

# 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.

<b>Question Paper Name :</b>	Engineering English 4th Aug 2021 Shift 1
<b>Subject Name :</b>	Engineering (English)
<b>Creation Date :</b>	2021-08-04 15:48:49
<b>Duration :</b>	180
<b>Total Marks :</b>	160
<b>Display Marks:</b>	No
<b>Calculator :</b>	None
<b>Magnifying Glass Required? :</b>	No
<b>Ruler Required? :</b>	No
<b>Eraser Required? :</b>	No
<b>Scratch Pad Required? :</b>	No
<b>Rough Sketch/Notepad Required? :</b>	No
<b>Protractor Required? :</b>	No
<b>Show Watermark on Console? :</b>	Yes
<b>Highlighter :</b>	No
<b>Auto Save on Console? :</b>	Yes

## Engineering (English)

<b>Group Number :</b>	1
<b>Group Id :</b>	3426041
<b>Group Maximum Duration :</b>	0

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<b>Group Minimum Duration :</b>	180
<b>Show Attended Group? :</b>	No
<b>Edit Attended Group? :</b>	No
<b>Break time :</b>	0
<b>Group Marks :</b>	160
<b>Is this Group for Examiner? :</b>	No

## Mathematics

<b>Section Id :</b>	3426041
<b>Section Number :</b>	1
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	80
<b>Number of Questions to be attempted :</b>	80
<b>Section Marks :</b>	80
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	3426041
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 1 Question Id : 3426041 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

If  $f: \mathbb{R} \rightarrow \mathbb{R}$  is defined as  $f(x+y) = f(x) + f(y)$ ,  $\forall x, y \in \mathbb{R}$  and  $f(1) = 10$ , then,

$$\sum_{r=1}^n (f(r))^2 =$$

  
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$$\frac{7}{2}n(n+1)$$

1. ✘

$$5n(n+1)$$

2. ✘

$$\frac{50}{3}n(n+1)(2n+1)$$

3. ✔

$$\frac{100}{4}n^2(n+1)^2$$

4. ✘

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Question Number : 2 Question Id : 3426042 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

If  $f: \mathbb{R} \rightarrow \mathbb{R}$  is defined as  $f(x) = \frac{3^x + 3^{-x}}{2}$ ,  $\forall x \in \mathbb{R}$  and it satisfies  
 $f(x+y) + f(x-y) = a f(x)f(y)$ , then  $a =$

Options :

✔

2

1.

1

2.

4

3. ✘

8

4. ✘

**Question Number : 3 Question Id : 3426043 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  $n \in \mathbb{N}$ ,  $\frac{1}{2.5} + \frac{1}{5.8} + \dots + \frac{1}{(3n-1)(3n+2)} =$

Options :

$$\frac{n}{6n+4}$$

1. ✔

$$\frac{n^2}{6n+4}$$

2. ✘

✘

$$\frac{1}{2} \cdot \frac{n^2}{6n+4}$$

3.

4.

$$\frac{n}{6n^2 + 4}$$

**Question Number : 4 Question Id : 3426044 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  $3x - 2y + z = 0$ ,  $\lambda x - 14y + 15z = 0$ ,  $x + 2y - 3z = 0$  has a solution other than  $x = y = z = 0$ , then  $\lambda =$

**Options :**

1

1. ✘

2

2. ✘

3

3. ✘

5

4. ✔

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**Question Number : 5 Question Id : 3426045 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

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$$\text{If } \Delta = \begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = K(a-b)(b-c)(c-a), \text{ then } K =$$

Options :

-1

1. ✘

1

2. ✔

2

3. ✘

3

4. ✘

Question Number : 6 Question Id : 3426046 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

If  $x = \alpha, y = \beta, z = \gamma$  is the unique solution of the system of equations  $5x - 7y + 3z = 0$ ,  
 $7x + 10y - 8z = 3$  and  $2x + 3y - 4z + 4 = 0$ , then  $\beta =$

**Options :**

1.

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

2

2. ✓

-2

3. ✗

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

4. ✗

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Question Number : 7 Question Id : 3426047 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

If  $(a + ib)^{\frac{1}{4}} = 2 + 3i$ , then  $3b - 2a =$

Options :

-22

1. ✗

–122

2.

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-598

3. ✖

-698

4. ✖

**Question Number : 8 Question Id : 3426048 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

$\omega$  is a complex cube root of unity. Match the items of List-I to the items of List-II

List-I

List-II

A)  $\omega^{1010} + \omega^{2020}$

I) 0

B)  $(1 + \omega - \omega^2)(1 - \omega + \omega^2)$

II) 1

C)  $(2 + \omega^2 + \omega^4)^5$

III) -1

D)  $(3 + 5\omega + 3\omega^2)^3$

IV) 4

V) 8

The correct match is

**Options :**

A

B

C

D

III

IV

I

V

1.

A	B	C	D
I	IV	II	V

2. ✘

A	B	C	D
III	IV	II	V

3. ✔

A	B	C	D
III	I	II	IV

4. ✘

**Question Number : 9 Question Id : 3426049 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  $(z-4)^3 = 8i$  are  $a-2i, b+i$ , and  $c+i$ , then  $\sqrt{abc} =$

Options :

13√3

1. ✘

✘

$$4\sqrt{13}$$

2.

3.

$$2\sqrt{13}$$

$$5\sqrt{3}$$

4. ✖

**Question Number : 10 Question Id : 34260410 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0**

If  $\frac{\alpha}{\alpha+1}$  and  $\frac{\beta}{\beta+1}$  are the roots of the quadratic equation  $x^2 + 7x + 3 = 0$ , then the equation having roots  $\alpha$  and  $\beta$  is

**Options :**

$$3x^2 - x - 3 = 0$$

1. ✖

$$11x^2 + 13x + 3 = 0$$

2. ✔

$$13x^2 + 11x + 13 = 0$$

3. ✖

✖

$$11x^2 + 3x + 13 = 0$$

4.

Question Number : 11 Question Id : 34260411 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

If  $y = \frac{x^2 + 14x + 9}{x^2 + 2x + 3} \forall x \in \mathbb{R}$ , then the interval of maximum length in which  $y$  lies is

Options :

1. ✓  $[-5, 4]$

2. ✗  $[-4, 5]$

3. ✗  $\left[\frac{1}{3}, 3\right]$

4. ✗  $\left[\frac{-1}{3}, 3\right]$

Question Number : 12 Question Id : 34260412 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 whose roots are squares of the roots of  $x^4 - 2x^3 + 6x - 21 = 0$  is

**Options :**

$$x^4 - 4x^3 - 18x^2 - 36x + 441 = 0$$

1. ✓

$$x^4 + 18x^3 - 4x^2 + 36x + 441 = 0$$

2. ✗

$$x^4 - 2x^3 + 4x^2 + 6x + 441 = 0$$

3. ✗

$$x^4 + 3x^3 - 5x^2 + 6x + 441 = 0$$

4. ✗

Question Number : 13 Question Id : 34260413 Question Type : MCQ Option Shuffling : Yes  
 Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical  
 Correct Marks : 1 Wrong Marks : 0

If  $\alpha, \beta, \gamma$  are the roots of  $x^3 - x + 1 = 0$ , then  $\frac{1+\alpha}{1-\alpha} + \frac{1+\beta}{1-\beta} + \frac{1+\gamma}{1-\gamma} =$

Options :

1

1. ✓

0

2. ✗

2

3.

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-2

4. ✘

**Question Number : 14 Question Id : 34260414 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0**

$${}^{34}C_5 + \sum_{r=0}^4 (38-r) {}^{C_4} =$$

**Options :**

$$22 \times 39 {}^{C_4}$$

1. ✘

$$39 {}^{C_4}$$

2. ✘

$$3 \times 39 {}^{C_5}$$

3. ✘

$$39 {}^{C_5}$$

4.

**Question Number : 15 Question Id : 34260415 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**

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$$\text{If } {}^{22}P_{r+1} : {}^{20}P_{r+2} = 11:52 \text{ then } r =$$

Options :

3

1. ✘

5

2. ✘

7

3. ✔

9

4. ✘

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Question Number : 16 Question Id : 34260416 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The value of the numerically greatest term in the expansion of  $(2x + 3y)^{11}$  when  $x = \frac{1}{2}$

and  $y = \frac{1}{3}$  is

**Options :**

462

1.

$${}^{11}C_5 \left(\frac{2}{3}\right)^6$$

2. ✘

$${}^{11}C_6 \left(\frac{3}{2}\right)^5$$

3. ✘

576

4. ✘

**Question Number : 17 Question Id : 34260417 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  $x^4$  in the expansion of  $(1-x-x^2+x^3)^6$  is

**Options :**

120

1. ✘

15

2. ✘

-75

3.

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-60

4. ✓

**Question Number : 18 Question Id : 34260418 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 coefficients in the expansion of  $\left(1 + \frac{x}{2}\right)^{12}$  is

**Options :**

1. ✗ 0

2. ✗  $2^{11}$ 3. ✓  $\left(\frac{3}{2}\right)^{12}$ 4. ✗  $2^{12}$

**Question Number : 19 Question Id : 34260419 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

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For any quadratic polynomial  $f(x)$ , it is true that

$$f(x) = f(a) + f'(a)(x-a) + \frac{f''(a)}{2!}(x-a)^2, \text{ where } a \text{ is any real number.}$$

If  $\frac{3x^2 + 4x + 7}{(x-2)^3} = \frac{A}{(x-2)^3} + \frac{B}{(x-2)^2} + \frac{C}{(x-2)}$  and  $g(x) = 3x^2 + 4x + 7$  then

$$A + B + C =$$

**Options :**

$$g(2) + g'(2) + g''(2)$$

1. ✘

$$g''(2) + 2g(2) + \frac{g'(1)}{2!}$$

2. ✘

$$g(2) + g'(2) + \frac{g''(2)}{2!}$$

3. ✔

$$2g(2) + 2g'(2) + \frac{g''(2)}{2!}$$

4. ✘

**Question Number : 20 Question Id : 34260420 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

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$$\cot \frac{\pi}{16} \cdot \cot \frac{2\pi}{16} \cdot \cot \frac{3\pi}{16} \cdot \cot \frac{4\pi}{16} \cdot \cot \frac{5\pi}{16} \cdot \cot \frac{6\pi}{16} \cdot \cot \frac{7\pi}{16} =$$

Options :

0

1. ✘

1

2. ✔

$\frac{1}{2}$

3. ✘

2

4. ✘

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Question Number : 21 Question Id : 34260421 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

Let  $\triangle ACB$  be a triangle with right-angle at  $C$ . Let  $AB = 29$  units,  $BC = 21$  units and

$\angle ABC = \theta$ . Then  $\cos^2 \theta - \sin^2 \theta =$

Options :

1

1.

2.

$$\frac{41}{841}$$

3. ✘

$$\frac{40}{441}$$

4. ✘

$$\frac{41}{800}$$

Question Number : 22 Question Id : 34260422 Question Type : MCQ Option Shuffling : Yes  
 Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical  
 Correct Marks : 1 Wrong Marks : 0

$$\frac{1 - \cos 2\theta + \sin 2\theta}{1 + \cos 2\theta + \sin 2\theta} =$$

Options :

$$\cot \theta$$

1. ✘

$$\cos 2\theta$$

2. ✘

$\tan \theta$

3.

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$$\tan 2\theta$$

4. ✘

**Question Number : 23 Question Id : 34260423 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0**

Let  $y = 4\sin^2\theta - \cos 2\theta$ . If  $l$  and  $m$  are the minimum and maximum values of  $y$  respectively, then

**Options :**

1. ✔  $lm = \frac{m}{l}$

2. ✘  $lm = \frac{l}{m}$

3. ✘  $l + m = \frac{l}{m}$

4. ✘  $\frac{lm}{l-m} = 1 + m$

**Question Number : 24 Question Id : 34260424 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

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If  $\cos \theta = -\frac{1}{\sqrt{2}}$  and  $\tan \theta = 1$ , then the general value of  $\theta$  is

**Options :**

$$2n\pi + \frac{\pi}{4}, n = 0, 1, 2, 3, \dots$$

1. ✘

$$(2n+1)\pi + \frac{\pi}{4}, n = 0, 1, 2, 3, \dots$$

2. ✔

$$n\pi + \frac{\pi}{4}, n = 0, 1, 2, 3, \dots$$

3. ✘

$$n\pi \pm \frac{\pi}{4}, n = 0, 1, 2, 3, \dots$$

4. ✘

**Question Number : 25 Question Id : 34260425 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0**

If  $\sin^{-1} x < \cos^{-1} x$ , then

**Options :**

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

1.



$$-\sqrt{3} \leq x < -1$$

2. ✘

$$\frac{1}{\sqrt{2}} < x \leq 1$$

3. ✘

$$1 < x < \sqrt{3}$$

4. ✘

Question Number : 26 Question Id : 34260426 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$$\cot h^{-1}(2) + \operatorname{Cosec} h^{-1}(-2\sqrt{2}) =$$

Options :

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

1. ✔

$$\log \sqrt{6}$$

2. ✘

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

3.

4.

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

**Question Number : 27 Question Id : 34260427 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

In  $\triangle ABC$ ,  $\angle B = \frac{\pi}{4}$ ,  $\angle C = \frac{\pi}{3}$ . If the area of the triangle is  $54 + 18\sqrt{3}$  sq. units, then  $a =$

**Options :**

1. ✖  $\sqrt{3} + 1$
2. ✖  $2(\sqrt{3} + 1)$
3. ✖  $4(\sqrt{3} + 1)$
4. ✔  $6(\sqrt{3} + 1)$

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**Question Number : 28 Question Id : 34260428 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

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If  $a, b, c$  are the sides of a  $\Delta ABC$  and exradii  $r_1, r_2, r_3$  are respectively 12, 6, 4 then

$$a + 2b + 3c =$$

**Options :**

24

1. ✘

44

2. ✔

30

3. ✘

54

4. ✘

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**Question Number : 29 Question Id : 34260429 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  $a : b : c = 4 : 5 : 6$ , then  $\frac{1}{4R} [r_1 + r_2 + r_3] =$

**Options :**

✔

$$\frac{71}{64}$$

1.

2.

$$\frac{4}{5}$$

$$\frac{81}{84}$$

3. ✖

$$\frac{7}{9}$$

4. ✖

**Question Number : 30 Question Id : 34260430 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, with usual notation, if  $a = 12$ ,  $b = 16$ ,  $c = 20$ , then the ratio of the exradii of the triangle opposite to the angles in the order  $\angle C, \angle B, \angle A$  is

**Options :**

$$3 : 4 : 5$$

1. ✖

$$6 : 3 : 2$$

2. ✔

✖

12 : 7 : 5

3.

4.

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2 : 3 : 5

**Question Number : 31 Question Id : 34260431 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 vectors  $-3\bar{i} + 4\bar{j} + \lambda\bar{k}$  and  $\mu\bar{i} + 8\bar{j} + 6\bar{k}$  are collinear, then  $\lambda - \mu =$

**Options :**

0

1. ✘

-3

2. ✘

6

3. ✘

9

4. ✔

**Question Number : 32 Question Id : 34260432 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 vectors  $2\bar{k} - 3\bar{j}$  and  $\bar{i} - 2\bar{k}$  is

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$$\cos^{-1}\left(\frac{8}{\sqrt{65}}\right)$$

1. ✘

$$\cos^{-1}\left(\frac{-4}{\sqrt{65}}\right)$$

2. ✔

$$\cos^{-1}\left(\frac{2}{\sqrt{65}}\right)$$

3. ✘

$$\cos^{-1}\left(\frac{3}{\sqrt{13}}\right)$$

4. ✘

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Question Number : 33 Question Id : 34260433 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

Three vectors  $\vec{a}$ ,  $\vec{b}$  and  $\vec{c}$  satisfy  $\vec{a} + \vec{b} + \vec{c} = \vec{0}$ . If  $|\vec{a}| = 3$ ,  $|\vec{b}| = 4$ ,  $|\vec{c}| = 2$ , then

$$\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a} + 2(|\vec{a}| + |\vec{b}| + |\vec{c}|) =$$

Options :

$$\frac{-7}{2}$$

1.

$$\frac{7}{2}$$

2. ✓

$$\frac{-11}{2}$$

3. ✗

$$\frac{11}{2}$$

4. ✗

**Question Number : 34 Question Id : 34260434 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

$$(\bar{a} + 2\bar{b} - \bar{c}) \cdot \{(\bar{a} - \bar{b}) \times (\bar{a} - \bar{b} - \bar{c})\} =$$

Options :

$$2[abc]$$

1. ✗

$$[abc]$$

2. ✗



$$3[abc]$$

3.

4.

$$[abc]^2$$

Question Number : 35 Question Id : 34260435 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

If  $\vec{a} = \vec{i} + \vec{j} + \vec{k}$ ,  $\vec{c} = \vec{j} - \vec{k}$  are given vectors, then a vector  $\vec{b}$  satisfying the equations  $\vec{a} \times \vec{b} = \vec{c}$  and  $\vec{a} \cdot \vec{b} = 3$  is

Options :

$$5\vec{i} + 2\vec{j} + 2\vec{k}$$

1. ✘

$$\frac{5}{2}\vec{i} + \vec{j} + \vec{k}$$

2. ✘

$$\frac{5}{3}\vec{i} + \frac{2}{3}\vec{j} + \frac{2}{3}\vec{k}$$

3. ✔

$$\vec{i} + \frac{2}{5}\vec{j} + \frac{2}{5}\vec{k}$$

4. ✘

**Question Number : 36 Question Id : 34260436 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

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Let  $\vec{a} = 2\vec{i} - 3\vec{j} + \vec{k}$ ,  $\vec{b} = \vec{i} + 2\vec{j} - 3\vec{k}$ ,  $\vec{c} = \vec{i} - \vec{j}$  and  $\vec{d} = \vec{i} + \vec{j} + x\vec{k}$ . If  $(\vec{a} \times \vec{b}) \times \vec{c}$  is perpendicular to  $\vec{d}$ , then  $x =$

Options :

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

1. ✘

$$2$$

2. ✘

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

3. ✘

$$1$$

4. ✔

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Question Number : 37 Question Id : 34260437 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

If 10 is the mean of the data 2, 3, 5, 18, 17, 15, 13,  $x$ , 9 and 7, then the mean deviation of this data about its mean is

4.7

1.

4.8

2. ✓

4.9

3. ✘

5.0

4. ✘

**Question Number : 38 Question Id : 34260438 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

A, B, C are aiming to shoot a balloon. A will succeed 4 times out of 6 attempts. The chance of B to shoot the balloon is 3 out of 5 and that of C is 2 out of 3. If the three aim to shoot the balloon simultaneously, then the probability that at least two of them hit the balloon is

**Options :**

$$\frac{5}{9}$$

1. ✘

✘

$$\frac{9}{25}$$

2.

$$\frac{4}{9}$$

3.

$$\frac{32}{45}$$

4. ✓

**Question Number : 39 Question Id : 34260439 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

$\omega$  is a complex cube root of unity. When an unbiased die is thrown 3 times, if  $\beta_1, \beta_2, \beta_3$  are the numbers appeared on the die, then the probability that  $\beta_1, \beta_2$  and  $\beta_3$  satisfy  $\omega^{\beta_1} + \omega^{\beta_2} = -\omega^{\beta_3}$ , is

Options :

$$\frac{212}{513}$$

1. ✘

$$\frac{1}{3}$$

2. ✘

$$\frac{3}{5}$$

3. ✘

$$\frac{2}{9}$$

4.

**Question Number : 40 Question Id : 34260440 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

If  $P\left(\frac{A}{B}\right) = \frac{3}{10}$ ,  $P\left(\frac{B}{A}\right) = \frac{4}{5}$  and  $P(A \cup B) = K P(B)$ , then  $\frac{1}{K} =$

**Options :**

1. ✘  $\frac{40}{49}$

2. ✔  $\frac{40}{43}$

3. ✘  $\frac{100}{101}$

4. ✘ 1

**Question Number : 41 Question Id : 34260441 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 probability that an individual will suffer a bad reaction from an injection is 0.001, then the probability that out of 2000 individuals, exactly 3 individuals suffer a bad reaction is

**Options :**

1. ✓  $\frac{4}{3e^2}$

2. ✗  $\frac{2}{e^2}$

3. ✗  $\frac{2}{3e^2}$

4. ✗  $\frac{4}{5e^2}$

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**Question Number : 42 Question Id : 34260442 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0**

A fair coin is tossed 15 times. The probability that the tail will appear atleast thrice is

**Options :**

1.

$$1 - \frac{10^5}{2^{15}}$$

2. ✓

$$1 - \frac{121}{2^{15}}$$

3. ✘

$$1 - \frac{1}{2^{15}}$$

4. ✘

$$1 - \frac{16}{2^{15}}$$

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**Question Number : 43 Question Id : 34260443 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

A rod of length 6 units slides with its ends on the coordinate axes. The locus of the midpoint of the rod is

**Options :**

$$x^2 + y^2 = 9$$

1. ✓

$$x + y = 3$$

2.

$$x^2 + y^2 = 36$$

3. ✘

$$x + y = 6$$

4. ✘

**Question Number : 44 Question Id : 34260444 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0**

The transformed equation of the curve  $2x^2 + y^2 - 3x + 5y - 8 = 0$  when the origin is translated to the point  $(-1, 2)$  is

**Options :**

$$2x^2 + y^2 - 7x + 9y + 11 = 0$$

1. ✔

$$2x^2 + y^2 + 7x + 9y + 11 = 0$$

2. ✘

$$2x^2 + y^2 - x + y + 11 = 0$$

3. ✘

✘

$$2x^2 + y^2 + 7x - 9y + 11 = 0$$

4.

Question Number : 45 Question Id : 34260445 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The point on the line  $4x - y - 2 = 0$  which is equidistant from the points  $(-5, 6)$  and  $(3, 2)$  is

Options :

(2, 6)

1. ✘

(4, 14)

2. ✔

(1, 2)

3. ✘

(3, 10)

4. ✘

Question Number : 46 Question Id : 34260446 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The incentre of the triangle having the vertices  $(1, \sqrt{3})$ ,  $(0, 0)$  and  $(2, 0)$  is

**Options :**

1.

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

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

2. ✘

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

3. ✘

$$\left(1, \frac{1}{\sqrt{3}}\right)$$

4. ✔

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**Question Number : 47 Question Id : 34260447 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

If  $P'(a, b)$  is the image of the point  $P(-1, 2)$  with respect to the line  $x - 2y + 3 = 0$ , then the length of the perpendicular from  $P'$  on to the line  $2x + y - 7 = 0$  is

**Options :**

$$\frac{3}{\sqrt{5}}$$

1.

5

2. ✘

$$\frac{7}{\sqrt{5}}$$

3. ✔

7

4. ✘

**Question Number : 48 Question Id : 34260448 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 vertices of a triangle ABC are A(1, 7), B(-5, -1) and C(7, 4), then the equation of a bisector of ABC is

**Options :**

$$7x - 9y + 26 = 0$$

1. ✔

$$9x - 7y + 38 = 0$$

2. ✘

✘

3.

$$7x + 9y + 44 = 0$$

4.

$$9x + 7y + 52 = 0$$

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

**Question Number : 49 Question Id : 34260449 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0**

The combined equation of the two diameters of a circle which divide the circle into 4 sectors is  $ax^2 + 2hxy + by^2 = 0$ . If the area of the bigger sector is 5 times the area of the

smaller sector, then  $\frac{|a+b|}{\sqrt{(a-b)^2 + 4h^2}} =$

**Options :**

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

1. ✘

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

2. ✔

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

3. ✘

1

4. ✖

**Question Number : 50 Question Id : 34260450 Question Type : MCQ Option Shuffling : Yes**

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

Correct Marks : 1 Wrong Marks : 0

If  $9x^2 - 24xy + 16y^2 + \alpha x + \beta y + 6$  represents a pair of parallel lines of 1 unit apart and

one of those lines passes through (1,1) then  $\frac{\alpha}{\beta} =$

Options :

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

1. ✘

$$1$$

2. ✘

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

3. ✘

$$\frac{-3}{4}$$

4. ✔

Question Number : 51 Question Id : 34260451 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

If  $(a, b)$  is the centre of the circle passing through the vertices of the triangle formed by  $x + y = 6$ ,  $2x + y = 4$  and  $x + 2y = 5$ , then  $(a, b)$  is

**Options :**

$$(-17, -16)$$

1. ✘

$$\left(\frac{17}{2}, \frac{19}{2}\right)$$

2. ✔

$$(17, 18)$$

3. ✘

$$\left(\frac{-17}{2}, \frac{-19}{2}\right)$$

4. ✘

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**Question Number : 52 Question Id : 34260452 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 the mid points of the chords of the circle  $x^2 - 2x + y^2 = 0$  drawn from a point  $(0, 0)$  on it is

**Options :**

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

1. ✔

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

2.

3.

$$y^2 + x - 1 = 0$$

$$y + x^2 + 2x - 3 = 0$$

4. ✘

**Question Number : 53 Question Id : 34260453 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 possible common tangents that can be drawn to the circles

$x^2 + y^2 + 4x - 6y - 3 = 0$  and  $x^2 + y^2 + 4x - 2y + 1 = 0$  is

**Options :**

4

1. ✘

3

2. ✘

1

3. ✔

0

4.

**Question Number : 54 Question Id : 34260454 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**

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The equation of the circle passing through (1, 1) and through the points of intersection of the circles  $x^2 + y^2 + 13x - 3y = 0$  and  $2x^2 + 2y^2 + 4x - 7y - 25 = 0$  is

Options :

$$4x^2 + 4y^2 + 30x - 13y - 25 = 0$$

1. ✓

$$2x^2 + 2y^2 + 15x - 19y = 0$$

2. ✗

$$4x^2 + 4y^2 + 25x + 12y - 45 = 0$$

3. ✗

$$4x^2 + 4y^2 + 13x - 30y + 9 = 0$$

4. ✗

Question Number : 55 Question Id : 34260455 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 circles  $(x-2)^2 + (y-3)^2 = 25$  and  $25x^2 + 25y^2 - 40x - 70y - 160 = 0$  touch internally at  $(\alpha, \beta)$  then  $\alpha + \beta =$

0

1.

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-2

2. ✓

-1

3. ✘

1

4. ✘

**Question Number : 56 Question Id : 34260456 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 parabola whose focus and vertex are respectively at  $\left(\frac{5}{4}, -2\right)$  and  $(1, -2)$  is

(4, 0)

1. ✘

(15, 2)

2. ✘

✘

$(3, -1)$

3.

4.

(10, 1)

**Question Number : 57 Question Id : 34260457 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  $y^2 - 4x - 8y - 12 = 0$  are

**Options :**

1. ✘  $x = 7 + 2t, \quad y = -4 + t^2$

2. ✘  $x = -7 + 2t, \quad y = 4 + 2t$

3. ✘  $x = -7 + t^2, \quad y = -4 + 2t$

4. ✔  $x = -7 + t^2, \quad y = 4 + 2t$

**Question Number : 58 Question Id : 34260458 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

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A focus of an ellipse having eccentricity  $\frac{1}{2}$  is at  $(0, 0)$  and a directrix is the line  $x = 4$ .

Then the equation of one such ellipse is

**Options :**

$$\frac{9x^2}{64} + \frac{3y^2}{16} = 1$$

1. ✖

$$\frac{(2x+1)^2}{32} + \frac{y^2}{16} = 1$$

2. ✖

$$\frac{(3x+4)^2}{64} + \frac{y^2}{32} = 1$$

3. ✖

$$(3x+4)^2 + 12y^2 = 64$$

4. ✔

**Question Number : 59 Question Id : 34260459 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 (in square units) of the quadrilateral formed by joining the foci of the two

ellipses  $\frac{x^2}{9} + \frac{y^2}{5} = 1$  and  $\frac{x^2}{5} + \frac{y^2}{9} = 1$  is

**Options :**

4

1. ✘

2

2. ✘

6

3. ✘

8

4. ✔

**Question Number : 60 Question Id : 34260460 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0**

The lines  $x \cos \alpha + y \sin \alpha = P, \alpha \in \mathbb{R}$  are chords of the hyperbola  $\frac{x^2}{9} - \frac{y^2}{36} = 1$  and they subtend a right angle at the centre of the hyperbola. The locus of the poles of these lines with respect to the given hyperbola is

**Options :**

$$x^2 - 16y^2 = 108$$

1. ✘

$$16x^2 - y^2 = 108$$

2.

$$16x^2 + y^2 = 108$$

3. ✓

$$x^2 + 16y^2 = 108$$

4. ✗

**Question Number : 61 Question Id : 34260461 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0**

If  $\left(\frac{9}{4}, \frac{5}{4}, \frac{15}{4}\right)$  is the centroid of a tetrahedron whose vertices are  $(a, 2, 1)$ ,  $(1, b, 4)$ ,  $(4, 0, c)$  and  $(1, 1, 7)$ , then

**Options :**

$$a = b = c$$

1. ✗

$$a = b = c + 1$$

2. ✗

$$b = c = a + 1$$

3. ✗

$$a = c = b + 1$$

4.

**Question Number : 62 Question Id : 34260462 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 line making angles  $\frac{\pi}{4}, \frac{\pi}{3}$  and  $\theta$   $\left(0 < \theta < \frac{\pi}{2}\right)$  respectively  
with  $x, y$  and  $z$  axes, are

**Options :**

1. ✓  $\frac{1}{\sqrt{2}}, \frac{1}{2}, \frac{1}{2}$

2. ✗  $\frac{1}{\sqrt{2}}, \frac{1}{2}, \frac{\sqrt{3}}{2}$

3. ✗  $\frac{1}{\sqrt{2}}, \frac{1}{2}, \frac{1}{\sqrt{2}}$

4. ✗  $\frac{1}{\sqrt{2}}, \frac{\sqrt{3}}{2}, \frac{1}{\sqrt{2}}$

**Question Number : 63 Question Id : 34260463 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

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The point on the plane  $2x - 2y + 4z + 5 = 0$  that is nearer to  $\left(1, \frac{3}{2}, 2\right)$  is

Options :

$$\left(0, \frac{5}{2}, 0\right)$$

1. ✓

$$\left(-5, \frac{-5}{2}, 0\right)$$

2. ✗

$$\left(0, 0, \frac{-5}{4}\right)$$

3. ✗

$$\left(-\frac{1}{2}, 0, -1\right)$$

4. ✗

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Question Number : 64 Question Id : 34260464 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$$\lim_{x \rightarrow 1} \frac{\log x}{(1-x)} =$$

**Options :**

1.

1

-1

2. ✓

0

3. ✗

 $\frac{-1}{2}$ 

4. ✗

**Question Number : 65 Question Id : 34260465 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

Let  $f(x) = \frac{2 - \sqrt{x+4}}{\sin 2x}$ ,  $x \neq 0$ . In order that  $f(x)$  is continuous at  $x = 0$ ,  $f(0)$  is to be defined as

**Options :** $\frac{-1}{8}$ 

1. ✓

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

2.

1

3. ✘

 $\frac{1}{8}$ 

4. ✘

Question Number : 66 Question Id : 34260466 Question Type : MCQ Option Shuffling : Yes  
 Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical  
 Correct Marks : 1 Wrong Marks : 0

If  $f(x) = \begin{cases} 1 + \cos x, & x \leq 0 \\ a - x, & 0 < x \leq 2 \\ x^2 - b^2, & x > 2 \end{cases}$  is continuous everywhere, then  $a^2 + b^2 =$

Options :

4

1. ✘

8

2. ✔

✘

6

3.

4.

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**Question Number : 67 Question Id : 34260467 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0**

If  $x = 5(1 - \sin t)$ ,  $y = 5(t + \cos t)$ , then  $\frac{dx}{dy} =$

**Options :**

$$\frac{\sin t - 1}{\cos t}$$

1. ✘

$$\frac{\cos t}{\sin t - 1}$$

2. ✔

$$\tan \frac{t}{2}$$

3. ✘

$$\frac{\cos \frac{t}{2} - \sin \frac{t}{2}}{\cos \frac{t}{2} + \sin \frac{t}{2}}$$

4.

Question Number : 68 Question Id : 34260468 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

Let  $g: [-2, 2] \rightarrow \mathbb{R}$  and  $f: [-2, 2] \rightarrow \mathbb{R}$  are two functions defined as

$$g(x) = \begin{cases} -1, & \text{if } -2 \leq x < 0 \\ x^2 - 1, & \text{if } 0 \leq x \leq 2 \end{cases} \quad \text{and} \quad f(x) = |g(x)| + g(|x|) + 2. \quad \text{In the interval}$$

$(-2, 2)$ ,  $f$  is not differentiable at  $x =$

Options :

0

1. ✘

1

2. ✔

$\frac{1}{2}$

3. ✘

-1

4. ✘

Question Number : 69 Question Id : 34260469 Question Type : MCQ Option Shuffling : Yes

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

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Consider the following statements.

- a) If a function is differentiable at a point 'p' then it is not continuous at 'p'
- b) If a function is not continuous at  $x = a$ , then it is not differentiable at  $x = a$
- c) If  $f(x) = |x|$  then  $f(x)$  is not differentiable but continuous on  $\mathbb{R}$
- d) If  $f(x) = x - [x]$ , then  $f'(1) = 1$

Which of the above statements are (is) correct?

**Options :**

Only (b)

1. ✘

(b) and (c)

2. ✔

Only (c)

3. ✘

(c) and (d)

4. ✘

**Question Number : 70 Question Id : 34260470 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0**

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

**Options :**

1.

$$\frac{-6k}{(x+2y)^3}$$

$$\frac{-6k}{(x+2y)^2}$$

2. ✖

$$\frac{x^2 + xy + y^2}{(2x+y)^2}$$

3. ✖

0

4. ✖

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Question Number : 71 Question Id : 34260471 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The approximate value of  $(8.01)^{\frac{4}{3}} + (8.01)^2$  upto 3 decimal places is

Options :

80.116

1. ✖

80.216

2.

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80

3. ✘

80.186

4. ✔

Question Number : 72 Question Id : 34260472 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 at a point P on the curve  $y = 4x^4 + x$  is perpendicular to the tangent to the same curve at  $(0, 0)$ , then the point P is

Options :

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

1. ✔

$$\left(\frac{1}{2}, \frac{3}{4}\right)$$

2. ✘

$$(1, 5)$$

3. ✘

4.

**Question Number : 73 Question Id : 34260473 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**

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The angle between the curves  $2x^2 + y^2 = 20$  and  $4y^2 - x^2 = 8$  at a point where they intersect in the 4<sup>th</sup> quadrant is

Options :

0

1. ✘

$\frac{\pi}{2}$

2. ✔

$\frac{\pi}{4}$

3. ✘

$\frac{\pi}{6}$

4. ✘

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Question Number : 74 Question Id : 34260474 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  $f(x) = x(x+3)e^{\frac{-x}{2}}$  satisfies all the conditions of Rolle's theorem in  $[-3, 0]$ , then a root of  $f'(x) = 0$  is

3

1.

-1

2. ✘

-2

3. ✔

-3

4. ✘

Question Number : 75 Question Id : 34260475 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$$\int \frac{dx}{\sin x + \cos x} =$$

Options :

$$\frac{1}{\sqrt{2}} \log \left| \tan \left( \frac{x}{2} + \frac{\pi}{8} \right) \right| + C$$

1. ✔

$$\frac{1}{\sqrt{2}} \log \left| \tan \left( \frac{x}{2} + \frac{\pi}{4} \right) \right| + C$$

2. ✘

3.

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$$\frac{1}{\sqrt{2}} \log \left| \tan \left( \frac{x}{4} + \frac{\pi}{2} \right) \right| + C$$

$$\frac{1}{\sqrt{2}} \log \left| \tan \left( \frac{x}{8} + \frac{\pi}{2} \right) \right| + C$$

4. ✘

Question Number : 76 Question Id : 34260476 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$$\int (x+2)\sqrt{x+3} dx =$$

Options :

$$\frac{2}{15} \sqrt{x+3} (3x^2 - 13x + 12) + C$$

1. ✘

$$\frac{2}{15} \sqrt{x+3} (3x^2 + 13x + 12) + C$$

2. ✔

$$\frac{2}{5} \sqrt{x+3} (3x^2 - 12x + 13) + C$$

✘

3.

4.

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$$\frac{2}{5} \sqrt{x+3} (3x^2 + 12x + 13) + C$$

Question Number : 77 Question Id : 34260477 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$$\int \frac{(1 - \cos x)^{2/7}}{(1 + \cos x)^{9/7}} dx =$$

Options :

1. ✓  $\frac{7}{11} \left( \tan \frac{x}{2} \right)^{\frac{11}{7}} + C$

2. ✗  $\frac{7}{11} \left( \tan \frac{x}{2} \right)^{\frac{7}{11}} + C$

3. ✗  $\frac{7}{11} \left( \cot \frac{x}{2} \right)^{\frac{11}{7}} + C$

✗  $\frac{11}{7} \left( \cot \frac{x}{2} \right)^{\frac{7}{11}} + C$

4.

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Question Number : 78 Question Id : 34260478 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$$\int_5^9 \frac{\log 3x^2}{\log 3x^2 + \log(588 - 84x + 3x^2)} dx =$$

Options :

1. ✓ 2

2. ✗ 1

3. ✗  $\frac{1}{2}$

4. ✗ 4

Question Number : 79 Question Id : 34260479 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$$\int_{-1}^1 \frac{\log(1+x)}{1+x^2} dx = \int_0^1 \frac{\log(1+x)}{1+x^2} dx + \int_0^1 f(x) dx \text{ then } f(x) =$$

**Options :**

1.

$$\frac{\log(1+x)}{1+x^2}$$

2. ✘

$$-\frac{\log(1+x)}{1+x^2}$$

3. ✔

$$\frac{\log(1-x)}{1+x^2}$$

4. ✘

0

**Question Number : 80 Question Id : 34260480 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  $\frac{dy}{dx} = x + \sin x \cos y + x \cos y + \sin x$  is

Options :

$$\tan \frac{x}{2} = \frac{y^2}{2} - \cos y + C$$

1. ✘

$$y = x^2$$

2.

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3.

4.

## Physics

<b>Section Id :</b>	3426042
<b>Section Number :</b>	2
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	40
<b>Number of Questions to be attempted :</b>	40
<b>Section Marks :</b>	40
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	3426042
<b>Question Shuffling Allowed :</b>	Yes

Question Number : 81 Question Id : 34260481 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 incorrect?

$$\tan \frac{x}{2} = \frac{1 - \cos x}{1 + \cos x}$$

Options :

Conservation laws have deep connection with symmetries of nature

1. ✘

Weak nuclear force is weakest among all fundamental forces of nature

2. ✔

A conservation law is a hypothesis based on observations and experiments

3. ✘

In a nuclear process mass gets converted to energy or vice versa

4. ✘

**Question Number : 82 Question Id : 34260482 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

The dimensions of  $\sigma b^4$  where ' $\sigma$ ' is Stefan's constant and ' $b$ ' is Wien's constant are

**Options :**

1. ✘  $[M^0L^0T^0]$

2. ✔  $[ML^4T^{-3}]$

3. ✘  $[ML^{-2}T]$

4. ✘  $[ML^6T^{-3}]$

4.

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Question Number : 83 Question Id : 34260483 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 travels in a straight line along a road. Its distance 'x' from a stop sign is given as a function of 't' by the equation  $x(t) = \alpha t + \beta t^3$ , where  $\alpha = 2.0$  m/s,  $\beta = 0.01$  m/s<sup>3</sup>. Calculate the average velocity of the car in the time interval  $t = 2.00$  sec to 4.00 sec.

Options :

1. ✓ 2.28 m/s

2. ✗ 4.94 m/s

3. ✗ 3.34 m/s

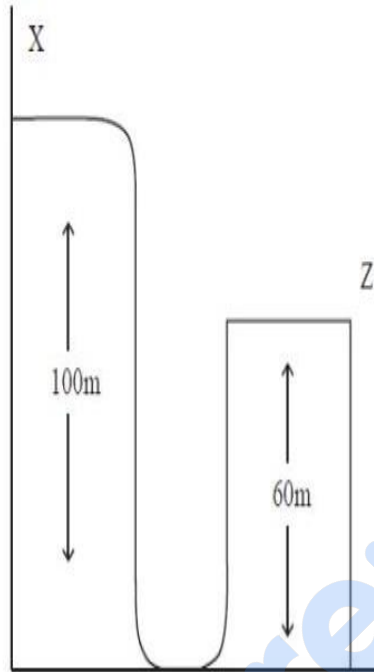
4. ✗ 4.12 m/s

Question Number : 84 Question Id : 34260484 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 driver is trying to jump across a path as shown in figure by driving horizontally off a cliff 'X' at the speed 10 m/s. When he touches peak Z (ignore air resistance), what would be speed?  
(use  $g = 10 \text{ m/s}^2$ )



**Options :**

1. ✓ 30 m/s
2. ✗ 40 m/s
3. ✗ 15 m/s
4. 50 m/s

**Question Number : 85 Question Id : 34260485 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**

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Find the angle between the two vectors:  $\vec{a} = 3\mathbf{i} + 2\mathbf{j} + 5\mathbf{k}$ ,  $\vec{b} = 5\mathbf{i} + 3\mathbf{j} + \mathbf{k}$

Options :

$$\cos^{-1}\left(\frac{26}{\sqrt{1330}}\right)$$

1. ✓

$$\sin^{-1}\left(\frac{26}{\sqrt{1330}}\right)$$

2. ✗

$$\cos^{-1}\left(\frac{26}{\sqrt{1335}}\right)$$

3. ✗

$$\tan^{-1}\left(\frac{26}{\sqrt{1330}}\right)$$

4. ✗

Question Number : 86 Question Id : 34260486 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 moves over a xy plane with a constant acceleration

$\vec{a} = (4.0 \text{ m/s}^2)\hat{i} + (4.0 \text{ m/s}^2)\hat{j}$ . At time  $t = 0$ , the velocity is  $(4.0 \text{ m/s})\hat{i}$ . The speed of the particle when it is displaced by 6.0 m parallel to the x-axis is

**Options :**

1. ✓  $4\sqrt{5}$  m/s

2. ✗  $\sqrt{60}$  m/s

3. ✗  $3\sqrt{10}$  m/s

4. ✗  $\sqrt{20}$  m/s

**Question Number : 87 Question Id : 34260487 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0**

Block A of mass 3 kg rests on another block B of mass 7 kg. The coefficient of friction between A and B is 0.4 while the coefficient of friction between B and the horizontal floor on which B rests is 0.55. Find the force of friction between A and B, when a horizontal force of 50 N is applied on the block B.  
(Use  $g=10$  m/s<sup>2</sup>)

**Options :**

1. ✓ 0

✗ 5 N

2.

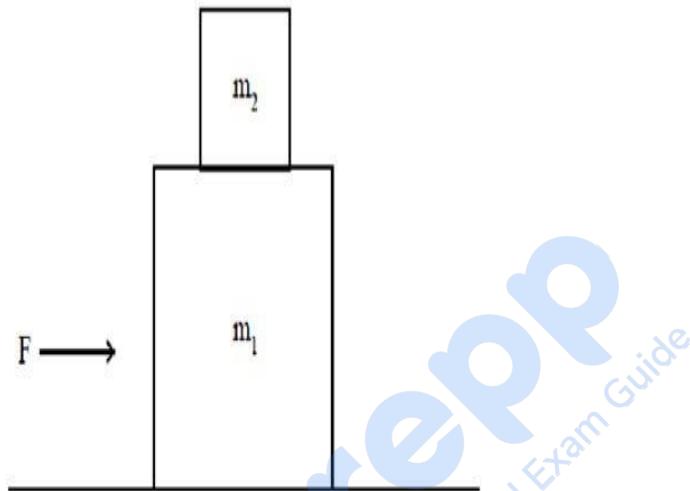
4 N

3.

1.2 N

4. ✖

**Question Number : 88 Question Id : 34260488 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**



What is the maximum force  $F$  that can be applied on block  $m_1$ , so that both  $m_1$  &  $m_2$  will move together? There is no friction between  $m_1$  and the horizontal table. The coefficient of friction between ' $m_1$ ' and ' $m_2$ ' is  $\mu$ .

**Options :**

1. ✖  $\mu m_2 g$

2. ✔  $\mu(m_1 + m_2)g$

✖  $\mu \frac{m_1 m_2}{(m_1 + m_2)} g$

3.

$\mu\text{m}_1\text{g}$

4.

**Question Number : 89 Question Id : 34260489 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

The potential energy of a particle in a central field has the form  $U(r) = \frac{1}{r^2} - \frac{1}{r}$ , where 'r' is the distance from the centre of the field. The magnitude of the maximum attractive force in Newton is

**Options :**

1. ✓  $\frac{1}{27}$

2. ✗  $\frac{1}{9}$

3. ✗  $\frac{1}{3}$

4. ✗ 1

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**Question Number : 90 Question Id : 34260490 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

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Consider a rocket is being fired. The kinetic energy of the rocket is increased by 16 times where as its total mass is reduced by half through the burning of fuel. The factor by which its momentum increases is

**Options :**

8

1. ✘

$2\sqrt{2}$

2. ✔

4

3. ✘

$4\sqrt{2}$

4. ✘

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**Question Number : 91 Question Id : 34260491 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

A rigid body of mass  $M$  and radius  $R$  rolls without slipping on an inclined plane of inclination  $\theta$ , under gravity. Match the type of body Column I with magnitude of the force of friction Column II.

Column I	Column II
A) For ring	I) $\frac{Mg \sin \theta}{2.5}$
B) For solid sphere	II) $\frac{Mg \sin \theta}{3}$
C) For solid cylinder	III) $\frac{Mg \sin \theta}{3.5}$
D) For hallow cylinder	IV) $\frac{Mg \sin \theta}{2}$

**Options :**

A	B	C	D
IV	III	II	IV
A	B	C	D
I	II	IV	IV

1. ✓

2. ✗

A

B

C

D

II

I

IV

III

3. ✖

A	B	C	D
II	IV	I	III

4. ✘

**Question Number : 92 Question Id : 34260492 Question Type : MCQ Option Shuffling : Yes****Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical****Correct Marks : 1 Wrong Marks : 0**

A small disc of mass 500 gm and radius 5 cm rolls down an inclined plane without slipping. Speed of its center of mass when it reaches the bottom of the incline plane depends on

**Options :**

1. ✘ mass &amp; radius

2. ✘ mass &amp; height of the incline

3. ✘ height of the incline

4. ✔ height of the incline and acceleration due to gravity

**Question Number : 93 Question Id : 34260493 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

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A body of mass 1 kg is executing simple harmonic motion (SHM). Its displacement

$y$  (in cm) at time  $t$  given by  $y = \left[ 6 \sin \left( 100t + \frac{\pi}{4} \right) \right]$  cm. Its maximum kinetic energy is

**Options :**

1.8 J

1. ✘

18 J

2. ✔

180 J

3. ✘

0.18 J

4. ✘

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**Question Number : 94 Question Id : 34260494 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

What is the change in mass of a body, when taken 64 km below the surface of the earth?

[Take radius of the earth as 6400 km]

**Options :**

Increases by 2%

1. ✘

Remain constant

2.

3.

Increases by 1%

Decrease by 1%

4. ✘

**Question Number : 95 Question Id : 34260495 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 rod of length 1.0 m with a cross-sectional area of  $0.50 \text{ cm}^2$ . The rod supports a 500-kg platform that hangs attached to the rod's lower end. What is elongation of the rod under the stress ignoring the weight of the rod? Consider the Young's modulus to be  $10^{11} \text{ Pa}$  and  $g = 10 \text{ m/s}^2$ .

**Options :**

1. ✘

2 mm

2. ✘

0.5 mm

3. ✘

1.5 mm

4. ✔

1 mm

**Question Number : 96 Question Id : 34260496 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

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Water is pumped steadily out of a flooded basement, at the speed of 10 m/s through a hose (tube) of radius 1 cm, passing through a window 3 m above the water level. The power of the pump is

(Assume  $g = 10 \text{ m/s}^2$ , density of water =  $1000 \text{ kg/m}^3$ )

**Options :**

1. ✓  $80\pi \text{ W}$

2. ✗  $30\pi \text{ W}$

3. ✗  $50\pi \text{ W}$

4. ✗  $90\pi \text{ W}$

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**Question Number : 97 Question Id : 34260497 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

A U-shaped tube is partially filled with an incompressible liquid of density  $1.2 \text{ g/cm}^3$ . Oil which does not mix with the liquid is next poured into left side of the U-tube until the liquid rises by 15 cm on the right side of U-tube. If the density of the oil is  $0.9 \text{ g/cm}^3$ , the oil level will stand higher than the liquid level of right side of U-tube by

**Options :**

✗  $15 \text{ cm}$

1.

10 cm

2.

3. ✘ 12 cm

4. ✘ 9 cm

**Question Number : 98 Question Id : 34260498 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 linear expansivity to the co-efficient of a real expansion of a rectangular sheet of a solid is

**Options :**

1. ✘ 2

2. ✔ 0.5

3. ✘ 1

4. ✘ 1.5

**Question Number : 99 Question Id : 34260499 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

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Two rods whose lengths are  $l_1$  and  $l_2$  with heat conductivity co-efficients  $k_1$  and  $k_2$  are placed end to end. The heat conductivity coefficient of a uniform rod of length  $l_1 + l_2$  whose conductivity is same as that of the system of these two rods is

**Options :**

1. ✓ 
$$\frac{(l_1 + l_2)k_1k_2}{k_2l_1 + k_1l_2}$$

2. ✗ 
$$\frac{(l_1 + l_2)k_1k_2}{k_1l_1 + k_2l_2}$$

3. ✗ 
$$\frac{k_1l_1 + k_2l_2}{(l_1 + l_2)k_1k_2}$$

4. ✗ 
$$\frac{k_1l_2 + k_2l_1}{(l_1 + l_2)k_1k_2}$$

**Question Number : 100 Question Id : 342604100 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 two stage Carnot engine. In the first stage heat  $Q_1$  is absorbed at temperature  $T$  and heat  $Q_2$  is expelled at temperature  $\alpha T$  (where  $\alpha < 1$ ). In the second stage heat  $Q_2$  is absorbed at temperature  $\alpha T$  and heat  $Q_3$  is expelled at temperature  $\beta T$  ( $\beta < \alpha$ ). The efficiency of the Carnot engine will be

**Options :**

$$1 - \alpha - \beta$$

1. ✘

$$1 - \alpha$$

2. ✘

$$1 - \beta$$

3. ✔

$$1 - \alpha\beta$$

4. ✘

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**Question Number : 101 Question Id : 342604101 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

A diatomic gas of volume  $2 \text{ m}^3$  at a pressure  $2 \times 10^5 \text{ N/m}^2$  is compressed adiabatically to a volume  $0.5 \text{ m}^3$ . The work done in this process is.

[ Use  $4^{1.4} = 6.96$  ]

**Options :**

$$2.96 \times 10^5 \text{ J}$$

1.

2.



$$- 2.96 \times 10^5 \text{ J}$$

3. ✓  $- 7.4 \times 10^5 \text{ J}$

4. ✗  $7.4 \times 10^5 \text{ J}$

**Question Number : 102 Question Id : 342604102 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

As per kinetic theory of gases which of the following statements is / are true?

- a) Temperature of a gas is a measure of average kinetic energy of a molecule
- b) Temperature of a gas depends on the nature of the gas
- c) Heavier molecule has lower average speed
- d) Lighter molecule has lower average speed

**Options :**

1. ✗ a & b are true

2. ✗ b & c are true

3. ✓ a & c are true

b & d are true

4.

**Question Number : 103 Question Id : 342604103 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

A wave is represented by the equation  $y = (0.02 \text{ m})\sin(5\pi x - 20t)$ . The minimum distance between the two particles always having the same speed is. (Assume  $x$  and  $t$  are in SI units)

**Options :**

1. ✘ 0.02 m

2. ✘ 0.4 m

3. ✘ 0.8 m

4. ✔ 0.2 m

**Question Number : 104 Question Id : 342604104 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

A screen is placed 90 cm from an object. The image is formed by using a convex lens twice on the screen by putting the lens at two different locations separated by 20 cm. The focal length of the lens is approximately equal to

**Options :**

21.38 cm

1.

2. ✘ 30.0 cm

3. ✘ 35.0 cm

4. ✘ 24 cm

**Question Number : 105 Question Id : 342604105 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0**

What would be the angular separation between the consecutive bright fringes in Young's double slit experiment with blue green light of wavelength 400 nm? The separation between the slits is 0.001 m.

**Options :**

1. ✔  $4 \times 10^{-4}$  rad

2. ✘  $3 \times 10^{-4}$  rad

3. ✘  $2 \times 10^{-4}$  rad

✘

4.  $1 \times 10^{-4} \text{ rad}$

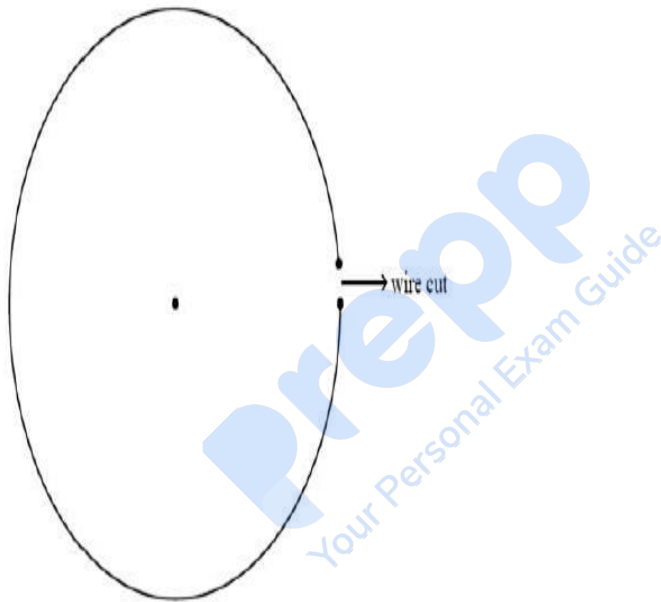
Question Number : 106 Question Id : 342604106 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A circular wire loop of radius 10 cm carries a total charge of  $10^{-5}$  C distributed uniformly over its length. A small length of  $3.14 \times 10^{-6}$  m of wire is cut off. The magnitude of electric field at the center due to the remaining wire is

(Assume  $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9$  SI units)



Options :

1.

2.

3.

4.

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✘ 30 N/C

✘ 40 N/C

✘ 35 N/C

**Question Number : 107 Question Id : 342604107 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 charged cylindrical capacitor. The magnitude of electric field  $\vec{E}$  in its annular region

**Options :**

1. ✓  Varies as  $\frac{1}{r}$ , where r is the distance from its axis

2. ✗  Zero

3. ✗  Is same throughout and  $|\vec{E}| > 0$

4. ✗  Varies as  $\frac{1}{r^2}$ , where r is the distance from its axis

**Question Number : 108 Question Id : 342604108 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

A spherical capacitor consists of two concentric spherical conductors. Find the capacitance of the spherical capacitor if the outer radius is  $2R$  and the inner radius is  $R$ .

**Options :**

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1. ✘  $4\pi\epsilon_0 R$

2. ✔  $8\pi\epsilon_0 R$

3. ✘  $\frac{8\pi\epsilon_0}{R}$

4. ✘  $\frac{4\pi\epsilon_0}{R}$

Question Number : 109 Question Id : 342604109 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 of length  $l$  carries a current  $I$  along the  $X$ - axis. The magnetic force acting on the wire is given by  $\vec{F} = IB_0 L (\hat{k} - \hat{j})$  T where  $B_0$  is a constant. The existing magnetic field  $\vec{B}$  is

Options :

1. ✘  $B_0 (\hat{i})$

$$B_0(\hat{i} + \hat{j} - \hat{k})$$

2.

3. ✓  $B_0 \left( \hat{i} + \hat{j} + \hat{k} \right)$

4. ✗  $B_0 \left( \hat{i} - \hat{j} - \hat{k} \right)$

**Question Number : 110 Question Id : 342604110 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

Two long wires with no contact are placed perpendicular to each other.  $i_1$  and  $i_2$  are currents flowing through these wires respectively. The magnetic force on a small length ' $dl$ ' of the second wire situated at a distance ' $l$ ' from first wire is proportional to

**Options :**

1. ✓  $i_1 i_2$

2. ✗  $l$

3. ✗  $\frac{1}{i_1 i_2}$

4.

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Question Number : 111 Question Id : 342604111 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A solenoid has a core of a material with relative permeability 501. The windings of the solenoid are insulated from the core and carry a current of 2.5 A. If the number of turns are 900 per metre. The magnetization in A/m is

Options :

1. ✓  $1.125 \times 10^6$

2. ✗  $2.8 \times 10^6$

3. ✗  $2.25 \times 10^6$

4. ✗  $1.69 \times 10^6$

Question Number : 112 Question Id : 342604112 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A long straight solenoid with cross sectional radius 'a' and number of turns per unit length 'n' has a current varying with time as  $I(As^{-1})$ . The magnitude of the electric field as a function of distance 'r' from the solenoid axis is

Options :

$$\frac{n\mu_0 a^2 I}{2r}$$

1.

2. ✘  $\frac{\mu_0 I n}{2a}$

3. ✘  $\frac{n a^2 I}{2 \mu_0 r}$

4. ✘  $\frac{\mu_0 I a}{2n}$

Question Number : 113 Question Id : 342604113 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

An alternating current is given by  $i = 2 \sin \omega t + 6 \cos \omega t$ . The rms current in amperes is

Options :

1. ✔  $2\sqrt{5}$

2. ✘  $2\sqrt{10}$

✘

3.  $\sqrt{5}$

4.  $10\sqrt{2}$

**Question Number : 114 Question Id : 342604114 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 EM Wave, the electric and magnetic fields are 300 V/m and 7.9 A/m respectively.  
The maximum rate of energy flow is

**Options :**

1. ✘  $2730 \frac{\text{watt}}{\text{m}^2}$

2. ✘  $2790 \frac{\text{watt}}{\text{m}^2}$

3. ✔  $2370 \frac{\text{watt}}{\text{m}^2}$

4. ✘  $2390 \frac{\text{watt}}{\text{m}^2}$

**Question Number : 115 Question Id : 342604115 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 particle has the shortest de-Broglie wavelength?

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1. ✘ Proton

2. ✘ Electron

3. ✔  $\alpha$  – particle

4. ✘ X – rays

Question Number : 116 Question Id : 342604116 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

Hydrogen atom in the ground state absorbs  $\Delta E$  amount of energy. If the orbital angular momentum of the electron is increased by  $\frac{h}{2\pi}$  ( $h \equiv$  Plank constant), then the magnitude of  $\Delta E$  is

Options :

1. ✘ 12.09 eV

2. ✘ 12.75 eV

3.  $10.2 \text{ eV}$

13.6 eV

4. ✘

**Question Number : 117 Question Id : 342604117 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 nuclear reactor, the main purpose of the moderator is to

**Options :**

1. ✘ Initiate the fission process by giving away its neutron

2. ✔ Slow down the fast neutrons

3. ✘ Cool down the excess of heat generated in the reactor

4. ✘ Absorb excess of neutrons and control the reaction rate

**Question Number : 118 Question Id : 342604118 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 temperature of the semi-conductor is increased, which of the following is correct statement?

**Options :**

1.

2. ✘ The number of electrons in valence band increases

3. ✔ The number of electrons in conduction band increases

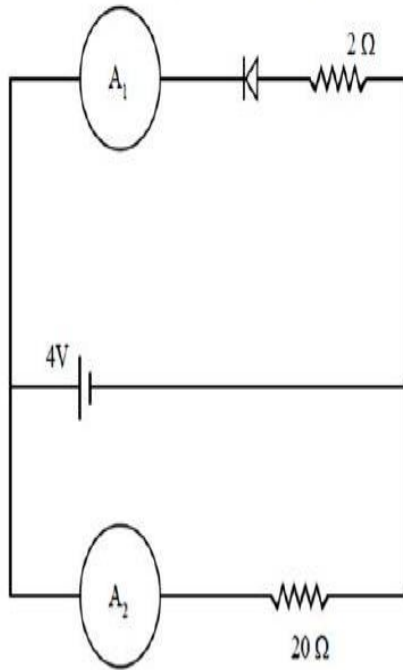
4. ✘ The number of holes in valence band decreases

**Question Number : 119 Question Id : 342604119 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

Two ammeters  $A_1$  and  $A_2$  are connected as shown in the given figure. By neglecting the internal resistance of the ammeters, the reading in the meter  $A_1$  is



**Options :**

1.

2. ✓ 0 A

3. ✘ 1 A

4. ✘ 4 A

Question Number : 120 Question Id : 342604120 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A message signal of frequency  $f_m$  is used to modulate a carrier of frequency  $f_c$ . If the side bands are  $f_1$  and  $f_2$  then the ratio  $\frac{f_c}{f_m}$  is

Options :

1. ✓  $\left| \frac{f_1 + f_2}{f_2 - f_1} \right|$

✘  $\frac{(f_1 + f_2)^2}{f_1 f_2}$

2.

3.



$$\left| \frac{f_1 - f_2}{f_2 + f_1} \right|$$

4.

## Chemistry

<b>Section Id :</b>	3426043
<b>Section Number :</b>	3
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	40
<b>Number of Questions to be attempted :</b>	40
<b>Section Marks :</b>	40
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	3426043
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 121 Question Id : 342604121 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

Heisenberg's uncertainty principle is in general significant to

$$\frac{f_1 f_2}{(f_1 + f_2)^2}$$

✘

1. ✘ planets
2. ✘ cricket ball of 500 g
3. ✘ cars
4. ✔ micro particles having a very high speed

Question Number : 122 Question Id : 342604122 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 relations is correct, if the wavelength ( $\lambda$ ) is equal to the distance travelled by the electron in one second?

$h$  is the planck's constant and  $m$  is the mass of electron

Options :

1. ✘  $\lambda = h/p$
2. ✘  $\lambda = h/m$

$$\lambda = \sqrt{h/p}$$

3.

$$\lambda = \sqrt{h/m}$$

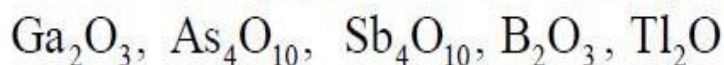
4. ✓

Question Number : 123 Question Id : 342604123 Question Type : MCQ Option Shuffling : Yes

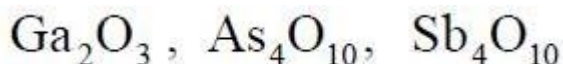
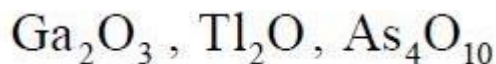
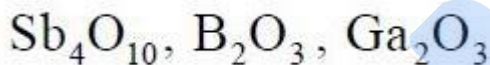
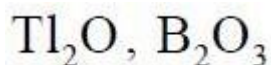
Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The set of amphoteric oxides among the given oxides are



Options :



Question Number : 124 Question Id : 342604124 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The first ionisation energies (in  $\text{kJ mol}^{-1}$ ) of four consecutive elements of the second period are given in the options. The first ionisation energy of nitrogen is

1. ✘ 1086

2. ✔ 1402

3. ✘ 1681

4. ✘ 1314

Question Number : 125 Question Id : 342604125 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

Highest covalent character is found in which of the following?

Options :

1. ✘  $\text{CaF}_2$

2. ✘  $\text{CaCl}_2$

✘  $\text{CaBr}_2$

3.

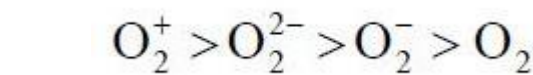
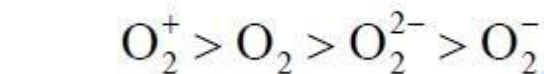
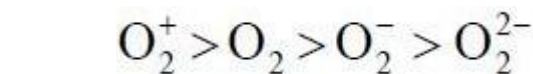
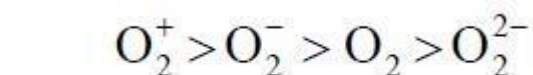
4.

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**Question Number : 126 Question Id : 342604126 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 sequence of bond order is

Options :



**Question Number : 127 Question Id : 342604127 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 probable velocity of a gas at 7200 K is equal to the RMS velocity of He gas at 27 °C. The gas is

Options :

0

1.

2.

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3. ✘  $N_2$

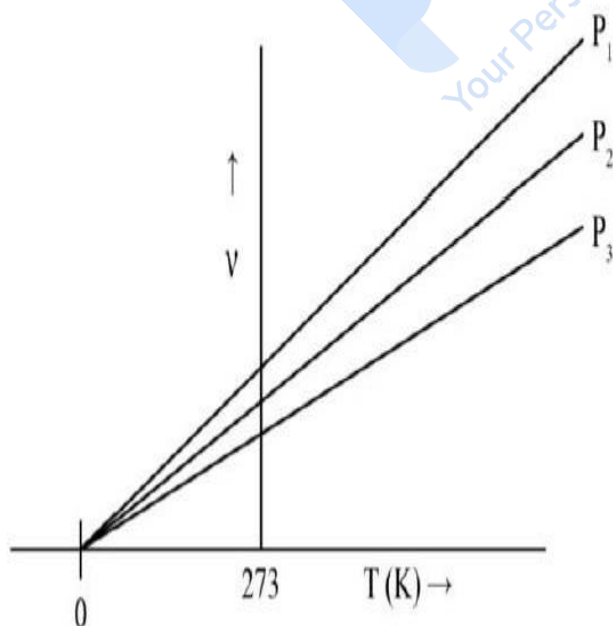
4. ✔  $SO_2$

Question Number : 128 Question Id : 342604128 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A plot of volume of the gas Versus T (K) is shown below. Which of the options is correct for the plot?



Options :

$$P_1 < P_2 < P_3$$

1.

2.



$$P_3 < P_2 < P_1$$

3. ✘  $P_1 = P_2 \neq P_3$

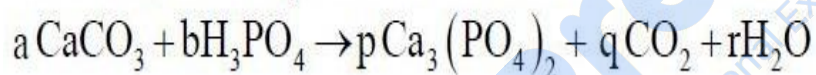
4. ✘  $P_1 = P_2 = P_3 = 0$  at 273 K

**Question Number : 129 Question Id : 342604129 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 balanced equation of the following reaction, the ratio of a/b is a



**Options :**

1. ✘  $2/3$

2. ✔  $3/2$

3. ✘  $1/2$

4.  $7/5$

**Question Number : 130 Question Id : 342604130 Question Type : MCQ Option Shuffling : Yes**

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

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The number of grams of oxygen in 32.2 g of  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$  is approximately

Options :

1. ✘ 32.2 g

2. ✔ 22.4 g

3. ✘ 11.2 g

4. ✘ 64.4 g

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Question Number : 131 Question Id : 342604131 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

Enthalpy of hydrogenation of one mole of benzene to cyclohexane is

[Resonance energy of benzene =  $-150.4$  kJ/mole.

Enthalpy of hydrogenation of cyclohexene =  $-119.5$  kJ/mole]

Options :

1. ✔  $-208.1$  kJ/mole

2.

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3. ✖ +150.4 kJ/mole

4. ✖ - 269.9 kJ/mole

**Question Number : 132 Question Id : 342604132 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-1 Acid	List-2 Ka (ionization constant)
A) HCN	I) $6.8 \times 10^{-4}$
B) $\text{H}_2\text{C}_2\text{O}_4$	II) $8.9 \times 10^{-8}$
C) $\text{H}_2\text{S}$	III) $4.9 \times 10^{-10}$
D) Niacin	IV) $5.6 \times 10^{-2}$
	V) $1.5 \times 10^{-5}$

The correct match is

**Options :**

A

B

C

D

I

III

IV

V

1.

2.

A	B	C	D
V	II	III	IV

A	B	C	D
II	III	IV	V

3. ✘

A	B	C	D
III	IV	II	V

4. ✔

**Question Number : 133 Question Id : 342604133 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 molar concentrations of base and its conjugate acid are same, then pOH of the buffer solution is

**Options :**1. ✔ same as  $pK_b$  of base2. ✘ same as  $pK_a$  of basesame as  $pK_a$  of acid

3.

4.

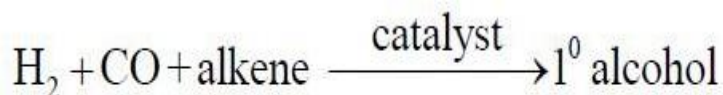
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same as  $pK_b$  of acid

Question Number : 134 Question Id : 342604134 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0



What is the stable intermediate and the nature of the reaction?

Options :

1. ✘ acid, reduction

2. ✘ aldehyde, oxidation

3. ✔ aldehyde, reduction

4. ✘ alcohol, oxidation

Question Number : 135 Question Id : 342604135 Question Type : MCQ Option Shuffling : Yes

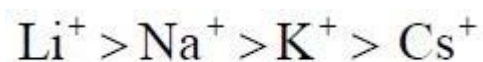
Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

**Correct Marks : 1 Wrong Marks : 0**

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The correct order of electrical conductivity of alkali metals ions in their aqueous solution for  $\text{Cs}^+$ ,  $\text{K}^+$ ,  $\text{Na}^+$  and  $\text{Li}^+$  is

**Options :**



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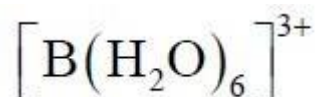
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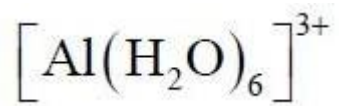
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

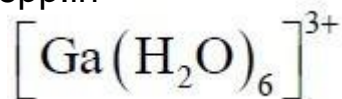
Which of the following complex ions does not exist?

**Options :**

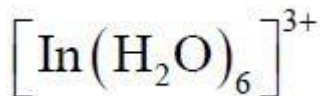




2.



3. ✖



4. ✖

**Question Number : 137 Question Id : 342604137 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 are correct?

- a) The isotope of carbon containing 7 neutrons has natural abundance of 1.1 %
- b) Among the IVA group elements, Sn has the lowest melting point
- c) Silicon is the 2<sup>nd</sup> (by mass) most abundant element in the earth's crust
- d) Elemental carbon shows the highest electrical resistivity among the 14 group elements

**Options :**

a, c and d only

1. ✖

a, b and c only

2. ✖

b, c and d only

3. ✖

4. a, b, c and d

**Question Number : 138 Question Id : 342604138 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 chemicals can be used as dry cleaning agents?

- a)  $\text{Cl}_2\text{C}=\text{CCl}_2$
- b)  $\text{CO}_2(\text{liq})$
- c)  $\text{H}_2\text{O}_2$
- d)  $\text{CH}_3\text{CHO}$

**Options :**

- 1. ✘ a, b, c and d
- 2. ✔ a, b and c only
- 3. ✘ b, c and d only
- 4. ✘ a and b only

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**Question Number : 139 Question Id : 342604139 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  $sp$  and  $sp^2$  carbon in Hepta-1, 3-dien-5-yne, respectively, are

**Options :**

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1. ✓ 2, 4

2. ✗ 4, 3

3. ✗ 2, 2

4. ✗ 2, 5

**Question Number : 140 Question Id : 342604140 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

When propyne is passed through a red hot iron tube at 873 K, the reaction gives product having molecular formula of

**Options :**

1. ✗  $C_7H_8$

2. ✓  $C_9H_{12}$

✗  $C_8H_{10}$

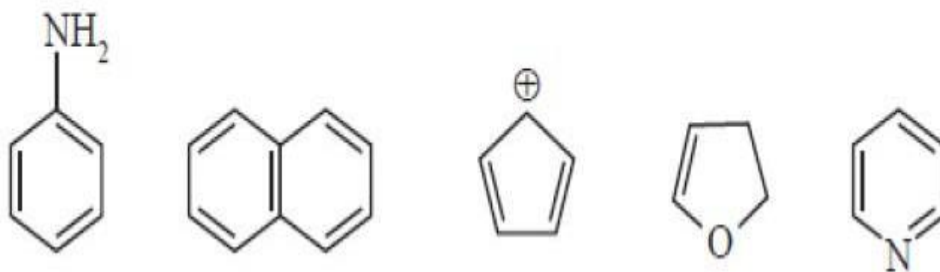
3.

4.

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**Question Number : 141 Question Id : 342604141 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

Total number of aromatic compounds from below is



**Options :**

1. ✘ 2

2. ✔ 3

3. ✘ 4

4. ✘ 5

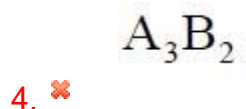
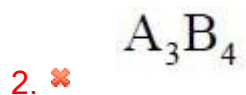
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**Question Number : 142 Question Id : 342604142 Question Type : MCQ Option Shuffling : Yes**  
**Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical**  
**Correct Marks : 1 Wrong Marks : 0**

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A compound made up of elements A and B (with a general formula  $A_x B_y$ ), where B form a hcp lattice and A occupy  $2/3^{\text{rd}}$  of the tetrahedral voids. The formula of the compound is

**Options :**



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**Question Number : 143 Question Id : 342604143 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 density of a 2 M solution of ethylene glycol in water is 1.11 g/ml, the molality (in 'm') of the solution is approximately

**Options :**



2.

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3. ✓ 2.05

4. ✗ 2.15

**Question Number : 144 Question Id : 342604144 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

Given

Sol A: Phenol and aniline

Sol B : Chloroform and acetone

Which of following is correct as per Raoult's law?

**Options :**

1. ✗ Sol A shows -ve and B shows +ve deviation

2. ✓ Both solutions A and B show -ve deviation

3. ✗ Sol A shows +ve and B shows -ve deviation

4.

**Question Number : 145 Question Id : 342604145 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

Salts of A (atomic weight 8), B (atomic weight 18) and C (atomic weight 50) were electrolysed under identical conditions using the same quantity of electricity. It was found that 2.4 g of A was deposited, the weight of B and C deposited are 1.8 g and 7.5 g respectively. The valences of A, B and C are, respectively,

**Options :**

1. ✘ 3, 1 and 2

2. ✘ 1, 2 and 3

3. ✔ 1, 3 and 2

4. ✘ 3, 2 and 1

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**Question Number : 146 Question Id : 342604146 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

What will be the overall order of a reaction for which the rate expression is given as

$$\text{Rate} = K[A]^{\frac{1}{2}} [B]^{\frac{3}{2}}$$

**Options :**

second order

1.

first order

2. ✖

zero order

3. ✖

third order

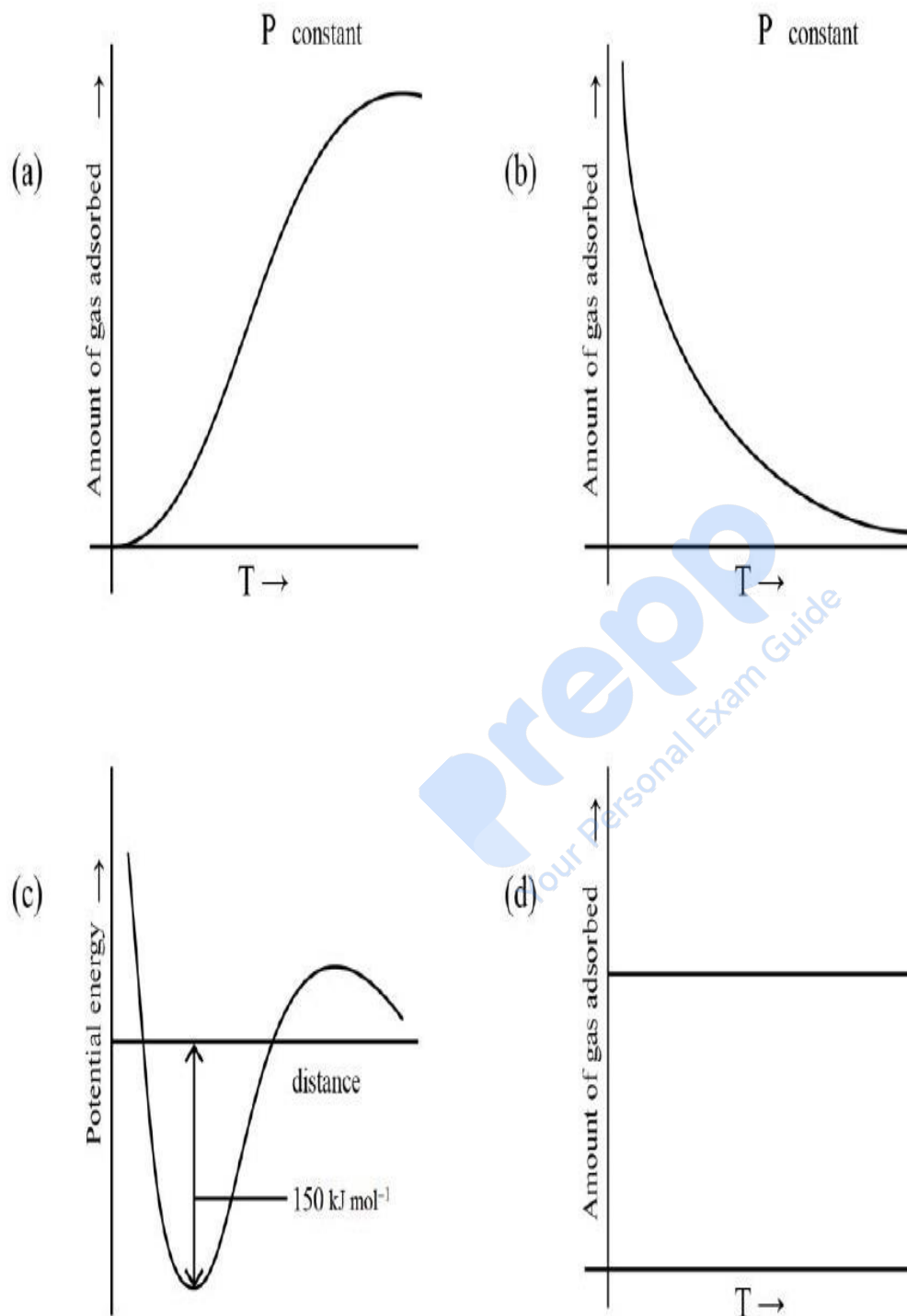
4. ✖

**Question Number : 147 Question Id : 342604147 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 are correct?



Options :

a and c represent physisorption

a and d represent physisorption

2. ✖

a and c represent chemisorption

3. ✓

b and c represent chemisorption

4. ✗

**Question Number : 148 Question Id : 342604148 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

The main products formed when copper metal is reacted with concentrated  $\text{HNO}_3$  are

**Options :**

1. ✗  $\text{Cu}(\text{NO}_3)_2 ; \text{NO}$

2. ✗  $\text{Cu}(\text{NO}_3)_2 ; \text{H}_2$

3. ✓  $\text{Cu}(\text{NO}_3)_2 ; \text{NO}_2$

4. ✗  $\text{Cu}(\text{NO}_3) ; \text{NO}$

**Question Number : 149 Question Id : 342604149 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

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Assertion (A) :  $\text{SF}_6$  is highly stable

Reason (R) :  $\text{SF}_6$  is a gas

The correct option among the following is

**Options :**

1. ✘ (A) is true, (R) is true and (R) is the correct explanation for (A)
2. ✔ (A) is true, (R) is true but (R) is not the correct explanation for (A)
3. ✘ (A) is true but (R) is false
4. ✘ (A) is false but (R) is true

**Question Number : 150 Question Id : 342604150 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

Complete hydrolysis of  $\text{XeF}_4$  and  $\text{XeF}_6$  gives its oxides P and Q, respectively. Identify P and Q

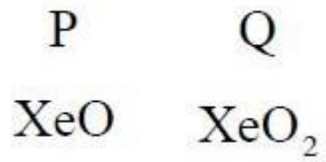
**Options :**

P

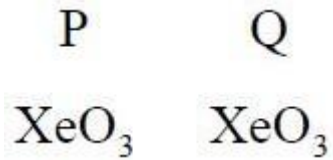
Q



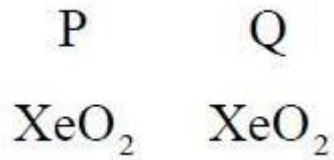
1.



2. ✖



3. ✔



4. ✖

Question Number : 151 Question Id : 342604151 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

Column-1 Reaction	Column-2 Main product
A) $4\text{FeCl}_3 + 3\text{K}_4[\text{Fe}(\text{CN})_6] \rightarrow$	I) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$
B) $\text{ZnCl}_2 + 4\text{NaOH} \rightarrow$	II) $\text{FeCl}_2$
C) $2\text{FeCl}_3 + \text{H}_2\text{S} \rightarrow$	III) $\text{Zn}(\text{OH})\text{Cl}$
	IV) $\text{Fe}_3[\text{Fe}(\text{CN})_6]_3$
	V) $\text{Na}_2\text{ZnO}_2$
	VI) $\text{FeS}$

The correct match is

Options :

A	B	C
I	III	VI

1.

2.

A	B	C
IV	V	II

3.

A	B	C
IV	III	VI

4.

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✘

A	B	C
I	V	II

✔

✘

**Question Number : 152 Question Id : 342604152 Question Type : MCQ Option Shuffling : Yes**

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

**Correct Marks : 1 Wrong Marks : 0**

The oxidation number of central metal in  $[\text{Pt}(\text{NH}_3)_2\text{Cl}(\text{NO}_2)]$  and  $[\text{CoCl}_2(\text{en})_2]^{\oplus}$ , respectively, are

**Options :**

1. ✘ +2 ; +1

2. ✘ +2 ; +2

3. ✔ +2 ; +3

4. ✘ +3 ; +2

**Question Number : 153 Question Id : 342604153 Question Type : MCQ Option Shuffling : Yes**

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

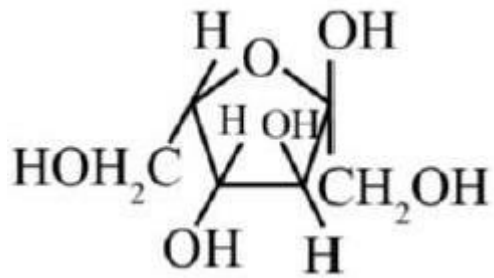
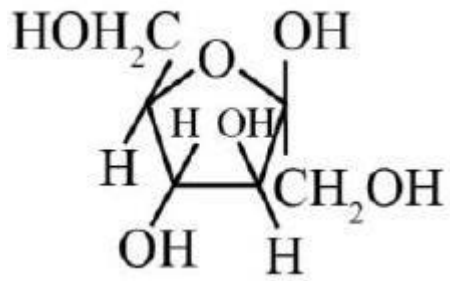
**Correct Marks : 1 Wrong Marks : 0**

The structure of  $\alpha$  - D - Fructofuranose is

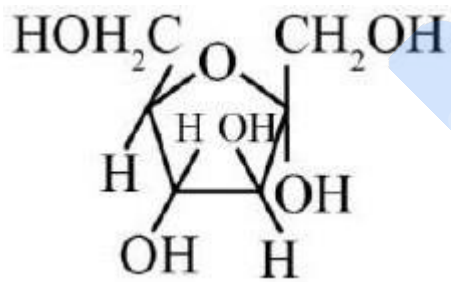
**Options :**

1.

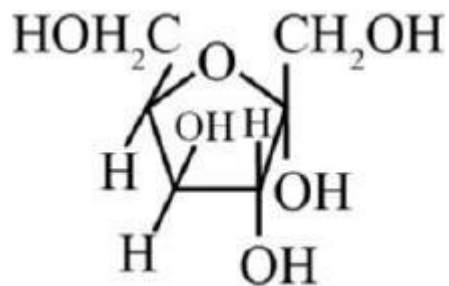
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2. ✖



3. ✔

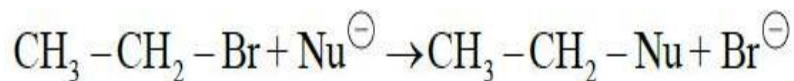


4.

**Question Number : 154 Question Id : 342604154 Question Type : MCQ Option Shuffling : Yes**

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

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The decreasing order of the reaction rate with nucleophile ( $\text{Nu}^\ominus$ ) is



Options :



1. ✓



2. ✗



3. ✗



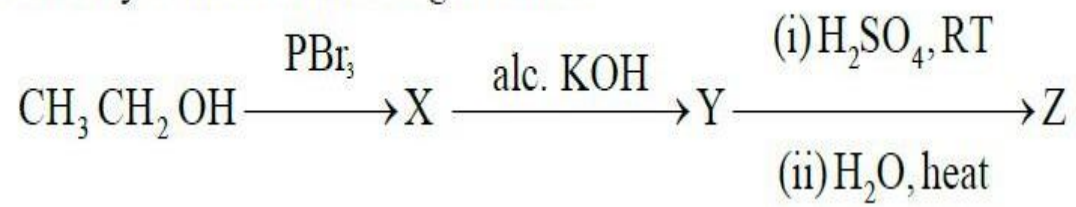
4. ✗

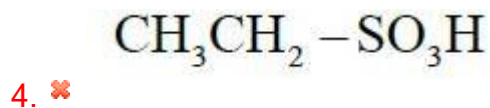
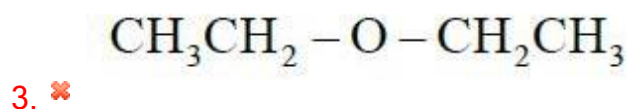
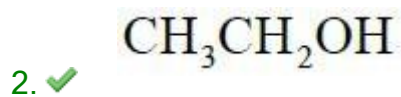
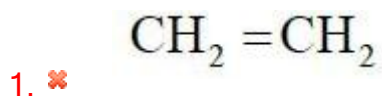
Question Number : 155 Question Id : 342604155 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

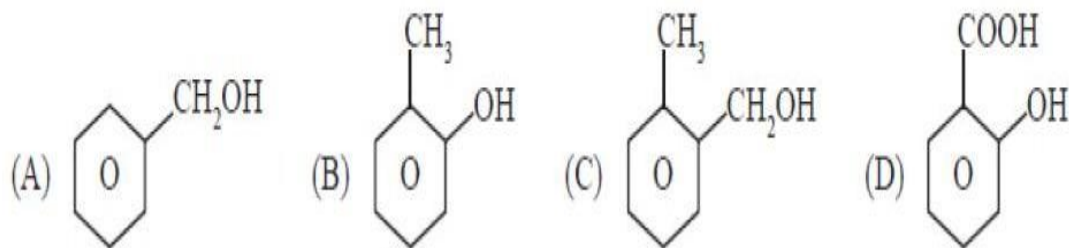
Identity Z in the following reaction





Question Number : 156 Question Id : 342604156 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 compounds deoxygenation is possible when heated with Zn



Options :

✘

A, B and C

1.

A, C and D

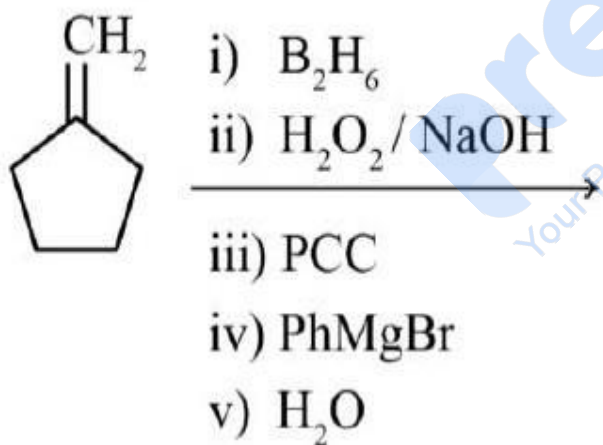
2.

3. ✓ B and D

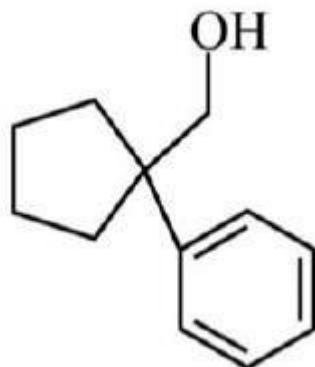
4. ✘ B and C

Question Number : 157 Question Id : 342604157 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 reactions is

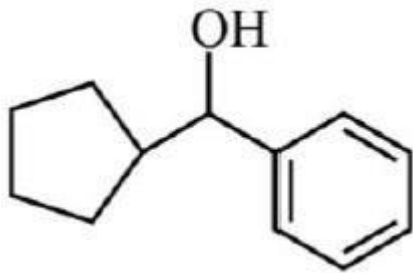
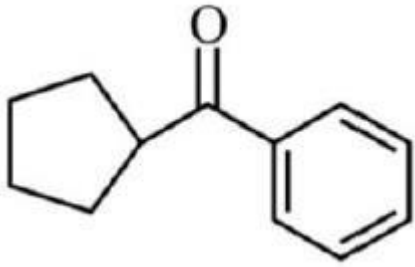


Options :

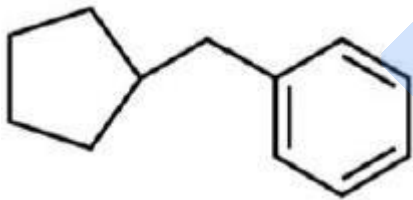


1.

2.



3. ✓



4. ✗

Question Number : 158 Question Id : 342604158 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

Column-1	Column -2
Reaction of carbonyl compound with	Product
A) Hydroxylamine	I) Hydrazone
B) Alcohol	II) Schiff's base (Substituted imine)
C) Hydrazine	III) Oxime
D) Amine	IV) Ketal

The correct match is

Options :

1.

A	B	C	D
III	IV	I	II

2.

A	B	C	D
III	II	I	IV

3.

A	B	C	D
I	IV	III	II

A

B

C

D

I

II

III

IV

4.



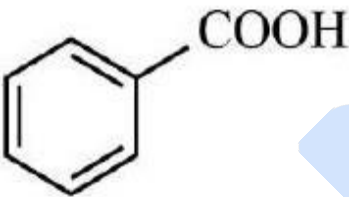
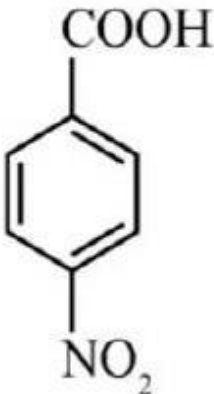
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Question Number : 159 Question Id : 342604159 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

Match the following

Column-1 Acid	Column-2 pKa value
A) $\text{CH}_3\text{COOH}$	I) 0.23
B) $\text{F}_3\text{CCOOH}$	II) 3.41
C) 	III) 4.19
D) 	IV) 4.76

The correct match is

Options :

A

B

C

D

IV

I

III

II

1.

2.

A	B	C	D
I	IV	II	III

A	B	C	D
IV	I	II	III

3. ✘

A	B	C	D
IV	III	II	I

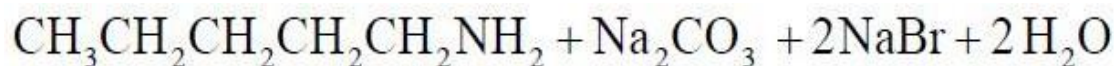
4. ✘

Question Number : 160 Question Id : 342604160 Question Type : MCQ Option Shuffling : Yes  
 Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical  
 Correct Marks : 1 Wrong Marks : 0

Products that are formed in the given reaction including by products are

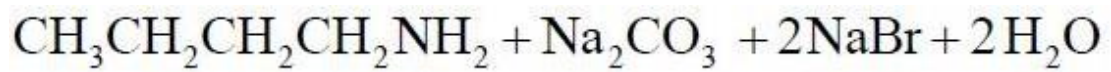


Options :

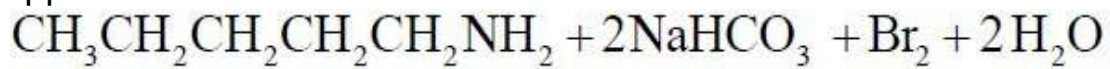


1. ✘

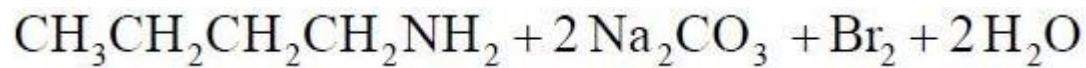




2.



3. ✖



4. ✖