from the positive X-axis is $\text{Tan}^{-1}\frac{2}{3}$, then the sum of the intercepts made by this line on the axes is

Options :

1. $\frac{-1}{41}$ ✖

2. $\frac{205}{6}$ ✖

3. $\frac{5}{41}$ ✖

4. $\frac{41}{6}$ ✔

Question Number : 47 Question Id : 342604847 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

Match the items given in List-I to the items given in List-II

List-I	List-II
A) Line passing through $(-4,3)$ and having intercepts in the ratio 5:3	I) $2x-5y+4=0$
B) Line passing through $P(2,-5)$ such that P bisects the part intercepted between the axes	II) $3x+5y=3$
C) Line parallel to $2x-3y+5=0$ with x−intercept $\frac{2}{5}$ is	III) $10x-15y+4=0$
D) Line perpendicular to $5x+2y+7=0$ with $y-$intercept $\frac{4}{5}$ is	IV) $10x-15y=4$
	V) $5x-2y-20=0$

The correct match is

Options :

1. ✖

A	B	C	D
II	V	III	I

2.

A	B	C	D
V	I	III	II

3. ✔

A	B	C	D
II	V	IV	I

A	B	C	D
II	I	IV	V

4. ✖

Question Number : 48 Question Id : 342604848 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If (h,k) is the image of the point $(2,-3)$ with respect to the line $5x-3y=2$, then $h+k=$

Options :

1. -3 ✔

2. $\frac{-3}{34}$ ✖

✖ $\frac{-1}{34}$

3.

4.

5

Question Number : 49 Question Id : 342604849 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 product of the lengths of the perpendiculars drawn from the point $(-1, 5)$ to the pair of lines $2x^2 - xy + ky^2 + 6x + y + 4 = 0$ is $\frac{65}{\sqrt{26}}$, then $37k^2 + 92k$

Options :

1. 56 ✖

2. 53 ✖

3. 57 ✔

4. 55 ✖

Question Number : 50 Question Id : 342604850 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 pair of lines joining the origin to the points of intersection of the line $x+y=1$ with the curve $x^2+y^2+2hxy+gx+fy+1=0$ are at right angles, then the point (g,f) lies on the line

Options :

1. $2x+y=5$ ✖

2. $x-y=4$ ✖

3. $x+y+4=0$ ✔

4. $x+2y=5$ ✖

Question Number : 51 Question Id : 342604851 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The circle $x=5\cos\theta, y=5\sin\theta$ is bounded by the rectangle formed by the lines $x\pm6=0$ and $y\pm6=0$. The area of the triangle that lies inside the rectangle which is formed by the tangent at $P\left(\frac{2\pi}{3}\right)$ to the circle with two of the above given lines is

Options :

1.

$$\frac{62-24\sqrt{3}}{\sqrt{3}}$$

$$\frac{1}{2}\left(6\sqrt{3}-4\right)^2$$

2. ✖

$$48+\sqrt{3}$$

3. ✖

$$\frac{1}{2}\left(\frac{6\sqrt{3}-4}{\sqrt{3}}\right)^2$$

4. ✖

Question Number : 52 Question Id : 342604852 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 two circles $x^2+y^2-2x-6y+10-r^2=0$ and $x^2+y^2-8x+2y+8=0$ have a common chord of non-zero length, then

Options :

✔

$2 < r < 8$

1.

$0 < r < 2$

2.

$r = 2, 8$

3. ✖

$8 < r < 13$

4. ✖

Question Number : 53 Question Id : 342604853 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 between the circles $x^2+y^2-2x-9=0$ and $x^2+y^2-4y-1=0$ at their point of intersection is

Options :

1. ✖ $\frac{\pi}{6}$

2. ✔ $\frac{\pi}{4}$

3. ✖ $\frac{\pi}{3}$

4. ✖ $\frac{\pi}{2}$

4.

Question Number : 54 Question Id : 342604854 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If two circles touch at $(0,0)$ externally, then their radical axis is

Options :

1. $x = y$ or $x = -y$ ✖

2. does not exist ✖

3. any line passing through $(0,0)$ ✖

4. their common tangent at $(0,0)$ ✔

Question Number : 55 Question Id : 342604855 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 straight line $x\cos\alpha + y\sin\alpha = P$ intersects the circle $x^2 + y^2 = a^2$ at A and B then the equation of the circle with diameter $\overline{AB}$ is

Options :

1.

$$x^2+y^2-2Px\cos\alpha-2Py\sin\alpha+2P^2-a^2=0$$

2. $$x^2+y^2+2Px\cos\alpha-2Py\sin\alpha+2P^2+a^2=0$$

3. $$x^2+y^2-2Px\cos\alpha+2Py\sin\alpha-2P^2-a^2=0$$

4. $$x^2+y^2-2Px\cos\alpha-2Py\sin\alpha-2P^2+a^2=0$$

Question Number : 56 Question Id : 342604856 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The area of a triangle (in sq. units) formed by the latus rectum of the parabola $x^2=16y$ and the lines joining the vertex of the parabola to the ends of the latus rectum is

Options :

1. 24

2.

3.

4.

28

2.

32

3.

64

4. ✖

Question Number : 57 Question Id : 342604857 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $(2, k)$ is a point on the parabola passing through the points $(1,-3)$, $(-1, 5)$, $(0, 2)$ and having its axis parallel to the Y-axis, then $k =$

Options :

-10

1. ✔

3

2. ✖

-7

3. ✖

5

4. ✖

Question Number : 58 Question Id : 342604858 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1(b>a)$ and the parabola $y^2=8ax$ cut at right angles. If e is the eccentricity of the ellipse, then $e^4=$

Options :

1. ✔ $\frac{1}{4}$

2. ✖ $\frac{1}{16}$

3. ✖ $\frac{1}{8}$

4. ✖ $\frac{1}{64}$

Question Number : 59 Question Id : 342604859 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The coordinates of any point, in the parametric form, on the ellipse whose foci are $(-2, 0), (8, 0)$ and eccentricity $\frac{1}{\sqrt{2}}$, is

Options :

1. $\left(5\sqrt{2}\cos\theta, 5\sin\theta\right)$ ✖

2. $\left(3+5\sqrt{2}\cos\theta, 5\sin\theta\right)$ ✔

3. $\left(3+5\cos\theta, 5\sqrt{2}\sin\theta\right)$ ✖

4. $\left(5\cos\theta, 3+5\sqrt{2}\sin\theta\right)$ ✖

Question Number : 60 Question Id : 342604860 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The focii of the hyperbola $5x^2-6y^2-10x-24y-34=0$ are

Options :

1. $\left(-2\pm\frac{\sqrt{33}}{2}, 2\right)$ ✖

2. $\left(2\pm\frac{\sqrt{33}}{2}, -2\right)$

2.

3. ✖ $\left(2 \pm \frac{\sqrt{11}}{\sqrt{2}}, 2\right)$

4. ✔ $\left(1 \pm \frac{\sqrt{11}}{\sqrt{2}}, -2\right)$

Question Number : 61 Question Id : 342604861 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A(2, 3, –4), B(–3, 3,–2), C(–1, 4, 2), D(3, 5, 1) are the vertices of a tetrahedron. If G_1, G_2, G_3 are the centroids of the three faces having the vertex D in common, then the centroid of the triangle $G_1G_2G_3$ is

Options :

1. ✖ $(0, 0, 0)$

2. ✖ $\left(\frac{5}{9}, \frac{35}{9}, \frac{-5}{3}\right)$

✖

$$\left(\frac{5}{3}, \frac{35}{3}, \frac{-5}{3}\right)$$

3.

4.

Question Number : 62 Question Id : 342604862 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Suppose the distance of a point P from the origin O is 63. If the direction ratios of the line OP are 3, −2, 6 then the coordinates of the point P is

Options :

1. $(-27, 18, 54)$ ✗

2. $(27, -18, -54)$ ✗

3. $(27, -18, 54)$ ✓

4. $(-27, -18, -54)$ ✗

Question Number : 63 Question Id : 342604863 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 (in cubic units) of the tetrahedran bounded by the plane $3x+4y-5z=60$ and the three coordinate planes is

Options :

1.

60

720

2. ✖

600

3. ✔

4800

4. ✖

Question Number : 64 Question Id : 342604864 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\lim_{x\to 0^-}\frac{\sqrt{\frac{1}{2}\left(1-\cos^2 x\right)}}{x}=$$

Options :

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

1. ✖

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

2.

-1

3. ✖

does not exist

4. ✖

Question Number : 65 Question Id : 342604865 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 function defined by $f(x)=\begin{cases}\dfrac{2^x-2^{-x}}{x}, & x\neq 0\\ k, & x=0\end{cases}$, is continuous at $x=0$ then $e^k=$

Options :

1. ✖ $\log\left(\dfrac{2}{e}\right)$

2. ✖ $\log 4$

3. ✔ 4

4. ✖

1

4.

Question Number : 66 Question Id : 342604866 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$$\lim_{x\to 0} \frac{2\sin x - \sin 2x}{x^3} =$$

Options :

1. 1 ✔

2. 0 ✖

3. -1 ✖

4. Does not exist ✖

Question Number : 67 Question Id : 342604867 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 defined as $f(x)=|x+1|+|x-1|$, then $f(x)$ is

Options :

not differentiable at every real number

1.

not differentiable at -1 and 1 only

2. ✔

not differentiable at $-1, 0$ and 1

3. ✖

differentiable on $\mathbb{R}$

4. ✖

Question Number : 68 Question Id : 342604868 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $f(x)=\begin{vmatrix} x^3+x & x+1 & x-2 \\ 2x^3+3x-1 & 3x & 3x-3 \\ x^3+2x+3 & 2x-1 & 2x-1 \end{vmatrix}$, then $\frac{d}{dx}(f(x))=$

Options :

24

1. ✔

0

2. ✖

-6

3.

12

4. ✖

Question Number : 69 Question Id : 342604869 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 and g be two differentiable functions satisfying $g'(5)=\frac{3}{4}$, $g(5)=6$ and $g=f^{-1}$.

Then $f'(6)=$

Options :

1. ✖ $\frac{1}{2}$

2. ✖ $\frac{1}{6}$

3. ✖ $\frac{2}{3}$

4. $\frac{4}{3}$

Question Number : 70 Question Id : 342604870 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $y = x + \tan x$, then $\cos^2 x \frac{d^2y}{dx^2} + 2x =$

Options :

1. $-2y$ ✖

2. $\frac{2}{3}y$ ✖

3. $3y$ ✖

4. $2y$ ✔

Question Number : 71 Question Id : 342604871 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The semi vertical angle of a right circular cone is 30°. If the height of the cone is 6.125 cm, then the approximate value of the volume of the cone (in cubic cm) is

Options :

$(23.5)\pi$

1.

2. $(76.5)\pi$

3. 48π

4. $(25.5)\pi$

Question Number : 72 Question Id : 342604872 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 normal drawn to the curve $y = \sin 3x$ at $x = \frac{\pi}{4}$ is

Options :

1. $y = \frac{\sqrt{3}}{2}\left(x + \frac{6-\pi}{4}\right)$

2. $y = \frac{\sqrt{2}}{3}\left(x + \frac{6-\pi}{4}\right)$

3. $$y=\frac{\sqrt{3}}{2}\left(x-\frac{6-\pi}{4}\right)$$

4.

$$y=\frac{\sqrt{2}}{3}\left(x-\frac{6-\pi}{4}\right)$$

Question Number : 73 Question Id : 342604873 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Suppose A, B, C and D are the 4 intersection points of the curves $\frac{x^2}{18}+\frac{y^2}{8}=1$ and $x^2-y^2=5$ in 1^{st}, 2^{nd}, 3^{rd} and 4^{th} quadrants respectively. If $\theta_1,\theta_2,\theta_3$ and θ_4 respectively are the angles between the curves at A, B, C and D, then

Options :

1. ✖ $\theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4$

2. ✖ $\theta_1=\theta_2;\ \theta_3=\theta_4;\theta_2\neq\theta_3$

3. ✖ $\theta_1=\theta_3;\theta_2=\theta_4;\theta_3\neq\theta_2$

✔

$$\theta_1 = \theta_2 = \theta_3 = \theta_4$$

4.

Question Number : 74 Question Id : 342604874 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$f:[2,10]\to\mathbb{R}$ is defined as $f(x)=\begin{cases}\frac{1}{2}(x-6)^2-3, & x\le 4\\ x-5, & x>4\end{cases}$. Which of the following is true?

Options :

1. ✖ $f(2)\neq f(10)$

2. ✖ $f(x)$ is not continuous on $[2,10]$

3. ✔ Rolle's theorem is not applicable for $f(x)$ in $[2,10]$

4. ✖ Rolle's theorem is applicable for $f(x)$ in $[2,10]$ and Rolle's point c = 6

Question Number : 75 Question Id : 342604875 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$$\int \frac{x^2}{1+x^6} dx =$$

Options :

1. $x^3 + C$ ✖

2. $\frac{1}{3}\text{Tan}^{-1}(x^3) + C$ ✔

3. $\log(1+x^3)$ ✖

4. $\frac{1}{1+x^3} + C$ ✖

Question Number : 76 Question Id : 342604876 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\int \frac{dx}{\left(x^2-a^2\right)^{\frac{3}{2}}} =$$

Options :

1.

$$\frac{a^2 x}{\sqrt{\left(x^2 - a^2\right)}} + C$$

$$-\frac{1}{a^2}\left(x^2 - a^2\right)^{\frac{5}{2}} + C$$

2. ✖

$$-\frac{x}{a^2\sqrt{\left(x^2 - a^2\right)}} + C$$

3. ✔

$$\frac{1}{a^2\sqrt{\left(x^2 - a^2\right)}} + C$$

4. ✖

Question Number : 77 Question Id : 342604877 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For $x \geq 0$, $\int \sqrt{x^2 + 2x}\, dx =$

Options :

✖

1. $$\frac{x+1}{2}\sqrt{x^2+2x}+\frac{1}{2}\text{Sinh}^{-1}\frac{(x+1)}{2}+C$$

2.

$$\frac{x+1}{2}\sqrt{x^2+2x}+\frac{1}{2}\text{Sinh}^{-1}(x+1)+C$$

$$\frac{x+1}{2}\sqrt{x^2+2x}-\frac{1}{2}\text{Cosh}^{-1}\frac{(x+1)}{2}+C$$

3. ✖

$$\frac{x+1}{2}\sqrt{x^2+2x}-\frac{1}{2}\text{Cosh}^{-1}(x+1)+C$$

4. ✔

Question Number : 78 Question Id : 342604878 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\int_{\pi/4}^{3\pi/4}\frac{dx}{1+\cos x}=$$

Options :

$$\pi-2$$

1. ✖

$$\pi+2$$

2. ✖

$$\pi$$

3.

$2\sin\frac{\pi}{2}$

4. ✔

Question Number : 79 Question Id : 342604879 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$$\int_0^{\pi} x\, f(\sin x)\, dx =$$

Options :

$2\pi\int_0^{\pi/4} f(\sin x)\, dx$

1. ✖

$\pi\int_0^{\pi/4} f(\sin x)\, dx$

2. ✖

$2\pi\int_0^{\pi/2} f(\sin x)\, dx$

3. ✖

4. $$\pi \int_0^{\pi/2} f(\sin x)\, dx$$

Question Number : 80 Question Id : 342604880 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The general solution of $\frac{dy}{dx}=\frac{x^3\left(y^4+1\right)}{\left[2y^{-2/3}+3\left(\frac{x}{\sqrt[3]{y}}\right)^2\right]^{3/2}}$ is

Options :

1. $log\left(\frac{y^4}{1+y^4}\right)=\frac{4}{9}\left(\frac{4+3x^2}{\sqrt{2+3x^2}}\right)+C$

2. $\frac{1}{4}log\left(\frac{y^4}{1+y^4}\right)=\frac{1}{9}log\left(\frac{4+3x^2}{\sqrt{2+3x^2}}\right)+C$

3. $\frac{1}{4}log\left(\frac{y^4}{1+y^4}\right)=\frac{4}{9}\frac{1}{\sqrt{2+3x^2}}+C$

4. $log\left(\frac{y^4}{1+y^4}\right)=\frac{1}{9}\frac{1}{\sqrt{2+3x^2}}+C$

Physics

Section Id : 34260417

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 :	34260417
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 342604881 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The strongest force among the following forces in nature is

Options :

1.

2. Weak Nuclear force

3.

4. Strong Nuclear force

✖ Electromagnetic force

Question Number : 82 Question Id : 342604882 Question Type : MCQ Option Shuffling : Yes

✖

✖ Gravitational force

✔

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

Correct Marks : 1 Wrong Marks : 0

Consider a series of measurements of the length of a box in an experiment. The readings are 2.4 m, 2.5 m, 2.6 m, 2.8 m, 3.0 m. What would be the relative error?

Options :

1. ✖ 0.110

2. ✖ 0.089

3. ✖ 0.079

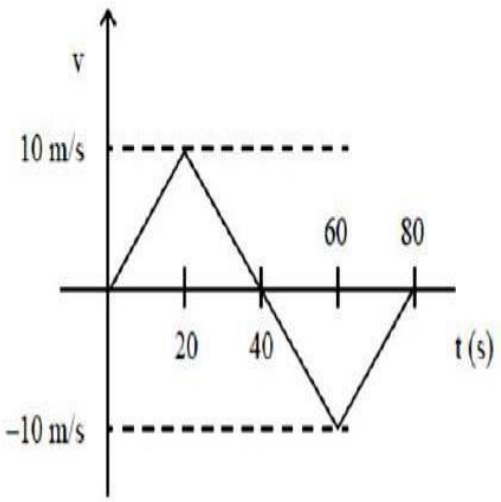
4. ✔ 0.072

Question Number : 83 Question Id : 342604883 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

For the following velocity- time graph, the average speed for the motion during first 80 seconds is



Options :

1. ✖ 0

2. ✔ 5 m/s

3. ✖ 10 m/s

4. ✖ 0.25 m/s

Question Number : 84 Question Id : 342604884 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A ball thrown upwards vertically reaches a height 25 m in 1 s. The ratio of total distance covered by the ball in time t = 2 s and t = 4 s is (use g = 10 m/s^2)

Options :

1. ✖ 1

2. ✔ $\frac{4}{5}$

3. ✖ $\frac{2}{3}$

4. ✖ $\frac{3}{4}$

Question Number : 85 Question Id : 342604885 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Car A is moving to the east with a speed of 30 km/hr, and car B is moving to the north with the same speed. What is the velocity of car B as measured in car A?

Options :

✔ 42 km/hr, 45° north of west

1.

2.

3. ✖ 60 km/hr, 45° south of east

4. ✖ 42 km/hr, 45° south of east

Question Number : 86 Question Id : 342604886 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

At time t = 0, a particle leaves the origin and moves in the positive direction of the X- axis. If the velocity of the particles varies as $\overline{V}(t) = \overline{V}_0\left(1 - \frac{t}{t_0}\right)$, $|\overrightarrow{V_0}| = 10\,m/s$ and $t_0 = 10$ s, then the distance covered by the particle during the first 20 s is:

Options :

1. ✖ 200 m

2. ✔ 100m

3. ✖ 0 m

4.

Question Number : 87 Question Id : 342604887 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A bullet of mass m enters a wooden block of length L at a speed v_1 and emerges out of block with a speed v_2. If $\overline{F}$ is the average force which impeded its motion through the wooden block then correct statement is
(Assume uniform deceleration inside the block)

Options :

1. ✔ $\overline{F}=\frac{m}{2L}\left(v_2^{\,2}-v_1^{\,2}\right)$

2. ✖ $\overline{F}=\frac{m}{4L}\left(v_2^{\,2}+v_1^{\,2}\right)$

3. ✖ $\overline{F}=2\frac{m}{L}\left(v_2-v_1\right)^2$

4. ✖ $\overline{F}=\frac{m}{2L}\left(v_2+v_1\right)^2$

Question Number : 88 Question Id : 342604888 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A car is moving with velocity V at the top of a semi-circular hill of radius 40 m such that the normal force on it is zero. Find the velocity (V) of the car.
[use $g = 10\ ms^{-2}$]

Options :

1. $15\ ms^{-1}$ ✗

2. $20\ ms^{-1}$ ✓

3. $30\ ms^{-1}$ ✗

4. $40\ ms^{-1}$ ✗

Question Number : 89 Question Id : 342604889 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 average terminal velocity of rain drop is $2\ ms^{-1}$, then the energy transferred by rain to each square meter of the surface at a place which receives 100 cm of rain in a year is

Options :

✗ $1 \times 10^4\ J$

1.

2.

3. 2×10^3 J

4. 2×10^4 J

Question Number : 90 Question Id : 342604890 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A horizontal force $\vec{F} = \left(g - x^2\right)\hat{i}$ N acts on a wooden block resting on a horizontal smooth surface. The work done to move the block from x = 0 to x = 3 m (in Joule) is (use $g = 10\ m/s^2$):

Options :

1. 24

2. 35

3. 30

4. 21

Question Number : 91 Question Id : 342604891 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A 750 kg boat is 10 m long and is floating without motion on still water. A man of mass 80 kg is at one end and if he runs to another end of the boat and stops, the displacement of boat is

Options :

1. ✖ 1.8 m in the direction of displacement of man

2. ✔ 0.96 m in the direction of opposite to the displacement of man

3. ✖ 0.96 m in the direction of displacement of the man

4. ✖ 1.8 m in the direction opposite to displacement of man

Question Number : 92 Question Id : 342604892 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 of mass 20 kg and radius 30 cm is rotating at an angular speed of 80 rev/min when the motor is turned off. Neglecting the friction at the axis, calculate the force that must be applied tangentially to the wheel to bring it to rest in 5 revolutions.

Options :

✔

$1.06\ \pi N$

1.

2.

3. ✖ $3.06\ \pi N$

4. ✖ $4.06\ \pi N$

Question Number : 93 Question Id : 342604893 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 executes simple harmonic motion according to the equation $x(t) = A\sin^2(\alpha t)$. If the time period of the S.H.M is 0.2 s, then the value of α (in units of rad/s) is

Options :

1. ✖ $2\ \pi$

2. ✖ $10\ \pi$

3. ✔ $5\ \pi$

4. ✖ $2.5\ \pi$

Question Number : 94 Question Id : 342604894 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A satellite revolving around the earth at a certain height experiences acceleration due to gravity equal to $\frac{16}{49}g_0$, when g_0 is the acceleration due to gravity on the earth's surface. If R is the radius of earth, then the square of time period of the satellite's revolution is equal to $K\left[\frac{\pi^2 R^3}{GM}\right]$. The value of K is:

Options :

1. $\frac{27}{36}R^3$ ✖

2. $\frac{343}{16}R^3$ ✔

3. $\frac{125}{64}R^3$ ✖

4. $\frac{675}{81}R^3$ ✖

Question Number : 95 Question Id : 342604895 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 material reduces by 2 % when the pressure is increased from 1 atm to 2 atm. What is it's bulk modulus?

Options :

1. ✖ $10^5\ \mathrm{N/m^2}$

2. ✖ $5\times10^5\ \mathrm{N/m^2}$

3. ✖ $10^6\ \mathrm{N/m^2}$

4. ✔ $5\times10^6\ \mathrm{N/m^2}$

Question Number : 96 Question Id : 342604896 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The work done in breaking a drop of liquid of radius R (Surface tension T) into 64 equal drops is:

Options :

1. ✖ $4\pi R^2 T$

2. ✖ $\dfrac{\pi R^2 T}{64}$

$12\pi T$

3.

$12\pi R^2 T$

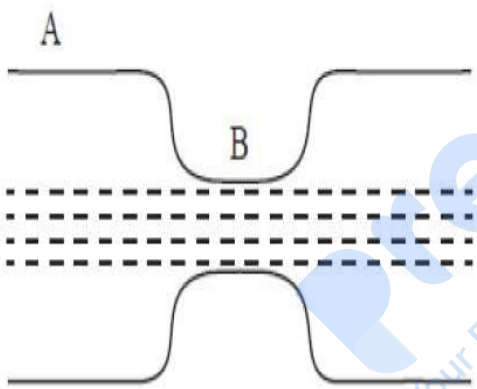
4. ✔

Question Number : 97 Question Id : 342604897 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 horizontal tube the water pressure changes by 1500 Nm^{-2} between A and B as shown in figure below. The cross sectional areas at A and B of the tube are 40 cm^2 and 20 cm^2 respectively. Find the rate of flow of water through the tube



Options :

$1000\ cm^3 s^{-1}$

1. ✖

$2000\ cm^3 s^{-1}$

2. ✖

$4000\ cm^3 s^{-1}$

3. ✔

$6000\ cm^3 s^{-1}$

4.

Question Number : 98 Question Id : 342604898 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The moment of inertia I of uniform rod about a perpendicular bisector increases to $I + \Delta I$, if the temperature is increased slightly by ΔT. If the coefficient of linear expansion is α then $\frac{\Delta I}{I}$ is

$\left(\text{Assume} \frac{\Delta T}{T} << 1\right)$

Options :

1. $\alpha \Delta T$ ✗

2. $2 \alpha \Delta T$ ✓

3. $3 \alpha \Delta T$ ✗

4. $4 \alpha \Delta T$ ✗

Question Number : 99 Question Id : 342604899 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 Carnot engine whose efficiency is 50%, receives heat at 500 K. If the efficiency is to be 60%, the intake temperature for the same exhaust temperature is

Options :

1.

600 K

2. ✔ 625 K

3. ✖ 650 K

4. ✖ 700 K

Question Number : 100 Question Id : 342604900 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

An engine performs 2000 J of mechanical work and discards 4000 J of heat each cycle. What is the thermal efficiency of the engine?

Options :

1. ✖ 45.5 %

2. ✖ 31.4%

3. ✖ 25%

✔

4. 33.3%

Question Number : 101 Question Id : 342604901 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A polyatomic gas follows a law T^2V^{α} = constant. Find 'α' for which the heat exchange of gas in the process becomes zero

Options :

1. ✖ $\alpha = 3/2$

2. ✔ $\alpha = 2/3$

3. ✖ $\alpha = 4/3$

4. ✖ $\alpha = 3/4$

Question Number : 102 Question Id : 342604902 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A molecule is travelling in air at 300 K and 1 atm, and the radius of the molecule is 0.6×10^{-10} m. Calculate the approx. mean free path of the molecule. (the number density is 2.44×10^{25} molecules / m^3)

Options :

1. $\frac{0.2}{\pi} \times 10^{-5}$ m

1.

2.

$\frac{0.3}{\pi}\times10^{-5}$ m

3. $\frac{0.4}{\pi}\times10^{-5}$ m

4. $\frac{0.1}{\pi}\times10^{-5}$ m

Question Number : 103 Question Id : 342604903 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A wire vibrates at a fundamental frequency of 500 Hz. A second identical wire produces 5 beats per second with it when the tension in the first wire is slightly decreased. The ratio of the tension in the second wire to the tension in the first wire is approximately equal to:

Options :

1. 1.04

2. 1.01

3. 1.05

4.

Question Number : 104 Question Id : 342604904 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A convex lens with lateral magnification 2 is used to image a point at the bottom of a tank. The image of the point is formed 60 cm above the lens. Now a liquid is filled into the tank to a height of 24 cm. It is found that the distance of the image of the same point is now 120 cm above the lens. Find the refractive index of the liquid.

Options :

1. ✖ 1.31

2. ✔ 1.33

3. ✖ 1.36

4. ✖ 1.39

Question Number : 105 Question Id : 342604905 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In Young's double slit experiment, point A on the screen has a path difference of λ and point B on the screen has a path difference of $\frac{\lambda}{4}$. What is the ratio of the intensities at point A to B?

Options :

1. $1:1$ ✖

2. $2:1$ ✔

3. $1:2$ ✖

4. $4:1$ ✖

Question Number : 106 Question Id : 342604906 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A thin non – conducting ring of radius r has a linear charge density $\lambda = \lambda_0 \cos\phi$, where λ_0 is a constant and ϕ is the azimuthal angle. The magnitude of the electric field strength at the centre of the ring is:

Options :

1. $\frac{1}{4\pi\varepsilon_0}\frac{\lambda_0}{r}$ ✖

2. $\frac{1}{2\pi\varepsilon_0}\frac{\lambda_0}{r}$

3.

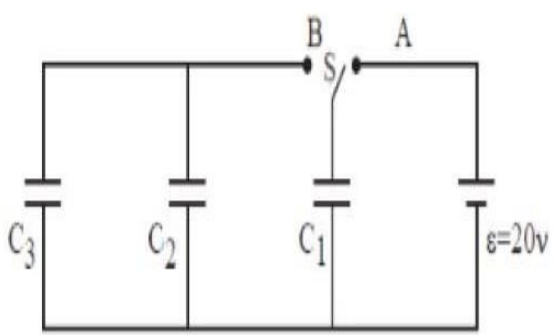
$$\frac{\lambda_0}{4\varepsilon_0 r}$$

$$\frac{\lambda_0}{2\varepsilon_0 r}$$

4. ✖

Question Number : 107 Question Id : 342604907 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 following figure $C_1 = 5\,\mu F$, $C_2 = C_3 = 10\,\mu F$ and $\varepsilon = 20\,V$. Initially the switch S is connected to point A until capacitor C_1 is fully charged. Afterwards switch is thrown to left side and connected to point B. The charge on capacitor C_3 after equilibrium is reached will be



Options :

1. ✔ $40\ \mu C$

$100\ \mu C$

2.

3.

50 μC

4. ✖ 20 μC

Question Number : 108 Question Id : 342604908 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A wire, 10 m long, has a resistance of 40 Ω. It is connected in series with a resistance box of resistance R and a 2 V storage cell. If the potential gradient along the wire is 0.1 m V/cm, the value of R is :

Options :

1. ✖ 260 Ω

2. ✔ 760 Ω

3. ✖ 960 Ω

4. ✖ 1060 Ω

Question Number : 109 Question Id : 342604909 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Force acting on an electron moving with velocity $\vec{V}$ in a magnetic field $\vec{B}$ is (e is the charge of electron)

Options :

1. $e\left(\vec{V}\times\vec{B}\right)$ ✔

2. $e\left(\vec{V}.\vec{B}\right)$ ✖

3. $e\frac{\vec{V}}{\vec{B}}$ ✖

4. $e\frac{\vec{B}}{\vec{V}}$ ✖

Question Number : 110 Question Id : 342604910 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Two circular coils P and Q are made of two identical wires of the same length. The number of turns in the P and Q are 4 and 2, respectively. The magnetic inductions at the centre of P and Q are B_p and B_α respectively. The ratio $\frac{B_p}{B_\alpha}$ is:

Options :

1.

2. ✔ 4

3. ✖ 0.5

4. ✖ 2

Question Number : 111 Question Id : 342604911 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The susceptibility of Al is 2×10^{-5}. The percent increase in the magnetic field when the space within a current carrying torroid to filled with Al is:

Options :

1. ✖ 2×10^{-2}

2. ✔ 2×10^{-3}

3. ✖ 2×10^{-4}

4. ✖ 2×10^{-5}

4.

Question Number : 112 Question Id : 342604912 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 coil of area 100 cm^2 & 20 turns is kept in magnetic field of flux density 2 $Wb-m^2$. It rotates from a position where its plane makes an angle of 30° with the field to a position perpendicular to the field in a time 0.2 sec. Find the magnitude of the emf induced in the coil due to its rotation

Options :

1. ✖ 2 V

2. ✖ 3 V

3. ✖ 1.5 V

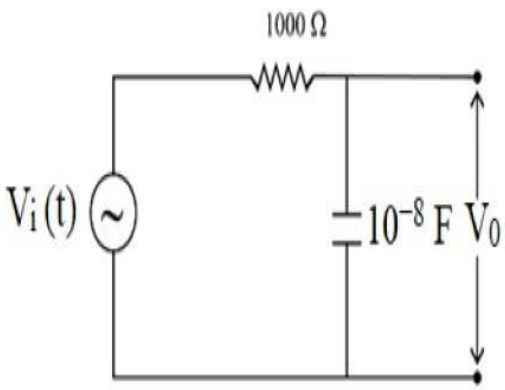
4. ✔ 1 V

Question Number : 113 Question Id : 342604913 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 following circuit an AC input $V_i(t)=(20\,mV)\sin\left(10^5\,t\right)$ is applied at the left end. The amplitude of the output voltage V_0 at the right end across the capacitor will be:



Options :

1. 14.14 mV ✔

2. 10.55 mV ✖

3. 20.2 mV ✖

4. 25.55 mV ✖

Question Number : 114 Question Id : 342604914 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 following List A consists of wave length range of different of E.M waves and List B consists of ways to produce them. Match the following

List-A		List-B	
A)	400 nm to 1 nm	I)	Radioactive decay of the nucleus
B)	> 0.1 nm	II)	Vibration of atoms and molecules
C)	1 mm to 700 nm	III)	Rapid acceleration and deceleration of electron in aerials
D)	$< 10^{-3}$ nm	IV)	Inner shell electrons in atoms moving from one energy level to a lower level

The correct match is

Options :

1.

A	B	C	D
III	II	I	IV

2.

A	B	C	D
II	III	IV	I

A	B	C	D
IV	III	II	I

3.

4.

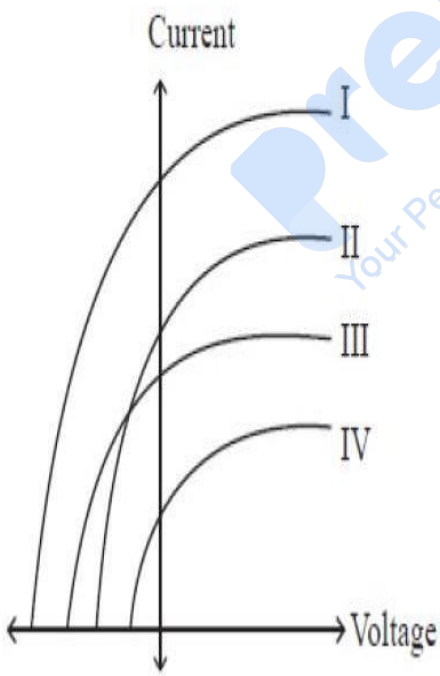
A	B	C	D
I	IV	III	II

Question Number : 115 Question Id : 342604915 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 photoelectric experiment 3 different lights are incident on a metal of work function 1.5 eV. Light A is 200 nm wavelength with intensity 1.8 w/m^2, light B is 400 nm with 1 w/m^2 and light C is 600 nm with 0.5 w/m^2. The current versus voltage is measured. Which graphs correspond to which light?



Options :

Light A	Light B	Light C
I	III	II

1.

2.

Light A	Light B	Light C
I	II	IV

Light A	Light B	Light C
I	III	IV

3. ✖

Light A	Light B	Light C
III	II	IV

4. ✔

Question Number : 116 Question Id : 342604916 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A mono chromatic radiation of wave length λ is incident on a hydrogen sample in ground state the sample subsequently emits radiation of six different wave lengths, then the value of λ is
[Use ch = 1242 ev-m]

Options :

80 nm

1. ✖

✖

85.5 nm

2.

3.

4. ✖ 100.2 nm

Question Number : 117 Question Id : 342604917 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Find the radius of Be^{3+} ions in its ground state assuming Bohr's model to be valid $(a_0 = 53pm)$.

Options :

1. ✖ 20 pm

2. ✖ 18.2 pm

3. ✖ 16.2 pm

4. ✔ 13.2 pm

Question Number : 118 Question Id : 342604918 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 correct with respect to the following statements?

Due to diffusion of electrons from n to p – side ____

(I) electrons are accumulated in the depletion region

(II) electron drift current is from p – side to n – side

(III) an ionised donor is left in the n –region

(IV) electrons of n – side comes to p – side and electron- hole combination takes in p – side

Select the correct option from the following.

Options :

1. ✖ (I) and (II)

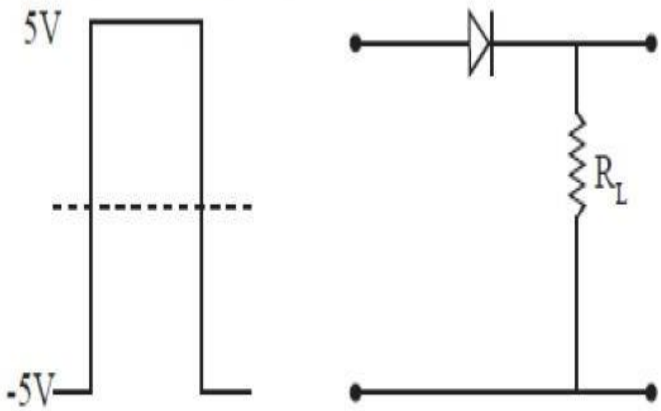
2. ✖ (I) and (III)

3. ✖ (I) and (IV)

4. ✔ (II), (III) and (IV)

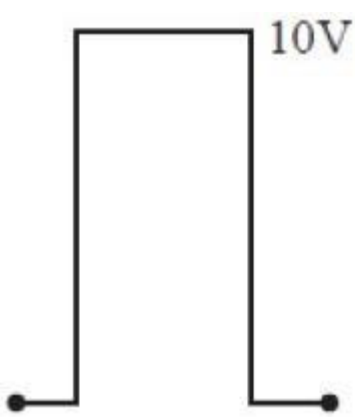
Question Number : 119 Question Id : 342604919 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If in a p-n junction diode, a square input signal of 10 V is applied as shown



Then, the output signal across R_L will be:

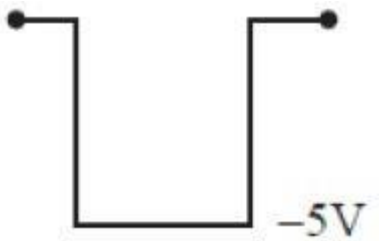
Options :

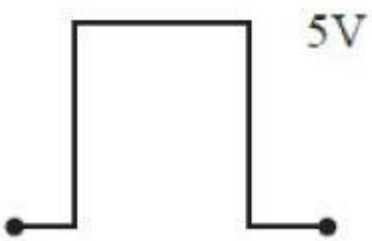


1. ✖

2. ✖

3. ✖





4. ✔

Question Number : 120 Question Id : 342604920 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

For an amplitude modulated wave, the maximum amplitude is found to be 10 V while the minimum amplitude is found to be 4 V. The modulation index is

Options :

1. ✖ $\frac{2}{5}$

✖ $\frac{2}{3}$

2.

3.

$\frac{3}{7}$

$\frac{4}{7}$

4.

Chemistry

Section Id :	34260418
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 :	34260418
Question Shuffling Allowed :	Yes

Question Number : 121 Question Id : 342604921 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

Match the following

List I		List II	
A)	Chadwick	I)	Cathode rays
B)	Rutherford	II)	X-rays spectra
C)	Mosley	III)	Discovery of neutrons
D)	J. J. Thomson	IV)	Nuclear atom model

The correct match is

Options :

A	B	C	D
IV	I	II	III

1.

A	B	C	D
III	II	IV	I

2.

A	B	C	D
III	II	I	IV

3.

4.

A	B	C	D
III	IV	II	I

Question Number : 122 Question Id : 342604922 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 radial nodes in 3s and 2p orbitals, respectively are

Options :

1. 2 ; 2 ✖

2. 2 ; 0 ✔

3. 0 ; 0 ✖

4. 3 ; 2 ✖

Question Number : 123 Question Id : 342604923 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 periodic property?

Options :

1. ✖ Atomic size

2. ✖ Electron affinity

3. ✔ Radioactivity

4. ✖ Ionisation potential

Question Number : 124 Question Id : 342604924 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 options represents the correct ionic radii in Å of N^{3-}, O^{2-} and F^{-}, respectively?

Options :

✖

1.71, 1.36 and 1.40

1.

1.36, 1.40 and 1.71

2.

1.71, 1.40 and 1.36

3. ✔

1.40, 1.36 and 1.71

4. ✖

Question Number : 125 Question Id : 342604925 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The order of the average bond length of the given bonds is

Options :

$C = O < C = N < C \equiv C < N - O$

1. ✖

$C \equiv C < C = O < C = N < N - O$

2. ✔

$C \equiv C < C = O < N - O < C = N$

3. ✖

$C = N < C = O < N - O < C \equiv C$

4.

Question Number : 126 Question Id : 342604926 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The shapes of BrF_5 and XeF_4, respectively are

Options :

1. square pyramid, square pyramid ✖

2. square planar, square planar ✖

3. square planar, square pyramid ✖

4. square pyramid, square planar ✔

Question Number : 127 Question Id : 342604927 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A balloon filled with an air sample occupies 3 L volume at 35 °C. On lowering the temperature to T, the volume decreases to 2.5 L. The temperature T is?
[Assume P constant]

Options :

16 °C

1.

$-16\ ^{\circ}C$

2. ✔

$24\ ^{\circ}C$

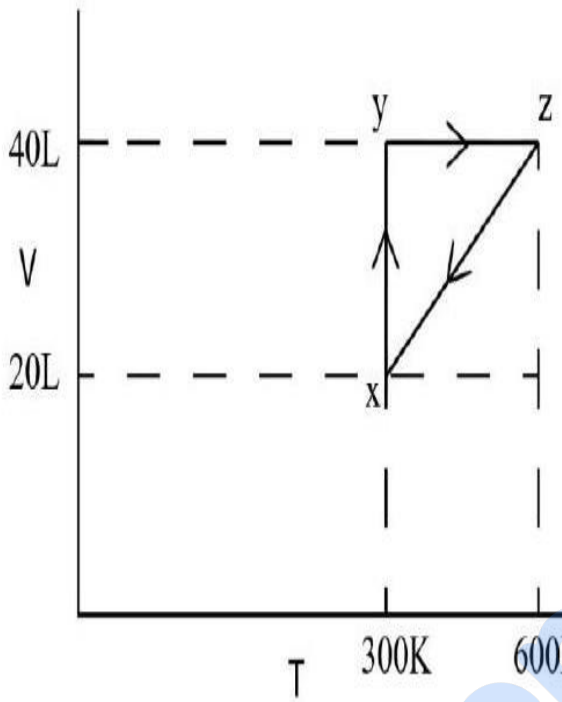
3. ✖

$-20\ ^{\circ}C$

4. ✖

Question Number : 128 Question Id : 342604928 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 graph indicates the system containing 1 mole of gas involving various steps. When it moves from z to x, the type of undergoing process is



Options :

1. Cyclic

Isothermal

2. ✖

Isochoric

3. ✖

Isobaric

4. ✔

Question Number : 129 Question Id : 342604929 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

100 g of a mixture of NaOH and Na_2SO_4 is neutralized by 100 ml of 0.5M H_2SO_4. What is the amount of Na_2SO_4 present in the mixture?

Options :

82 g

1. ✖

96 g

2. ✔

✖

88 g

3.

4.

92 g

Question Number : 130 Question Id : 342604930 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 disproportionation reaction?

Options :

1. $Cl_2(g) + 2OH^-(aq) \rightarrow ClO^-(aq) + Cl^-(aq) + H_2O$ ✖

2. $F_2(g) + 2OH^-(aq) \rightarrow OF_2(g) + 2F^-(aq) + H_2O(l)$ ✔

3. $4ClO_3^-(aq) \rightarrow Cl^-(aq) + 3ClO_4^-(aq)$ ✖

4. $3ClO^-(aq) \rightarrow 2Cl^-(aq) + ClO_3^-(aq)$ ✖

Question Number : 131 Question Id : 342604931 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 relation is correct?

Options :

1. ✖ $dG = VdP + SdT$

2. ✔ $dG = VdP - SdT$

3. ✖ $\Delta G = -RT\ ln(K)$

4. ✖ $dU = PdV + T\ dS$

Question Number : 132 Question Id : 342604932 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The successive equilibrium constants for the stepwise dissociation of a tribasic acid are K_1, K_2 and K_3, respectively. The equilibrium constant for the overall dissociation is

Options :

1. ✖ $(K_1 + K_2 + K_3)$

2. ✖ $\sqrt[3]{(K_1 + K_2 + K_3)}$

$$(K_1 \times K_2 \times K_3)^3$$

3.

$K_1 \times K_2 \times K_3$

4. ✔

Question Number : 133 Question Id : 342604933 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For the reaction $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

Options :

$K_P = K_C \neq 0$

1. ✔

$K_P > K_C$

2. ✖

$K_P < K_C$

3. ✖

$K_P = K_C = 0$

4. ✖

Question Number : 134 Question Id : 342604934 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The compound used as a moderator in nuclear reactors is

Options :

1. BeD_2 ✖

2. D_2O_2 ✖

3. D_2O ✔

4. NaD ✖

Question Number : 135 Question Id : 342604935 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): LiCl and $MgCl_2$ are soluble in ethanol

Reason (R) : Lithium and magnesium are harder than their respective group elements

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 : 136 Question Id : 342604936 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Match the following

List I Compound	List II Physical/Chemical property/name/ structure
A) H_3BO_3	I) Dimeric form
B) $AlCl_3$	II) Back bonding
C) $B_3N_3H_6$	III) Hydrogen bonding
D) BF_3	IV) Inorganic benzene

The correct match is

Options :

1.

A	B	C	D
I	II	III	IV

A	B	C	D
III	II	IV	I

2. ✖

A	B	C	D
III	I	II	IV

3. ✖

A	B	C	D
III	I	IV	II

4. ✔

Question Number : 137 Question Id : 342604937 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 statements from the below is

(I) Charcoal can be obtained on heating wood in absence of air

(II) Charcoal is impure form of graphite

(III) Diamond is thermodynamically the most stable allotrope of carbon

(IV) Coke is used as an oxydizing agent during the extraction of iron from its ores

Options :

1.

(I) and (III)

(II) and (IV)

2. ✖

(I) and (IV)

3. ✖

(I) and (II)

4. ✔

Question Number : 138 Question Id : 342604938 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The fluoride ions make the enamel of teeth much harder by converting, which of the following substance / compound

Options :

$\left[3Mg_3(PO_4)_2 \cdot Ca(OH)_2\right]$

1. ✖

$\left[3Ca_3(PO_4)_2 \cdot Ca(OH)_2\right]$

2. ✔

3.

$\left[3Ca_3(PO_4)_2 \cdot MgCl_2\right]$

4. ✖

Question Number : 139 Question Id : 342604939 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Metamerism can be exhibited by the compounds containing

Options :

monovalent functional group

1. ✖

bivalent functional group

2. ✔

double bond

3. ✖

triple bond

4. ✖

Question Number : 140 Question Id : 342604940 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In which of the following reactions, t-butyl benzene is formed

(I) Benzene + t- Butyl Chloride $\xrightarrow{AlCl_3}$

(II) Benzene + $(CH_3)_2 C{=}CH_2$ $\xrightarrow{BF_3 \cdot HF}$

(III) Benzene + t- Butyl alcohol $\xrightarrow{H_2SO_4}$

(IV) Benzene + Butanoyl chloride $\xrightarrow[Zn/HCl]{AlCl_3}$

Options :

1. (I), (II) and (III) ✔

2. (II), (III) and (IV) ✖

3. (I), (II) and (IV) ✖

4. (I), (III) and (IV) ✖

Question Number : 141 Question Id : 342604941 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The total number of overlapping p- orbitals present in cycloheptatrienyl cation is

Options :

4

1. ✖

5

2. ✖

6

3. ✖

7

4. ✔

Question Number : 142 Question Id : 342604942 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

An alloy made up of A and B metals crystallizes in a cubic lattice, where B atoms occupy the corners and A atoms occupy the face centers. The formula of the alloy formed is

Options :

AB_3

1. ✖

A_3B

2.

3.

A_2B_3

A_3B_2

4. ✖

Question Number : 143 Question Id : 342604943 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 mixture form an ideal solution?

Options :

$CCl_4 + C_7H_8$

1. ✖

$CHCl_3 + C_6H_6$

2. ✖

$H_2O + CH_3OH$

3. ✖

$n-C_6H_{14} + n-C_7H_{16}$

4.

Question Number : 144 Question Id : 342604944 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The freezing point of an aqueous solution containing 25g of ethanol in 1000g of H_2O is $[K_f = 1.86\ K\ kg\ mol^{-1}]$

Options :

1. ✖ 0.25 °C

2. ✖ 0.5 °C

3. ✖ −1.5 °C

4. ✔ −1 °C

Question Number : 145 Question Id : 342604945 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 plate of dimension of ($1 \times 2cm^2$) has to be coated on both the sides by Cu metal. How long does it take to deposit Cu of 0.01cm thickness, if 1.5A current is used?
[Electrochemical equivalence of Cu is 0.0003 g/c and the density of Cu is 9 g/cm^3]

Options :

1.

400s

800s

2. ✔

120s

3. ✖

160s

4. ✖

Question Number : 146 Question Id : 342604946 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 reaction $A+B \rightarrow P$, the following data are provided

Entry	[A] in M	[B] in M	Initial rate (M/s)
1	0.02	0.02	2×10^{-2}
2	0.02	0.04	4×10^{-2}
3	0.04	0.04	8×10^{-2}

The rate constant for this reaction in standard unit is

Options :

1. 5

1.2

2. ✖

2.4×10^{-4}

3. ✖

50

4. ✔

Question Number : 147 Question Id : 342604947 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For precipitating $Fe(OH)_3$ sol, the best precipitating agent is

Options :

Na_2SO_4

1. ✖

$Cr(OH)_3$

2. ✖

✖

$Al(OH)_3$

3.

$Na_3[Fe(CN)_6]$

4.

Question Number : 148 Question Id : 342604948 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Sulphur on boiling with NaOH solution forms

Options :

1. $Na_2S_2O_3 + Na_2S$ ✔

2. $Na_2SO_3 + SO_2$ ✖

3. $Na_2S_2O_3 + NaHSO_3$ ✖

4. $Na_2SO_3 + H_2S$ ✖

Question Number : 149 Question Id : 342604949 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Commercial name of Peroxydisulphuric acid is

Options :

1.

Marshall's acid

Caro's acid

2. ✖

Oleum

3. ✖

Fuming sulphuric acid

4. ✖

Question Number : 150 Question Id : 342604950 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 does not exist?

Options :

$XeOF_4$

1. ✖

NeF_2

2. ✔

XeF_2

3.

XeF_6

4. ✖

Question Number : 151 Question Id : 342604951 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The element with highest standard reduction potential (in Volt) $[M^{2+} \rightarrow M]$ among the I^{st} row of transition elements is

Options :

Ti

1. ✖

Ni

2. ✖

Cr

3. ✖

Cu

4. ✔

Question Number : 152 Question Id : 342604952 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 order of field strength of the following ligands is

Options :

1. $N^{3-} > C_2O_4^{2-} > NH_3 > CO$ ✗

2. $N^{3-} > NH_3 > C_2O_4^{2-} > CO$ ✗

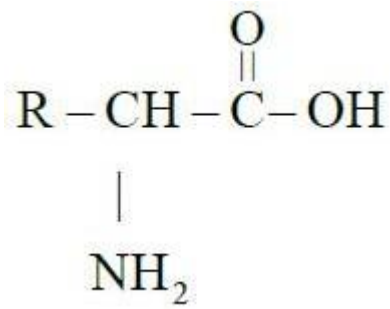
3. $CO > NH_3 > C_2O_4^{2-} > N^{3-}$ ✓

4. $CO > N^{3-} > NH_3 > C_2O_4^{2-}$ ✗

Question Number : 153 Question Id : 342604953 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

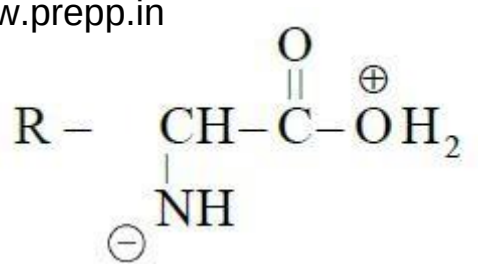
The Zwitter ion among the following is

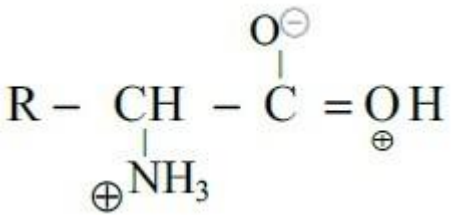
Options :



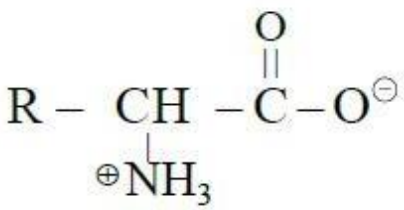
1.

2.





3. ✖



4. ✔

Question Number : 154 Question Id : 342604954 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The Swarts reaction yields

Options :

Iodohydrocarbons

1. ✖

✔

Fluorohydrocarbons

2.

Bromohydrocarbons

3.

Chlorohydrocarbons

4. ✖

Question Number : 155 Question Id : 342604955 Question Type : MCQ Option Shuffling : Yes

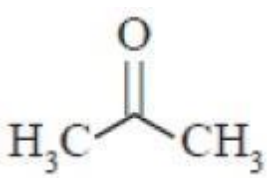
Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The major product of the following synthetic reactions is

$$CH_3CH_2CH_3 \xrightarrow[\text{iii) } Cl_2, 773\,K \\ \text{iv) } AgOH(aq)]{\text{i) } Cl_2, hv \\ \text{ii) alc. } KOH} \quad ?$$

Options :



1. ✖

CH_3CH_2CHO

2. ✖

$CH_2=CHCH_2OH$

3. ✔

$CH_3CH_2CH_2OH$

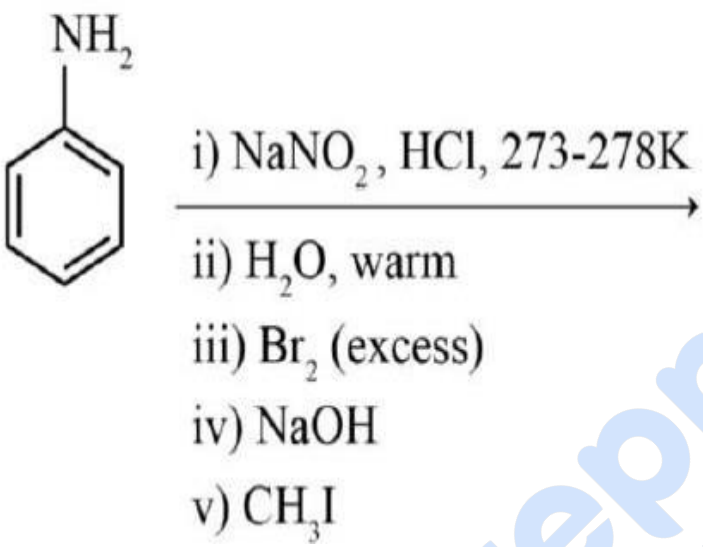
4.

Question Number : 156 Question Id : 342604956 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 sequence is

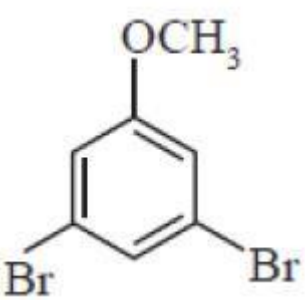


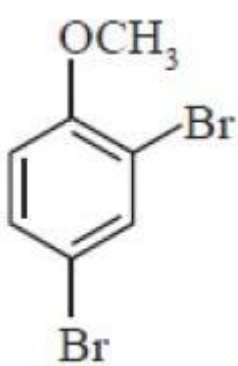
Options :

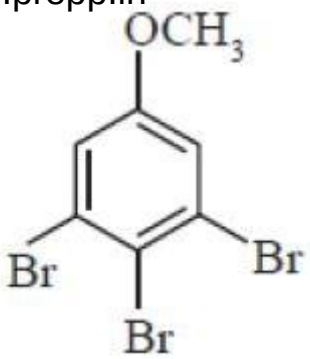
1.

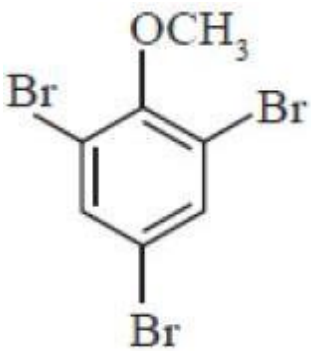
2.

3.









4. ✔

Question Number : 157 Question Id : 342604957 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The molecular formula of the final product of the following synthetic scheme is

$$\text{Benzyl Iodide} \xrightarrow[\text{ii) } CH_3MgBr]{\text{i) KCN}} \xrightarrow{\text{iii) } H_3O^+}$$

Options :

✖

1. $C_9H_{12}O$

2. $C_{10}H_{14}O$

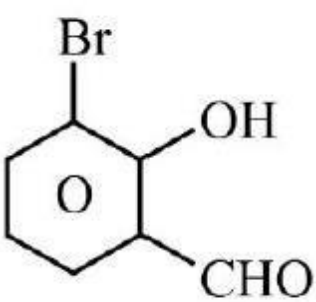
3. ✖ $C_{10}H_{15}N$

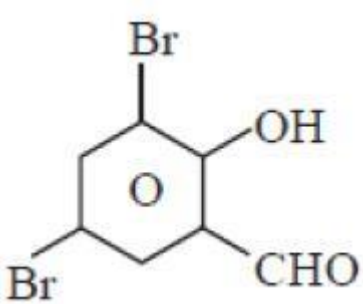
4. ✔ $C_9H_{10}O$

Question Number : 158 Question Id : 342604958 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

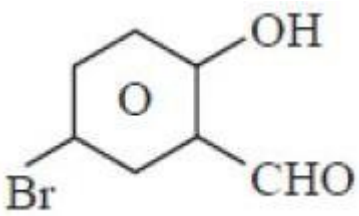
The major product formed when salicylaldehyde is reacted with 2 equivalents of bromine in glacial acetic acid at 0 °C

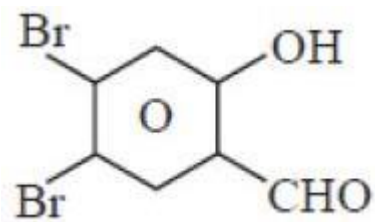
Options :

1. ✖ 

2. ✔ 

3.





4. ✖

Question Number : 159 Question Id : 342604959 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 incorrect statement regarding acetic acid

Options :

1. ✔ Acetic acid is obtained when calcium acetate is distilled in the presence of calcium formate

2. ✖ Acetic acid is used in curing meat and fish

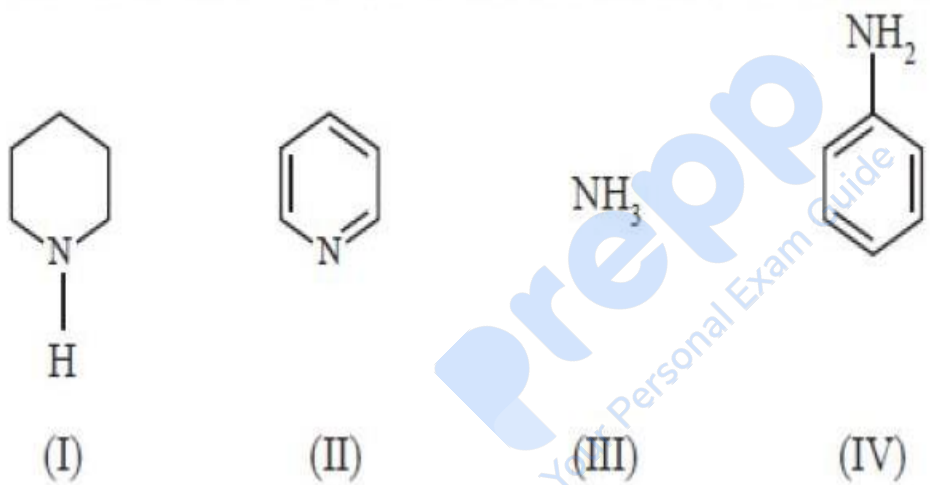
3. ✖ Anhydrous acetic acid is known as glacial acetic acid because it forms ice like solid below 16.6 °C

The catalyst used in the conversion of acetic acid to trichloroacetic acid is red phosphorous

4. ✖

Question Number : 160 Question Id : 342604960 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 order of basic strength of the following amines is



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

Options :

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

1. ✖

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

2. ✖

✖

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

3.

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

4.