Telangana State Council Higher Education

Notations :

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

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

Question Paper Name :	Engineering English 4th Aug 2021 Shift 2
Subject Name :	Engineering (English)
Creation Date :	2021-08-04 19:19:44
Duration :	180
Total Marks :	160
Display Marks:	No
Calculator :	None
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console? :	Yes

Engineering (English)

Group Number :	1
Group Id :	3426042
Group Maximum Duration :	0

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

Mathematics

Section Id :	3426044
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	80
Number of Questions to be attempted :	80
Section Marks :	80
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	3426044
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 342604161 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let $f:\mathrm{A}\to\mathrm{B}$, $g:\mathrm{B}\to\mathrm{A}$ be defined as $f(x)=x^2\ \forall x\in\mathrm{A}$ and $g(x)=x^{1/2}\ \forall x\in\mathrm{B}$.

$f(x)$ and $g(x)$ are inverse functions to each other when

Options :

1. ✖

$A = B = \mathbb{R}$

2. ✖ $A = \mathbb{R} \setminus \mathbb{R}^-; B = \mathbb{R} \setminus \mathbb{R}^+$

3. ✖ $A = \mathbb{R}; B = \mathbb{R} \setminus \mathbb{R}^-$

4. ✔ $A = B = \mathbb{R} \setminus \mathbb{R}^-$

Question Number : 2 Question Id : 342604162 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The function of $f(x) = \log(x + \sqrt{x^2 + 1})$ is

Options :

1. ✖ an even function

2. ✔ an odd function

3. ✖ a periodic function

4. ✖ neither an even function nor an odd function

Question Number : 3 Question Id : 342604163 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For all $n \in \mathbb{N}$, $2^{2n+1} + 3^{2n+1}$ is divisible by

Options :

1. ✖ 7

2. ✔ 5

3. ✖ 11

4. ✖ 8

Question Number : 4 Question Id : 342604164 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $A_\alpha = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$, then determinant of $A_{\pi/5} A_{\pi/4} A_{3\pi/10} =$

Options :

1. ✖ $\sqrt{2}$

2. ✖ $\frac{1}{\sqrt{2}}$

3. ✖ 0

4. ✔ 1

Question Number : 5 Question Id : 342604165 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\text{If } \begin{vmatrix} 2 & 2k & 1 \\ 1 & k-1 & 1 \\ 2 & 1 & k+1 \end{vmatrix} = Ak^2 + Bk + C, \text{then } A+B+C =$$

Options :

1. ✖ 0

2. ✖ 1

3. ✔ -1

4. ✖

2

Question Number : 6 Question Id : 342604166 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A and C lie in $\left[0,\frac{\pi}{2}\right)$ and B lies in $[0,2\pi]$. If $\tan A+3\cos B+6\sin C=1$; $3\tan A+\cos B+4\sin C=4$; $5\tan A+3\cos B-8\sin C=-2$, then $B-2A-C=$

Options :

1. $\frac{\pi}{6}$ ✖

2. $\frac{\pi}{3}$ ✔

3. $\frac{\pi}{4}$ ✖

4. $\frac{\pi}{2}$ ✖

Question Number : 7 Question Id : 342604167 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

If $x+iy=\frac{1+7i}{(2-i)^2}$; then $\operatorname{cosec}\left(\operatorname{Tan}^{-1}\frac{y}{x}-\frac{\pi}{4}\right)=$

Options :

1. 1 ✔

2. ∞ ✖

3. -1 ✖

4. 0 ✖

Question Number : 8 Question Id : 342604168 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

If ω represents a cube root of unity and $\sum_{k=1}^{n}\left(k+\frac{1}{\omega}\right)\left(k+\frac{1}{\omega^2}\right)=340$, then $n=$

Options :

1. 20 ✖

25

2. ✖

10

3. ✔

15

4. ✖

Question Number : 9 Question Id : 342604169 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\sum_{k=1}^{6}\left(\sin\frac{2\pi k}{7}-i\cos\frac{2\pi k}{7}\right)=$$

Options :

i

1. ✔

$-i$

2. ✖

$2i$

3. ✖

4. ✖

$-2i$

Question Number : 10 Question Id : 342604170 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The smallest negative integer satisfying both the quadratic inequalities $x^2 < 4x + 77$ and $x^2 > 4$ is

Options :

1. -3 ✖

2. -6 ✔

3. -2 ✖

4. -7 ✖

Question Number : 11 Question Id : 342604171 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 equation $x^2-2cx+ab=0$ are real and unequal, then the roots of $x^2-2(a+b)x+a^2+b^2+2c^2=0$ are

Options :

1. real and unequal ✖

2. imaginary ✔

3. irrational and unequal ✖

4. real and equal ✖

Question Number : 12 Question Id : 342604172 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $f(x)$ is a polynomial of degree n with rational coefficients and $1+2i$, $2-\sqrt{3}$ and 5 are three roots of $f(x)=0$, then the least value of n is

Options :

1. 5 ✔

2. 4 ✖

3

3. ✖

6

4. ✖

Question Number : 13 Question Id : 342604173 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^2-3x+2 is a factor of x^4-ax^2+b, then the equation whose roots are a and b is

Options :

$x^2-9x-20=0$

1. ✖

$x^2-9x+20=0$

2. ✔

$x^2+9x-20=0$

3. ✖

$x^2+9x+20=0$

4. ✖

Question Number : 14 Question Id : 342604174 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If there are 5 letters written to 5 different people and 5 envelopes addressed to them, then the number of ways in which these letters can be arranged so that no letter goes into its corresponding envelope is

Options :

1. ✖ 9

2. ✖ 24

3. ✔ 44

4. ✖ 119

Question Number : 15 Question Id : 342604175 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 ways of selecting a committee of 30 persons from 20 boys, 20 girls and 20 teachers such that the participation of number of boys, girls and teachers in that committee is equal, is

Options :

1. ✖ $(20!)(20!)(20!)$

$^{60}C_{30}$

2. ✖

$\frac{(20!)^3}{(10!)^6}$

3. ✔

$\frac{(20!)(20!)}{10!\,10!}$

4. ✖

Question Number : 16 Question Id : 342604176 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\left(2+\sqrt{3}\right)^{49}+\left(\sqrt{3}-2\right)^{49}=a+b\sqrt{3}$, then

Options :

$a \neq 0,\ b \neq 0$

1. ✖

$b \neq 0,\ a = 0$

2. ✔

$b = 0,\ a \neq 0$

3. ✖

4. ✖

$a = b$

Question Number : 17 Question Id : 342604177 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 expansion of $\left(1+\frac{3x}{2}\right)^{-5}$, the coefficient of x^{10} is equal to the coefficient of x^{10} in $(1+ax)^n, n \in N$, then $na =$

Options :

1. 15 ✖

2. 18 ✖

3. 24 ✖

4. 21 ✔

Question Number : 18 Question Id : 342604178 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For $x>0$, if p^{th} term is the first negative term in the expansion of $\left(1+\frac{3x}{5}\right)^{22/3}$ and in the expansion of $\left(1-\frac{3x}{5}\right)^{22/3}$ from r^{th} term onwards all the terms are positive, then the number of terms in the expansion of $\left(px+\frac{r}{x}\right)^{pr}$ is

Options :

1. ✔ 101

2. ✖ 119

3. ✖ 200

4. ✖ 99

Question Number : 19 Question Id : 342604179 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\frac{9x-7}{(x+3)(x^2+1)}=\frac{A}{x+3}+\frac{Bx+C}{x^2+1}$ where $A, B, C \in \mathbb{R}$, then $A+B+C=$

Options :

1. ✖ $\frac{17}{5}$

2. ✔ $\frac{-6}{5}$

3. ✖ $\frac{6}{5}$

4. ✖ $\frac{-17}{5}$

Question Number : 20 Question Id : 342604180 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 $(1-\cos\theta)(1+\cos\theta)(1+\cot^2\theta)$ when $\theta=\frac{\pi}{15}$ is

Options :

1. ✔ 1

2. ✖ $\frac{1}{2}$

$\frac{-1}{\sqrt{3}}$

3. ✖

2

4. ✖

Question Number : 21 Question Id : 342604181 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $x \neq -y$ and $\sin x + \sin y = 3(\cos y - \cos x)$, then $\tan(x-y) =$

Options :

1. ✖ $\frac{\sqrt{3}}{2}$

2. ✖ -1

3. ✔ $\frac{3}{4}$

4. ✖ 1

Question Number : 22 Question Id : 342604182 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\frac{\sin(x+y)}{\sin(x-y)}=\frac{a+b}{a-b}$, then $\frac{\tan x}{\tan y}=$

Options :

1. $\frac{b}{a}$ ✖

2. $\frac{a}{b}$ ✔

3. ab ✖

4. a^b ✖

Question Number : 23 Question Id : 342604183 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $90^\circ < A < 180^\circ$ and $\sin A=\frac{4}{5}$, then $\tan\frac{A}{2}=$

Options :

1. ✖ $\frac{1}{2}$

2. ✖ $\frac{3}{5}$

3. ✖ $\frac{3}{2}$

4. ✔ 2

Question Number : 24 Question Id : 342604184 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 solutions of the equation $\tan\theta + \cot 2\theta = 1$ lying in the interval $(-\pi, \pi)$ is

Options :

1. ✖ 1

2. ✔ 2

3

3. ✖

4

4. ✖

Question Number : 25 Question Id : 342604185 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\text{Sin}^{-1}\left(\frac{x}{5}\right)+\text{Cosec}^{-1}\left(\frac{5}{4}\right)=\frac{\pi}{2}$, then $5+x=$

Options :

6

1. ✖

5

2. ✖

7

3. ✖

8

4. ✔

Question Number : 26 Question Id : 342604186 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\text{Tan h}^{-1}\left(\frac{1}{3}\right)+\text{Cot h}^{-1}(2)=$$

Options :

1. $\log\sqrt{6}$ ✔

2. $\log 6$ ✖

3. $-\log\sqrt{6}$ ✖

4. $-\log 6$ ✖

Question Number : 27 Question Id : 342604187 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, if the length of the sides a, b and c are three consecutive natural numbers and $a<b<c$, then $(\cos A+\cos B+\cos C)2abc=$

Options :

1. ✔

$3b\left(b^2-2\right)$

$3b^3+6b^2+3b$

2. ✖

$(3b+2)(3b-2)b$

3. ✖

$(b-1)b(b+1)$

4. ✖

Question Number : 28 Question Id : 342604188 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A triangle ABC has area of P square units and circumference 2S units. If h_1, h_2 and h_3 are respectively the length of the altitudes of the triangle drawn from the vertices A, B and C, then $P^2\left[\frac{(h_1h_2+h_2h_3+h_3h_1)^2}{h_1^2h_2^2h_3^2}-2\right]=$

Options :

$S^2-\left(\frac{ab+bc+ca}{2}\right)$

1. ✔

$\frac{\cot^2 A+\cot^2 B+\cot^2 C}{2}$

2. ✖

$\frac{a+b+c}{4S}$

3. ✖

$S^2-\left((ab)^2+(bc)^2+(ca)^2\right)$

4. ✖

Question Number : 29 Question Id : 342604189 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In a ΔABC, if $(a-b)(s-c)=(b-c)(s-a)$ then r_1, r_2 and r_3 are

Options :

in arithmetic progression

1. ✔

in geometric progression

2. ✖

in harmonic progression

3. ✖

equal

4. ✖

Question Number : 30 Question Id : 342604190 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In an equilateral triangle ABC, $r:R:r_1$ is

Options :

1. $1:3:2$ ✖

2. $1:3:1$ ✖

3. $1:2:3$ ✔

4. $2:1:3$ ✖

Question Number : 31 Question Id : 342604191 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The vector in the direction of the sum of the vectors $\bar{a}=2\bar{i}-2\bar{j}+5\bar{k}$ and $\bar{b}=-2\bar{i}+5\bar{j}-3\bar{k}$ is

Options :

1. ✖

Perpendicular to ZX – plane

Parallel to ZX – plane

2. ✖

Parallel to YZ – plane

3. ✔

Perpendicular to YZ – plane

4. ✖

Question Number : 32 Question Id : 342604192 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 vectors $\bar{a} = 2\bar{i} + 3\bar{j} - 6\bar{k}$, $\bar{b} = 6\bar{i} - 2\bar{j} + 3\bar{k}$ and $\bar{c} = 3\bar{i} - 6\bar{j} - 2\bar{k}$.

Assertion (A): The three vectors do not form a triangle

Reason(R) : The three vectors are non-coplanar

The correct option among the following is

Options :

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

1. ✔

2. ✖

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

(A) is true but (R) is false

3. ✖

(A) is false but (R)is true

4. ✖

Question Number : 33 Question Id : 342604193 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 plane is at a distance of 6 units from the origin and the vector $2\bar{i}+6\bar{j}-3\bar{k}$ is its normal, then the equation of the plane in Cartesian form is

Options :

$2x+3y-6z-35=0$

1. ✖

$2x+6y-3z-42=0$

2. ✔

$2x+6y-3z-35=0$

3. ✖

$2x-6y+3z-42=0$

4. ✖

Question Number : 34 Question Id : 342604194 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The unit vector perpendicular to the vector $\bar{i}-2\bar{j}+3\bar{k}$ and coplanar with the vectors $\bar{i}+\bar{j}+\bar{k}$ and $2\bar{i}-\bar{j}-\bar{k}$ is

Options :

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

2. ✖ $\pm\frac{1}{4\sqrt{5}}\left(3\bar{i}-6\bar{j}-5\bar{k}\right)$

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

4. ✔ $\pm\frac{1}{\sqrt{3}}\left(\bar{i}-\bar{j}-\bar{k}\right)$

Question Number : 35 Question Id : 342604195 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let $\bar{a}=2\bar{i}-\bar{j}+\bar{k}$, $\bar{b}=2\bar{j}-3\bar{k}$. If $\bar{b}=\bar{c}-\bar{d}$, $\bar{a}$ is parallel to $\bar{c}$ and perpendicular to $\bar{d}$, then $\bar{c}+\bar{d}=$

Options :

1. ✖ $\frac{-1}{6}(2\bar{a}+5\bar{b})$

2. ✖ $\frac{1}{3}(3\bar{a}+5\bar{b})$

3. ✖ $\frac{1}{6}(5\bar{a}+2\bar{b})$

4. ✔ $\frac{-1}{3}(5\bar{a}+3\bar{b})$

Question Number : 36 Question Id : 342604196 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let $\bar{a},\bar{b},\bar{c},\bar{d}$ be four vectors such that $\bar{a}$ is perpendicular only to $\bar{c}$. The vector $\bar{b}$ is parallel to $(\bar{c}-\bar{d})$ then $\bar{c}=$

Options :

1. ✖

$$\bar{b}-\left(\frac{\bar{a}\cdot\bar{d}}{\bar{a}\cdot\bar{b}}\right)\bar{d}$$

$$\bar{d}-\left(\frac{\bar{a}\cdot\bar{d}}{\bar{a}\cdot\bar{b}}\right)\bar{b}$$

2. ✔

$$\bar{d}+\left(\frac{\bar{a}\cdot\bar{d}}{\bar{a}\cdot\bar{b}}\right)\bar{b}$$

3. ✖

$$\bar{b}+\left(\frac{\bar{a}\cdot\bar{d}}{\bar{a}\cdot\bar{b}}\right)\bar{d}$$

4. ✖

Question Number : 37 Question Id : 342604197 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If 65 is the range of the ungrouped data 50, 70, 60, B, 20, 40, then the absolute difference of the possible values of B is

Options :

90

1. ✖

20

2. ✖

3. ✔ 80

4. ✖ 65

Question Number : 38 Question Id : 342604198 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A non-zero integer x is selected randomly from the set of integers $\{x \in \mathbb{Z} / -25 \le x \le 25, x \ne 0\}$. The probability that $x + 6 \le \frac{135}{x}$ is

Options :

1. ✖ $\frac{12}{25}$

2. ✔ $\frac{2}{5}$

3. ✖ $\frac{3}{5}$

4. ✖

$\frac{14}{25}$

Question Number : 39 Question Id : 342604199 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If two cards are drawn one after the other without replacement from a well-shuffled ordinary deck of 52 cards, then the probability that both of them are aces is

Options :

1. ✖ $\frac{1}{169}$

2. ✔ $\frac{1}{221}$

3. ✖ $\frac{168}{169}$

4. ✖ $\frac{220}{221}$

Question Number : 40 Question Id : 342604200 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

Out of 40 consecutive integers two integers are drawn at random. The probability that their sum is odd is

Options :

1. $\frac{15}{29}$ ✖

2. $\frac{20}{39}$ ✔

3. $\frac{25}{29}$ ✖

4. $\frac{40}{39}$ ✖

Question Number : 41 Question Id : 342604201 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The range of a random variable X is $\{0,1,2\}$. If $P(X=0)=3C^3$, $P(X=1)=4C-10C^2$; $P(X=2)=5C-1$, then $P(0<X\leq 2)=$

Options :

1. ✖ $\frac{1}{9}$

2. ✖ $\frac{2}{3}$

3. ✔ $\frac{8}{9}$

4. ✖ $\frac{1}{3}$

Question Number : 42 Question Id : 342604202 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If 'm' is the mean of a Poisson distribution, then $P(x > 0) =$

Options :

1. ✖ e^{-m}

2. ✖ $1 - e^{m}$

3. ✔ $\frac{e^m - 1}{e^m}$

4. ✖ m^{-e}

Question Number : 43 Question Id : 342604203 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 a point P which moves such that the sum of its distances from two perpendicular lines is equal to 1 is a

Options :

1. ✔ Square

2. ✖ Circle

3. ✖ Straight line

4. ✖ set of four parallel lines

Question Number : 44 Question Id : 342604204 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 point to which the origin is to be shifted by translation of axes so as to remove the first degree terms from the equation $4x^2+2xy+y^2-8x-4y-12=0$ and θ is the angle through which the axes are to be rotated about the origin so as to remove the xy-term from the above equation, then $a+b+3\tan 2\theta =$

Options :

1. ✖ 2

2. ✔ 4

3. ✖ 8

4. ✖ 6

Question Number : 45 Question Id : 342604205 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

If the two lines $\frac{3}{2}x+(2a-1)y=3$ and $2x+a^2y=-3$ are perpendicular, then the distance of their point of intersection from the point $(1,1)$ is

Options :

1. ✖ $\frac{9}{\sqrt{5}}$

2. ✔ 3

3. ✖ $\frac{\sqrt{45}}{5}$

4. ✖ $\sqrt{\frac{3}{5}}$

Question Number : 46 Question Id : 342604206 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A straight line passing through a fixed point (3, 5) intersects the coordinate axes at two points A and B. If the locus of $C(x, y)$ which forms a rectangle with the points A, O(origin) and B is $ax + 2hxy + by = 0$, then $a + b + h =$

Options :

1. ✖ $\frac{17}{2}$

2. ✖

7

3. ✔ $\frac{15}{2}$

4. ✖ 10

Question Number : 47 Question Id : 342604207 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For all $\alpha, \beta \in \mathbb{R}$ and $\alpha\beta > 0$, the line $\alpha x + \beta y + \sqrt{\alpha\beta} = 0$ is such that it

Options :

1. ✖ possesses a slope independent of α and β

2. ✖ passes through a fixed point

3. ✔ forms a triangle of constant area with coordinate axes

4. ✖ possesses intercepts on the axes that differ by a quantity independent of α, β

Question Number : 48 Question Id : 342604208 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let L_1 be a line passing through (2, 1) and $\left(3, \frac{5}{2}\right)$. L_2 is a line perpendicular to L_1 and passing through (4, –1). The area of the triangle formed by L_1, L_2 and Y-axis is

Options :

1. $\frac{121}{39}$ ✔

2. $\frac{221}{13}$ ✖

3. $\frac{154}{169}$ ✖

4. $\frac{22}{13}$ ✖

Question Number : 49 Question Id : 342604209 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 $3ax^2 - 16xy - (a^2 - 10)y^2 = 0$ represents

Options :

1. ✖ two perpendicular lines if $a = -5$

2. ✖ two parallel lines if a satisfies $3a^3 + 30a + 64 = 0$

3. ✖ two parallel lines if a satisfies $3a^3 - 30a - 64 = 0$

4. ✔ two perpendicular lines if $a = -2$

Question Number : 50 Question Id : 342604210 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 pair of straight lines $3y^2 - 8xy - 3x^2 - 29x + 3y - 18 = 0$ is

Options :

1. ✔ $90°$

2. ✖ $35°$

$45°$

3. ✖

$30°$

4. ✖

Question Number : 51 Question Id : 342604211 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The area of a circle having the lines $3x-4y+4=0$ and $6x-8y-7=0$ as two of its tangents, is

Options :

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

1. ✖

$\frac{9\pi}{16}$

2. ✔

$\frac{3\pi}{4}$

3. ✖

$\frac{3\pi}{16}$

4. ✖

Question Number : 52 Question Id : 342604212 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The polars of (–1, 2) with respect to the two circles $S_1 \equiv x^2 + y^2 + 6y + 7 = 0$ and $S_2 \equiv x^2 + y^2 + 6x + 1 = 0$ are

Options :

1. ✖ Parallel

2. ✖ coincident

3. ✖ Perpendicular

4. ✔ Intersecting at a non zero point

Question Number : 53 Question Id : 342604213 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The internal centre of similitude of the two circles $x^2 + y^2 - 4x - 6y + 12 = 0$, $x^2 + y^2 + 4x - 2y - 4 = 0$ is

Options :

1. ✖

$(4,\ 4)$

2. ✖ $\left(4,\ \frac{5}{2}\right)$

3. ✔ $\left(1,\ \frac{5}{2}\right)$

4. ✖ $\left(2,\ \frac{3}{2}\right)$

Question Number : 54 Question Id : 342604214 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If a circle has its centre on the line $x-y-1=0$ and passes through the points of intersection of the two circles $x^2+y^2+2x-2y-2=0$ and $x^2+y^2-2x+2y-7=0$, then the centre of that circle is

Options :

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

2. ✔

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

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

3. ✖

$(-2,-3)$

4. ✖

Question Number : 55 Question Id : 342604215 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 radical centre of the circles $x^2+y^2-8x-2y+8=0$, $x^2+y^2+6x+8y-24=0$, and $x^2+y^2-2x+2y+2=0$ is (a,b), then $a+b=$

Options :

34

1. ✖

10

2. ✔

-15

3. ✖

-24

4. ✖

Question Number : 56 Question Id : 342604216 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Match the items given in List-A with those of the items of List-B

List-A		List-B	
A)	The vertex of the parabola $y^2+4x-2y+3=0$ is	I)	$\left(\frac{5}{4},1\right)$
B)	The vertex of the parabola $x^2+8x+12y+4=0$ is	II)	$\left(1,\frac{5}{4}\right)$
C)	The focus of the parabola $y^2-x-2y+2=0$ is	III)	$\left(\frac{-1}{2},1\right)$
D)	The focus of the parabola $x^2-2x-8y-23=0$ is	IV)	$(1,-1)$
		V)	$(-4,1)$

The correct match is

Options :

A	B	C	D
III	V	II	IV

1. ✖

2. ✖

A	B	C	D
V	II	I	IV

A	B	C	D
III	II	I	IV

3. ✖

A	B	C	D
III	V	I	IV

4. ✔

Question Number : 57 Question Id : 342604217 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For the parabola $y=2+4t, x=-2+2t^2$, the ends of the latus rectum are at $t=\alpha$ and $t=\beta$, then $\alpha\beta=$

Options :

0

1. ✖

1

2. ✖

3. ✔

-1

8

4. ✖

Question Number : 58 Question Id : 342604218 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

P is a point on the conic $a^2x^2+b^2y^2=a^2(a^2+b^2-y^2)$ and S is a focus of that conic. M is the foot of the perpendicular from P on to a directrix of that conic nearer to S. If PM =KSP, then K =

Options :

1. ✖ $\frac{b}{\sqrt{a^2+b^2}}$

2. ✔ $\frac{\sqrt{a^2+b^2}}{b}$

3. ✖ $\frac{a}{\sqrt{a^2+b^2}}$

4. ✖ $\frac{\sqrt{a^2+b^2}}{a}$

Question Number : 59 Question Id : 342604219 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For the ellipse $4(x-2y+1)^2+9(2x+y+2)^2=25$, which of the following is true?

Options :

1. ✔ equation of major axis is $x-2y+1=0$

2. ✖ eccentricity $\frac{\sqrt{5}}{3}$

3. ✖ length of major axis is $\frac{1}{2}\sqrt{5}$

4. ✖ centre is $(-1, 0)$

Question Number : 60 Question Id : 342604220 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $(\alpha,-1)$ is an interior point of the curve $4x^2-3y^2=1$, then α lies in

Options :

1. ✖ $(-\infty,-1)\cup(1,\infty)$

2. ✔ $(-1,1)$

3. ✖ $(-\infty,\infty)$

4. ✖ $[0,\infty)$

Question Number : 61 Question Id : 342604221 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 mid points of the sides AB, BC and CA of a triangle are respectively $D(1,2,-3)$, $E(3,0,1)$ and $F(-1,1,-4)$, then the centroid of the triangle ADF is

Options :

1. ✔ $(-1,2,-5)$

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

3. ✖ $(1,0,-3)$

4. $\left(-1, \frac{5}{3}, -3\right)$ ✖

Question Number : 62 Question Id : 342604222 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 passing through P(2, 3, –1) and the origin are

Options :

1. $\frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}, \frac{1}{\sqrt{14}}$ ✖

2. $\frac{2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{1}{\sqrt{14}}$ ✖

3. $\frac{-2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{1}{\sqrt{14}}$ ✔

4. $\frac{2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{-1}{\sqrt{14}}$ ✖

Question Number : 63 Question Id : 342604223 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A plane $ax+by+cz+1=0$ is perpendicular to the two planes $2x-2y+z=0$ and $x-y+2z=4$ and passes through the point $(1,-2,1)$. Then $a+b-c=$

Options :

1. -6 ✖

2. 1 ✖

3. 0 ✖

4. 2 ✔

Question Number : 64 Question Id : 342604224 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

$$\lim_{x\to 0}\frac{x^2 2^x - x^2\sin x - x^2}{3^x+\cos x - 3^x\cos x - 1} =$$

Options :

1. $\frac{1}{\log 3}(\log 2 - 1)$ ✖

2. ✖ $\frac{4}{\log 3}(1-\log 2)$

3. ✖ $\frac{4}{\log 3}(\log 2-1)$

4. ✔ $\frac{2}{\log 3}(\log 2-1)$

Question Number : 65 Question Id : 342604225 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\lim_{x \to 2} \frac{3x^2 - ax + 5b}{x-2} = 17$, then $ab =$

Options :

1. ✖ -34

2. ✖ -25

3. ✖ -22

22

4. ✔

Question Number : 66 Question Id : 342604226 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\lim_{x\to 0}\frac{(1-\cos 2x)}{x\tan 2x+\frac{2x}{3}\tan 3x}=$$

Options :

-6

1. ✖

$\frac{1}{2}$

2. ✔

0

3. ✖

$\frac{-6}{5}$

4. ✖

Question Number : 67 Question Id : 342604227 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $f(x)=\text{Tan}^{-1}\left(\frac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right)$ then $\underset{x\to\frac{1}{2}}{Lt}\frac{2\left[f(x)-f\left(\frac{1}{2}\right)\right]}{2x-1}=$

Options :

1. $\frac{1}{\sqrt{2}}$ ✖

2. $\frac{\sqrt{3}}{2}$ ✖

3. $\frac{\sqrt{2}}{\sqrt{3}}$ ✖

4. $\frac{1}{\sqrt{3}}$ ✔

Question Number : 68 Question Id : 342604228 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\frac{d}{dx}\left(\frac{x2^x-x}{1-\cos x}\right)=\left(\frac{x2^x-x}{1-\cos x}\right)\left(f(x)+log\,2\right)$, then $f(x)=$

Options :

1. ✖ $\frac{1}{x}+\frac{log\,2}{2^x}+\tan\frac{x}{2}$

2. ✖ $\frac{1}{x}+\frac{2^x log\,2}{2^x-1}+\frac{\sin x}{1-\cos x}$

3. ✖ $x+2^x-1+\sin x(1-\cos x)$

4. ✔ $\frac{1}{x}+\frac{log\,2}{2^x-1}+\cot\frac{x}{2}$

Question Number : 69 Question Id : 342604229 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $(a+bx)e^{\frac{y}{x}}=x$, then $\frac{d^2y}{dx^2}=$

Options :

1. ✖ $\frac{1}{x^3}(xy'+y)^2$

2. ✖

$$\frac{1}{x^3}\left(xy'+y^2\right)$$

$$\frac{1}{x^3}\left(xy'-y\right)$$

3. ✖

$$\frac{1}{x^3}\left(xy'-y\right)^2$$

4. ✔

Question Number : 70 Question Id : 342604230 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $f(x)=\frac{\cos^2 x}{1+\sin^2 x}$, then $f\left(\frac{\pi}{4}\right)-3f'\left(\frac{\pi}{4}\right)=$

Options :

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

1. ✖

$$\frac{11}{3}$$

2. ✖

$$\frac{13}{9}$$

3. ✖

3

4. ✔

Question Number : 71 Question Id : 342604231 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 at which the tangent line to the curve of $y = \frac{16}{x} - x^2$ is horizontal, is

Options :

$(2, 4)$

1. ✖

$(-2, -12)$

2. ✔

$(1, 15)$

3. ✖

$(-1, -17)$

4. ✖

Question Number : 72 Question Id : 342604232 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The equation of the tangent to the curve $y = \pi e^{\frac{-x}{\pi}}$ at the point where it crosses Y-axis is

Options :

1. ✖ $\pi x + 2y = 2\pi$

2. ✖ $2x + \pi y = \pi^2$

3. ✖ $x - y + \pi = 0$

4. ✔ $x + y = \pi$

Question Number : 73 Question Id : 342604233 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 radius of a spherical balloon is increasing at the rate of 5 inch per minute, then the rate at which the volume increases (in cube inches per minute) when the radius is 10 inches is

Options :

1. ✖ $100\ \pi$

2. ✖

$1000\ \pi$

$2000\ \pi$

3. ✔

$25000\ \pi$

4. ✖

Question Number : 74 Question Id : 342604234 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The absolute maximum value of the function $f(x) = 2x^3 - 9x^2 + 12x + 1$ on $[0, 2]$ is

Options :

8

1. ✖

1

2. ✖

6

3. ✔

5

4. ✖

Question Number : 75 Question Id : 342604235 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $f(x)=\frac{3-8x}{3x-1}$ and $\int f(y)dy=Ay+B\log(3y-1)+C$, then $\frac{A-3B}{2}=$

Options :

1. ✖ 0

2. ✖ $\frac{-5}{2}$

3. ✖ $\frac{1}{2}$

4. ✔ $\frac{-3}{2}$

Question Number : 76 Question Id : 342604236 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$\int \sqrt{\sin x}\cos x\,dx = \frac{2}{3}(\sin x)^{3/2} + C$ is valid when x lies in the interval

Options :

1. ✖ $(-\infty, \infty)$

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

3. ✔ $(2n\pi, (2n+1)\pi), n \in \mathbb{N}$

4. ✖ $((2n+1)\pi, (2n+2)\pi), n \in \mathbb{N}$

Question Number : 77 Question Id : 342604237 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For $x > 0$ $\int \left(\frac{\sqrt{1+x+x^2}}{1+x} + \frac{1}{2\sqrt{1+x+x^2}} - \frac{1}{(1+x)\sqrt{1+x+x^2}} \right) dx =$

Options :

1. ✖ $\frac{1}{\sqrt{1+x+x^2}} + C$

$\sqrt{1+x}+C$

2. ✖

$\frac{1}{\sqrt{1+x}}+C$

3. ✖

$\sqrt{x^2+x+1}+C$

4. ✔

Question Number : 78 Question Id : 342604238 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\lim_{n\to\infty}\frac{1}{n}\left[\sin\frac{\pi}{4}+\sin\frac{\pi}{12}\left(3+\frac{1}{n}\right)+\sin\frac{\pi}{12}\left(3+\frac{2}{n}\right)+.....+\sin\frac{\pi}{3}\right]=$$

Options :

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

1. ✖

$\frac{6(\sqrt{2}-1)}{\pi}$

2. ✔

3. ✖

$$\frac{\sqrt{2}-1}{6\pi}$$

$$0$$

4. ✖

Question Number : 79 Question Id : 342604239 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\int_0^{\pi/2} \frac{\sin^{3/2} x}{\sin^{3/2} x + \cos^{3/2} x}\, dx =$$

Options :

$$\pi$$

1. ✖

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

2. ✖

$$\frac{\pi}{4}$$

3. ✔

$$0$$

4. ✖

Question Number : 80 Question Id : 342604240 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The solution of $\frac{dy}{dx} = e^{-2x}$, $y(log2) = \frac{1}{16}$, is $y =$

Options :

1. ✖ $\frac{log\, x}{16}$

2. ✖ $\frac{4 - 12e^{-2x}}{16}$

3. ✖ $\frac{4e^{-2x}}{16}$

4. ✔ $\frac{3 - 8e^{-2x}}{16}$

Physics

Section Id : 3426045

Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	40
Number of Questions to be attempted :	40
Section Marks :	40
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	3426045
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 342604241 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 (E/W) of relative strength of electromagnetic force (E) to weak nuclear force (W) is

Options :

1. ✖ 10^{-11}

2. ✔ 10^{11}

3. ✖ 10^{20}

4. ✖ 10^{-20}

Question Number : 82 Question Id : 342604242 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 physical quantity Z expressed as $Z = \frac{AB^{\frac{1}{2}}}{C^2}$. If the relative error in the magnitudes of A, B and C is 1% then the relative error in Z will be

Options :

1. ✖ 0.5%

2. ✔ 3.5%

3. ✖ 1%

4. ✖ $2\sqrt{2}\%$

Question Number : 83 Question Id : 342604243 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A stone falls freely under gravity. It covers distance d_1 and d_2 in the first 4 seconds, and the next 8 seconds respectively. The ratio $\frac{d_2}{d_1}$ is

Options :

1. ✔ 8

2. ✖ 2

3. ✖ 16

4. ✖ 12

Question Number : 84 Question Id : 342604244 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The velocity of a particle moving along the x – axis varies as a function of time t as $v(t)=\left(1-3t^2+2t^3\right)\text{m/s}$. If its position at t = 0 is $x = 0$ then at t = 2 s, its position is

Options :

1. ✖ 1 m

2. ✔ 2 m

3. ✖ 4 m

4. ✖ 18 m

Question Number : 85 Question Id : 342604245 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The y-component of vector $\vec{A}$ is +3.0 m if $\vec{A}$ makes an angle of 30° counter clockwise from the positive y – axis, the magnitude of $\vec{A}$ is
(assume $\vec{A}$ is in x – y plane)

Options :

1. $2\sqrt{3}\,\text{m}$ ✔

2. $\sqrt{11}\,\text{m}$ ✖

3. $\sqrt{15}\,\text{m}$ ✖

4. $\sqrt{21}\,\text{m}$ ✖

Question Number : 86 Question Id : 342604246 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Find the component of vector $\vec{P} = 2\hat{i} + 3\hat{j}$ along the direction of vector $\vec{Q} = \hat{i} + \hat{j}$.

Options :

1. ✖ 2

2. ✖ $2\sqrt{5}$

3. ✔ $\frac{5}{\sqrt{2}}$

4. ✖ $\frac{\sqrt{2}}{5}$

Question Number : 87 Question Id : 342604247 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 minimum speed of the roller-coaster so that the passenger at the top, when becomes upside down, do not fall out? Consider the acceleration due to gravity as $10\,m/s^2$, and the radius of curvature of the roller coaster is 10 m.

Options :

1. ✖ $20\ m/s$

2. ✔ $10\ m/s$

15 m/s

3. ✖

25 m/s

4. ✖

Question Number : 88 Question Id : 342604248 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 moves on a horizontal circular road of radius 16 m with increasing speed at a constant rate of $3\ m/s^2$. If the coefficient of friction between the road and tyre is 0.5, then the minimum speed at which the car will skid is
(assume $g = 10\ m/s^2$)

Options :

5 m/s

1. ✖

10 m/s

2. ✖

16 m/s

3. ✖

8 m/s

4. ✔

Question Number : 89 Question Id : 342604249 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 small block sliding down an inclined plane of inclination 30° with the horizontal. The coefficient of friction is $\mu = \frac{2}{3}x$, where x is the distance (in meter) through which the mass slides down. The distance covered by the mass before it stops is

Options :

1. ✖ $\frac{\sqrt{3}}{2}\,\mathrm{m}$

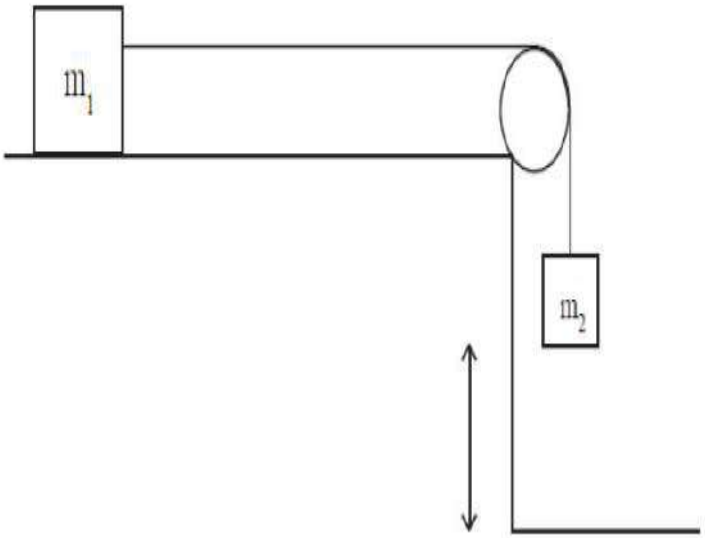
2. ✔ $\sqrt{3}\,\mathrm{m}$

3. ✖ $\frac{2}{\sqrt{3}}\,\mathrm{m}$

4. ✖ $2\sqrt{3}\,\mathrm{m}$

Question Number : 90 Question Id : 342604250 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Consider two masses m_1 and m_2 are connected through a pully. Mass 'm_2' starts from rest at height 'h' and falls down. With what speed it hits the ground?
(Assume no friction and massless strings & pulleys)



Options :

1. $\sqrt{\left(\frac{m_2}{m_1+m_2}\right)gh}$ ✖

2. $\sqrt{2gh}$ ✖

3. $\sqrt{\left(\frac{m_2}{m_1+m_2}\right)2gh}$ ✔

4. $\sqrt{\left(\frac{m_1}{m_1+m_2}\right)2gh}$ ✖

Question Number : 91 Question Id : 342604251 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 earth shrinks to $\frac{1}{8}$ of its original volume, while maintaining the same mass, then the duration of the day will be

Options :

1. 8 hrs ✖

2. 48 hrs ✖

3. 6 hrs ✔

4. 72 hrs ✖

Question Number : 92 Question Id : 342604252 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A thin uniform rod of mass 1 kg and length 1 m is hanged at one end to the ground floor. It originally stands vertically and allowed to fall to the ground. If the rod hits the ground with angular speed ω then the correct statement is
(Assume $g = 10\ m/s^2$)

Options :

1. $\omega = \sqrt{30}\ \text{rad/s}$ ✔

2. $\omega = \sqrt{20}\ \text{rad/s}$ ✖

3. $\omega = 5\ \text{rad/s}$ ✖

4. $\omega = 6\,\text{rad/s}$ ✖

Question Number : 93 Question Id : 342604253 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A particle is executing simple harmonic motion (SHM). Its acceleration at a distance of 1 cm from the mean position is 3 cm/s^2. If its velocity is 6 cm/s when it is at a distance of 2 cm from its mean position, then the amplitude of SHM is

Options :

1. $5\ \text{cm}$ ✖

2. $4\ \text{cm}$ ✔

3. $2\sqrt{3}\ \text{cm}$ ✖

$3\sqrt{2}$ cm

4. ✖

Question Number : 94 Question Id : 342604254 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Four identical masses of m are kept at corners of a square. If the gravitational force exerted on one of masses by the other masses is $\left(\frac{2\sqrt{2}+1}{32}\right)\frac{Gm^2}{L^2}$, then the length of the side of the square is

Options :

1. ✖ L

2. ✖ 2 L

3. ✔ 4 L

4. ✖ L/2

Question Number : 95 Question Id : 342604255 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The length of a metal wire is L, when it is subjected to tension T. If the tension is increased to $T+\Delta T$, the length becomes $L+\Delta L$. The natural length of the wire is

Options :

1. ✔ $\frac{L(\Delta T)-(\Delta L)T}{\Delta T}$

2. ✖ $L-2\Delta L$

3. ✖ $\Delta L\left(\frac{\Delta T}{T}\right)$

4. ✖ $\frac{T(\Delta L)-L(\Delta T)}{\Delta T}$

Question Number : 96 Question Id : 342604256 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 terminal velocity of air bubble of 1.0 mm in diameter rising in liquid of viscosity 0.85 Ns/m^2 and density 900 kgm^{-3}?
[air density 1.293 kg/m^3, $g = 9\ m/s^2$]

Options :

1. ✖ $V_T = 0.25\ mm/s$

2. ✔ $V_T = 0.5$ mm/s

3. ✖ $V_T = 1.5$ mm/s

4. ✖ $V_T = 2.5$ mm/s

Question Number : 97 Question Id : 342604257 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A steel wire and a copper wire are joined end to end having equal cross section. The elongation of two wires are found to be equal under tension. What is the ratio of the length of the steel to the length of copper wire?
(Young modulus of steel = 2.0×10^{11} Nm^{-2} and
Young modulus of copper = 1.1×10^{11} Nm^{-2})

Options :

1. ✖ 1: 2

2. ✖ 2: 1

3. ✔ 20: 11

4. ✖ 11: 20

Question Number : 98 Question Id : 342604258 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A metal ball initially at pressure of 10^5 P_a is heated from 20 °C to 127 °C keeping its volume constant. The coefficient of linear expansion of metal is 10^{-5} °C^{-1} and bulk modulus of metal is 2×10^{11} N/m^2. The pressure inside the ball becomes

Options :

1. ✖ 2×10^8 Pa

2. ✔ 6×10^8 Pa

3. ✖ 1×10^9 Pa

4. ✖ 4×10^8 Pa

Question Number : 99 Question Id : 342604259 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Two spheres of same material and radii 5 m and 2 m are at temperature 200 K and 2500 K respectively. The ratio of energies radiated by them per second is

Options :

1. ✔ 64: 25

2. ✖ $36: 75$

3. ✖ $128: 625$

4. ✖ $16: 125$

Question Number : 100 Question Id : 342604260 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

500 g of water is heated from 30 °C to 90 °C. What is the change in its internal energy? (Specific heat of water is 4184 J kg^{-1} K^{-1})

Options :

1. ✔ 1.25×10^5 J

2. ✖ 2.0×10^5 J

3. ✖ 1.3×10^4 J

4. ✖ 2.0×10^4 J

Question Number : 101 Question Id : 342604261 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A tyre pumped to a pressure of 2 atmosphere, suddenly bursts. If the temperature of air before expansion is T then the air temperature after the tyre busts is

(Assume the expansion is adiabatic and adiabatic constant $\gamma = \frac{3}{2}$)

Options :

1. $\frac{T}{\sqrt{2}}$ ✖

2. $\frac{\sqrt{2}\,T}{3}$ ✖

3. $\frac{T}{3\sqrt{2}}$ ✔

4. $\frac{2T}{3}$ ✖

Question Number : 102 Question Id : 342604262 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 gas with molar mass M. If the sound at frequency f is introduced to a tube of this gas at temperature T then an internal acoustic standing wave is set up with nodes separated by L. The adiabatic constant $\left(\gamma = C_p/C_v\right)$ is

Options :

1. ✖ $\frac{M f^2 L^2}{RT}$

2. ✖ $\frac{M f^2 L^2}{4RT}$

3. ✔ $\frac{4M f^2 L^2}{RT}$

4. ✖ $\frac{3M f^2 L^2}{2RT}$

Question Number : 103 Question Id : 342604263 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Two vibrating strings 'A' and 'B' produce beats of frequency 8 Hz. The beat frequency is found to reduce to 4 Hz if the tension in the string 'A' is slightly reduced. If the original frequency of A is 320 Hz, then the frequency of 'B' is

Options :

1. ✖

324 Hz

2. ✔ 312 Hz

3. ✖ 316 Hz

4. ✖ 328 Hz

Question Number : 104 Question Id : 342604264 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Two lenses of power $-1.6D$ and $+2.1D$ respectively are placed in contact. The focal length of the combination is

Options :

1. ✖ 100 cm

2. ✔ 200 cm

3. ✖ 160 cm

4. ✖ 210 cm

Question Number : 105 Question Id : 342604265 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In Young's double slit experiment using monochromatic light of wavelength λ, the intensity of light at a point on the screen where the path difference is $\frac{\lambda}{3}$, is I_0. What is the intensity of light at a point where the path difference is λ?

Options :

1. ✖ $2\,I_0$

2. ✔ $4\,I_0$

3. ✖ $\frac{I_0}{2}$

4. ✖ $\frac{\sqrt{3}}{2} I_0$

Question Number : 106 Question Id : 342604266 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Two infinitely long thin straight wires having uniform linear charge densities 2λ and 3λ are arranged parallel to each other at a distance R apart. The intensity at a point midway between them is

Options :

1. $\frac{\lambda}{2\pi \in_0 R}$ ✖

2. $\frac{\lambda}{\pi \in_0 R}$ ✔

3. $\frac{5\lambda}{\pi \in_0 R}$ ✖

4. $\frac{2\lambda}{3\pi \in_0 R}$ ✖

Question Number : 107 Question Id : 342604267 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 spherical drop of mercury of radius R with capacitance $C = 4\pi \in_0 R$. If two such droplets combine to form a larger one, what would be its capacitance in terms of C?

Options :

1. $3^{1/3} C$ ✖

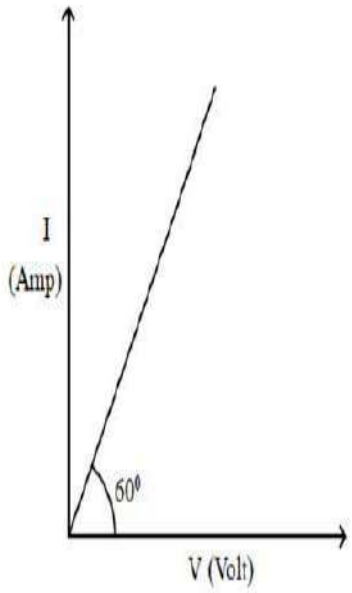
2. ✖ $3^{2/3}\,C$

3. ✖ $2^{2/3}\,C$

4. ✔ $2^{1/3}\,C$

Question Number : 108 Question Id : 342604268 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Current flowing through a circuit is shown in the figure then the resistance of the circuit is



Options :

1. ✖ cannot be determined

2. ✔ $\frac{1}{\sqrt{3}}\Omega$

3. ✖ $\frac{\sqrt{3}}{4}\Omega$

4. ✖ $\frac{1}{2}\Omega$

Question Number : 109 Question Id : 342604269 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The force acting on a current carrying wire joining two fixed points A and B in a uniform magnetic field

Options :

1. ✖ increases exponentially with increase in current

2. ✖ is inversely proportional to the magnitude of the magnetic field

3. ✔ is independent of the shape of the wire

4. ✖ is parallel to the direction of the magnetic field

Question Number : 110 Question Id : 342604270 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 number of turns per unit length of a solenoid is doubled, what happens to the magnetic field in the solenoid?

Options :

1. ✖ It remains unchanged

2. ✖ It becomes half

3. ✔ It doubles

4. ✖ It quadruples

Question Number : 111 Question Id : 342604271 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The magnetic field intensity (H) at the centre of a long solenoid carrying a current of 2 A, is found to be 1000 A/M. The number of turns per centimetre of the solenoid is
(Use $\mu_0 = 4\pi \times 10^{-7}$ TM/A)

Options :

1. ✖ 500

2. ✖ 50

3. ✔ 5

4. ✖ 100

Question Number : 112 Question Id : 342604272 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 cube of side of 1 mm is placed at the centre of a circular loop of radius 20 cm. If the current in the loop is 2 A then the magnetic energy stored inside the cube is (Assume $\mu_0 = 4\pi \times 10^{-7}$ SI units)

Options :

1. ✖ 1.57×10^{-18} J

2. ✖ 2.57×10^{-14} J

3. ✔ 1.57×10^{-14} J

4. ✖ 4.57×10^{-13} J

Question Number : 113 Question Id : 342604273 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A resistance of $20\,\Omega$ is connected to an alternating current source of 110 V. If the frequency of the AC source is 50 Hz, then the time taken by the current to change from its maximum value to the rms value is

Options :

1. ✖ 4 ms

2. ✖ 2.5 s

3. ✖ 2 s

4. ✔ 2.5 ms

Question Number : 114 Question Id : 342604274 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 % of the power of a $(100\,\pi)$ W light bulb is converted to visible radiation, then the average intensity of visible radiation at a distance of 10 m is

Options :

1. ✔ $0.025\ \mathrm{W/m^2}$

2. ✖ $0.01\ \text{W/m}^2$

3. ✖ $0.031\ \text{W/m}^2$

4. ✖ $0.05\ \text{W/m}^2$

Question Number : 115 Question Id : 342604275 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The work function of a metal is hv_0. Light of frequency v falls on this metal. The photoelectric effect will take place only if

Options :

1. ✔ $v > v_0$

2. ✖ $v > 2v_0$

3. ✖ $v < v_0$

4. ✖ $v < \frac{v_0}{2}$

Question Number : 116 Question Id : 342604276 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The mass number of an iodine nucleus and a polonium nucleus is 125 and 216 respectively. The ratio of radius of iodine nucleus to that of polonium nucleus is

Options :

1. 5 : 6 ✔

2. 6 : 5 ✖

3. 7 : 6 ✖

4. 5 : 7 ✖

Question Number : 117 Question Id : 342604277 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The distance between two nucleons for which the potential energy is minimum, is

Options :

1. 0.2 fm ✖

2. 0.6 fm ✖

3. ✔ 0.8 fm

4. ✖ 0.1 fm

Question Number : 118 Question Id : 342604278 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 p – n junction, an electric field of 5×10^5 V/m exists in the depletion region. The minimum kinetic energy of a conduction electron, in order to diffuse from n-side to the p-side, is found to be 3.2×10^{-20} J. The width of the depletion region is

Options :

1. ✖ 2×10^{-4} cm

2. ✖ 8×10^{-5} cm

3. ✖ 5×10^{-6} cm

4. ✔ 4×10^{-5} cm

Question Number : 119 Question Id : 342604279 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A typical integrated circuit (IC) consisting of logic gates ≤ 1000 is termed as

Options :

1. ✖ SSI

2. ✖ VLSI

3. ✔ LSI

4. ✖ MSI

Question Number : 120 Question Id : 342604280 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A signal of 20 kHz is being carried on a carrier wave of 3 MHz . What are the side band frequencies?

Options :

1. ✖ 3050 kHz & 2950 kHz

2. ✖ 3020 kHz & 2970 kHz

3. ✖ 3050 kHz & 2980 kHz

4. ✔ 3020 kHz & 2980 kHz

Chemistry

Section Id :	3426046
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	40
Number of Questions to be attempted :	40
Section Marks :	40
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	3426046
Question Shuffling Allowed :	Yes

Question Number : 121 Question Id : 342604281 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 elements has the highest work function value?

Options :

1. ✖ Na

2. ✖ K

3. ✔ Cu

4. ✖ Ag

Question Number : 122 Question Id : 342604282 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 electron in the d-orbital, the orbital angular momentum is

Options :

1. ✖ $\frac{h}{2\pi}$

2. ✖ $\frac{\sqrt{2}h}{2\pi}$

3. ✖ $\frac{\sqrt{6h}}{2\pi}$

4. ✔ $\frac{\sqrt{6}h}{2\pi}$

Question Number : 123 Question Id : 342604283 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 basic hydroxide among the following is

Options :

1. $Ce(OH)_4$ ✖

2. $Ce(OH)_3$ ✔

3. $Lu(OH)_3$ ✖

4. $Gd(OH)_3$ ✖

Question Number : 124 Question Id : 342604284 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 formula of the compounds formed when group 13 elements (A) reacts with group 16 elements (B) is

Options :

1. AB ✖

2. A_3B_2 ✖

3. ✔ A_2B_3

4. ✖ A_3B_3

Question Number : 125 Question Id : 342604285 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The total number of dative bonds present in all the following CO, NH_4Cl, Al_2Cl_6, $Al(H_2O)_6$, HNO_3 and CO_2 is

Options :

1. ✔ 11

2. ✖ 10

3. ✖ 9

4. ✖ 12

Question Number : 126 Question Id : 342604286 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Among the following compounds, the one with the highest lactice energy is

Options :

1. ✖ LiF

2. ✖ $NaCl$

3. ✔ MgO

4. ✖ $LiCl$

Question Number : 127 Question Id : 342604287 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 rates of diffusion of oxygen and an unknown gas is 1 : 4. The unknown gas is

Options :

1. ✖ SO_2

2. ✖ N_2

3. ✔ H_2

4. ✖ D_2

Question Number : 128 Question Id : 342604288 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Two gases A and B are released from the two ends of a tunnel of length 100 m. A travels 40 min, before meeting the gas B in the tunnel. If the molecular weight of B is 18, what is the molecular weight of A?

Options :

1. ✖ 28.5

2. ✖ 10.5

3. ✖ 8.5

4. ✔ 40.5

Question Number : 129 Question Id : 342604289 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The products P and Q of the following reaction, respectively, are

$$a\,S_8\,(s) + b\,NaOH\,(aq) \longrightarrow P\,(aq) + q\,Q\,(aq) + r\,H_2O$$

Options :

1. ✔ Na_2S ; $Na_2S_2O_3$

2. ✖ Na ; $Na_2S_2O_3$

3. ✖ Na ; Na_2S

4. ✖ SO_2 ; Na_2SO_4

Question Number : 130 Question Id : 342604290 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 state of Cr in CrO_5 is

Options :

1. ✖ 3

2. ✖ 5

3. ✖ 10

4. ✔ 6

Question Number : 131 Question Id : 342604291 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 compounds has the highest standard molar entropy?

Options :

1. $SO_2(g)$ ✖

2. $SO_3(g)$ ✔

3. $CO_2(g)$ ✖

4. $CO(g)$ ✖

Question Number : 132 Question Id : 342604292 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The degree of dissociation of 0.1 M acid HA is 5 %. The value of K_c of HA is

Options :

1. 1.3×10^{-4} ✖

2. ✖ 2.6×10^{-3}

3. ✔ 2.6×10^{-4}

4. ✖ 1.3×10^{-2}

Question Number : 133 Question Id : 342604293 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For the reaction $A_{(g)} \rightleftharpoons B_{(g)} + C_{(g)}$, A is 33 % dissociated at a total pressure P. The correct relation between P and K_p is

Options :

1. ✖ $P = K_p$

2. ✖ $P = \frac{1}{4} K_p$

3. ✔ $P = 8K_p$

4. ✖ $P = 2K_p$

Question Number : 134 Question Id : 342604294 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 products during the removal of temporary hardness of water are

Options :

1. $Mg(OH)_2$; $Ca(OH)_2$ ✖

2. $MgCO_3$; $CaCO_3$ ✖

3. $Mg(OH)_2$; $CaCO_3$ ✔

4. $MgCO_3$; $Ca(OH)_2$ ✖

Question Number : 135 Question Id : 342604295 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Which one of the following options is correct pertaining to the below transformations?

$$Na + NH_3(l) \longrightarrow \text{Coloured solution} \xrightarrow{\text{on standing}} X + Y$$

Options :

Colour of the solution	X	Y
Yellow	$NaNH_2$	$\frac{1}{2}H_2$

1. ✖

Colour of the solution	X	Y
Orange	NaN_3	$\frac{9}{2}H_2$

2. ✖

Colour of the solution	X	Y
Blue	$NaNH_2$	$\frac{1}{2}H_2$

3. ✔

Colour of the solution	X	Y
Red	NaN_3	$\frac{9}{2}H_2$

4. ✖

Question Number : 136 Question Id : 342604296 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In the following reaction sequence, the compound C is

$$Al + N_2 \xrightarrow{\Delta} (A) \xrightarrow{H_2O} B\ (ppt) + C\ (g)$$

Options :

1. ✖ NO_2

2. ✔ NH_3

3. ✖ NO

4. ✖ N_2

Question Number : 137 Question Id : 342604297 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Diamond is extremely hard whereas graphite is soft. This is because

Options :

1. ✖ diamond is covalent, whereas graphite is ionic

2. ✖ diamond is ionic whereas graphite is covalent

3. ✔

each carbon atom in diamond is chemically bonded to greater number of neighbouring carbon atoms

certain atoms in diamond are smaller in size

4. ✖

Question Number : 138 Question Id : 342604298 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Ozone is formed in the upper atmosphere by a photochemical reaction with O_2 in the presence of

Options :

Ultraviolet solar radiation

1. ✔

Infrared radiation

2. ✖

Visible light

3. ✖

Microwave radiation

4. ✖

Question Number : 139 Question Id : 342604299 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The energy difference between the staggered and eclipsed conformations of ethane is

Options :

1. ✖ 6.5 kJ / mol

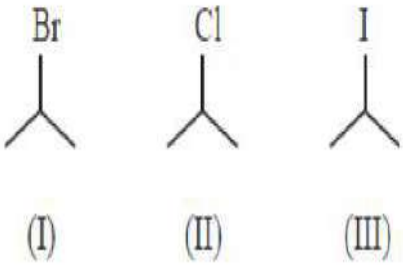
2. ✖ 8.5 kJ / mol

3. ✖ 10.5 kJ / mol

4. ✔ 12.5 kJ / mol

Question Number : 140 Question Id : 342604300 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The correct order of rate of dehydrohologenation of the following halides in the presence of alcoholic KOH is



(I) (II) (III)

Options :

1. ✖ (II) > (I) > (III)

2. ✖ (III) > (II) > (I)

3. ✔ (III) > (I) > (II)

4. ✖ (I) > (II) > (III)

Question Number : 141 Question Id : 342604301 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The correct order of acidity of the following compounds is

I) $CH_3 - C \equiv CH$

II) $F_3C - C \equiv CH$

III) $CH_3C \equiv CCH_3$

IV) $CH_3CH = CHCH_3$

Options :

1. ✖ (I) > (II) > (III) > (IV)

2. ✖ (I) > (III) > (II) > (IV)

3. ✖ (II) > (III) > (I) > (IV)

4. ✔

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

Question Number : 142 Question Id : 342604302 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Potassium crystallizes in FCC lattice with unit cell length of 0.5 nm. The approximate density (in g cm^{-3}), if it contains 0.1 % Schottky defects is

Options :

1. ✖ 1.2

2. ✔ 2.1

3. ✖ 1.7

4. ✖ 2.8

Question Number : 143 Question Id : 342604303 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The trend in the colligative properties for the same concentration of $BaCl_2$, $MgCl_2$ and NaCl, respectively, is

Options :

1. ✖

$NaCl > MgCl_2 > BaCl_2$

2. ✖ $NaCl > BaCl_2 > MgCl_2$

3. ✖ $MgCl_2 = BaCl_2 < NaCl$

4. ✔ $MgCl_2 = BaCl_2 > NaCl$

Question Number : 144 Question Id : 342604304 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

A and B on mixing form an ideal solution at room temperature. Which of the following options is correct for this process?

Options :

1. ✖

ΔG	ΔS System	ΔS Surroundings	ΔH
−	+	+	+

2. ✖

ΔG	ΔS System	ΔS Surroundings	ΔH
+	+	0	+

ΔG	ΔS System	ΔS Surroundings	ΔH
−	+	0	0

3. ✔

ΔG	ΔS System	ΔS Surroundings	ΔH
−	−	+	+

4. ✖

Question Number : 145 Question Id : 342604305 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 reactant quotient (Ø) for the cell is

$Zn\ (s) / Zn^{2+}\ (0.01\ M) \parallel Cu^{2+}(1.25\ M) / Cu\ (s)$

Options :

1. ✖ 1

2. ✖ 2×10^{-2}

3. ✔ 8×10^{-3}

4. ✖ 1.25

Question Number : 146 Question Id : 342604306 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 sequence of reaction

$$A \xrightarrow{k_1} X \xrightarrow{k_2} Y \xrightarrow{k_3} Z$$

$k_3 > k_2 > k_1$, then the rate determining step is

Options :

1. ✖ $A \longrightarrow Z$

2. ✔ $A \longrightarrow X$

3. ✖ $Y \longrightarrow Z$

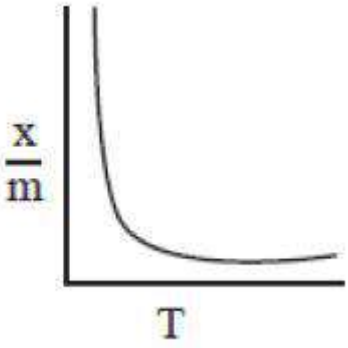
4. ✖ $X \longrightarrow Y$

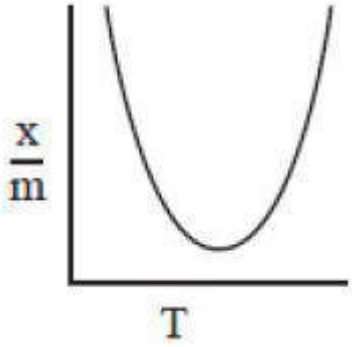
Question Number : 147 Question Id : 342604307 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Which plot is the adsorption isobar for chemisorption?

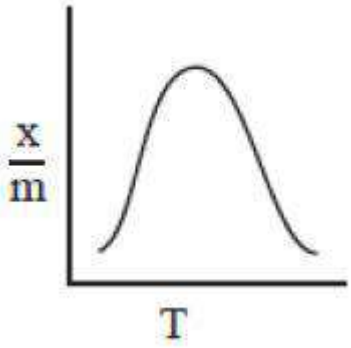
Options :

1. ✖

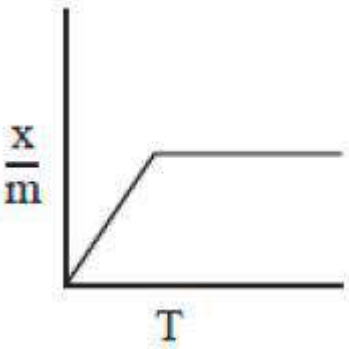




2. ✖



3. ✔



4. ✖

Question Number : 148 Question Id : 342604308 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The boiling point of hydrogen halides varies in the order

Options :

1. $HF > HI > HBr > HCl$ ✔

2. $HF > HCl > HBr > HI$ ✖

3. $HI > HBr > HCl > HF$ ✖

4. $HBr > HI > HCl > HF$ ✖

Question Number : 149 Question Id : 342604309 Question Type : MCQ Option Shuffling : Yes

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

Correct Marks : 1 Wrong Marks : 0

The correct order of bond angles of the following compounds is

Options :

1. $H_2O < H_2S < H_2Se < H_2Te$ ✖

2. $H_2S < H_2O < H_2Se < H_2Te$ ✖

3. $H_2Se < H_2S < H_2O < H_2Te$ ✖

4. ✔ $H_2Te < H_2Se < H_2S < H_2O$

Question Number : 150 Question Id : 342604310 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The hybridisation of central atom I of IF_7 is

Options :

1. ✖ sp^2d^4

2. ✖ sp^3d^2

3. ✖ sp^3d^1

4. ✔ sp^3d^3

Question Number : 151 Question Id : 342604311 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Assertion (A) : VF_5 is stable while VCl_5 is not.

Reason (R) : Fluorine stabilises the higher oxidation state due to its higher bond enthalpy.

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 : 152 Question Id : 342604312 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-I Complex		Column-II Structure / Geometry / Property
A)	$[Ni(CN)_4]^{2-}$	I)	Tetrahedral / Paramagnetic
B)	$[Ni(CO)_4]$	II)	Tetrahedral / Diamagnetic
C)	$[NiCl_4]^{2-}$	III)	Square planar / Diamagnetic

The correct match is

Options :

1. ✖

A	B	C
II	I	III

2. ✖

A	B	C
I	II	III

3. ✔

A	B	C
III	II	I

4. ✖

A	B	C
III	I	II

Question Number : 153 Question Id : 342604313 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A polypeptide can be called as protein when its mass is

Options :

1. ✔ $> 10{,}000$ u

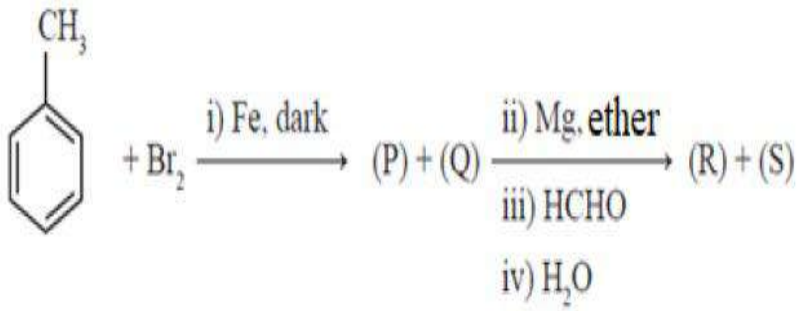
2. ✖ 5,000 to 6,000 u

3. ✖ 7,000 to 8,000 u

4. ✖ 4,000 to 5,000 u

Question Number : 154 Question Id : 342604314 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

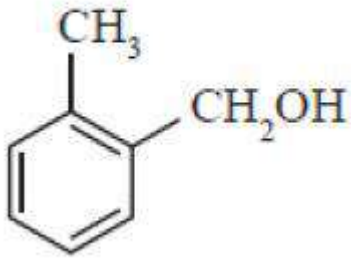
The possible final products (R) and (S) of the following reaction sequence are



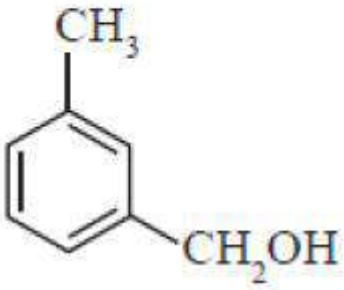
Options :

1. ✖

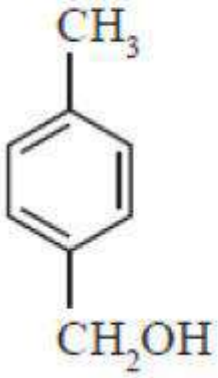
R



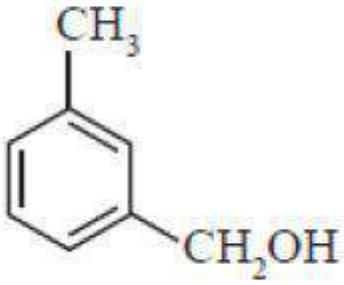
S



R

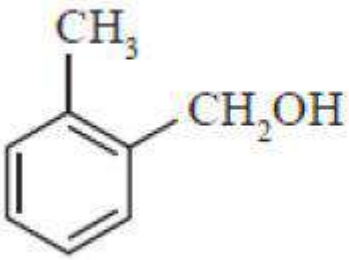


S

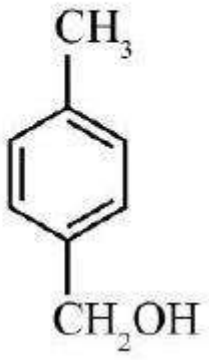


2. ✖

R



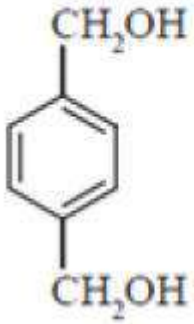
S



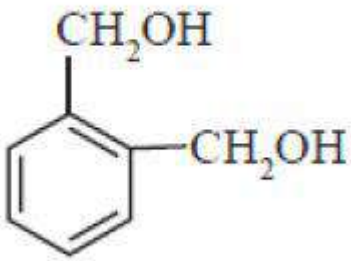
3. ✔

4. ✖

R

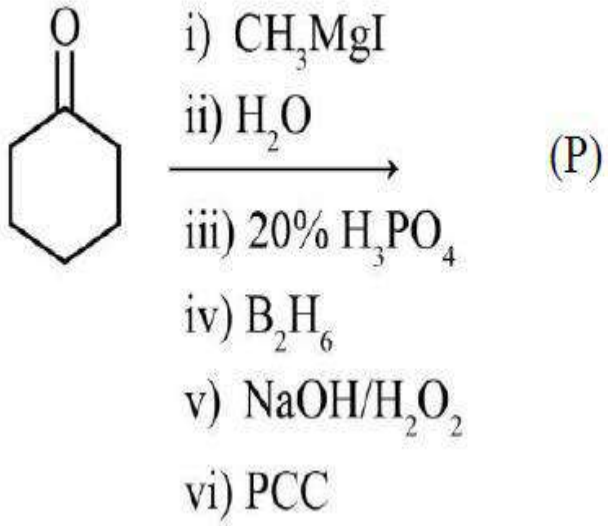


S



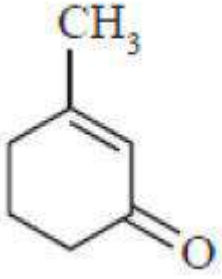
Question Number : 155 Question Id : 342604315 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The major product (P) in the following reaction sequence is

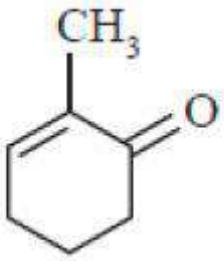


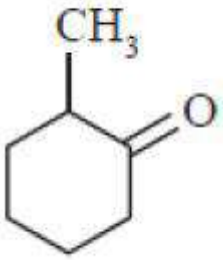
Options :

1. ✖

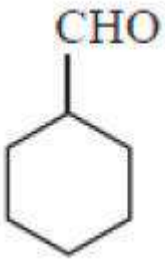


2. ✖





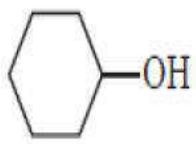
3. ✔



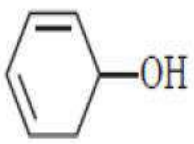
4. ✖

Question Number : 156 Question Id : 342604316 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

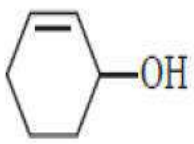
The correct order of decreasing of reactivity towards H_3PO_4 of the following compounds is



I



II



III

Options :

1. ✖ $II > I > III$

2. ✖ $I > III > II$

3. ✔ $II > III > I$

4. ✖ $III > I > II$

Question Number : 157 Question Id : 342604317 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Ethane can be obtained from ethanal in one step by

Options :

1. ✖ $Na - Hg + water$

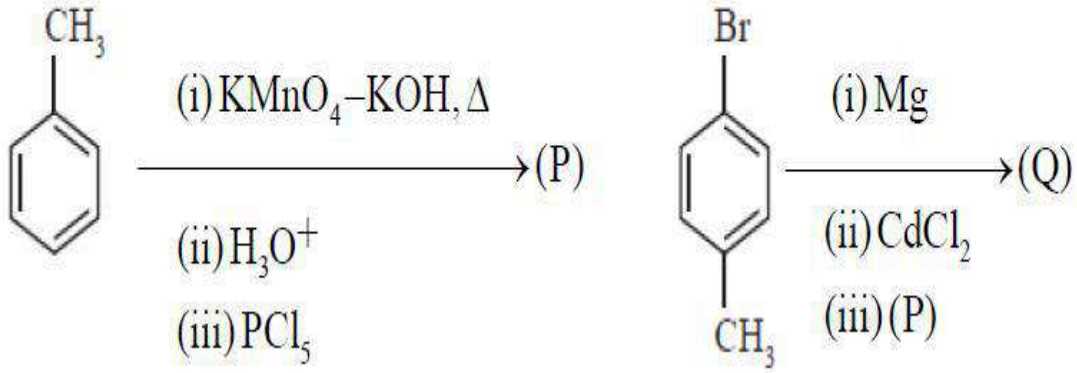
2. ✔ $Zn - Hg + conc.\ HCl$

3. ✖ Aluminium isopropoxide and isopropyl alcohol

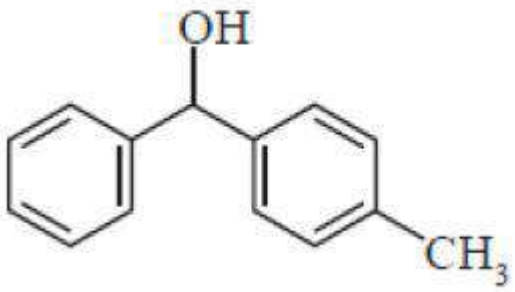
4. ✖ $LiAlH_4 + ether$

Question Number : 158 Question Id : 342604318 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

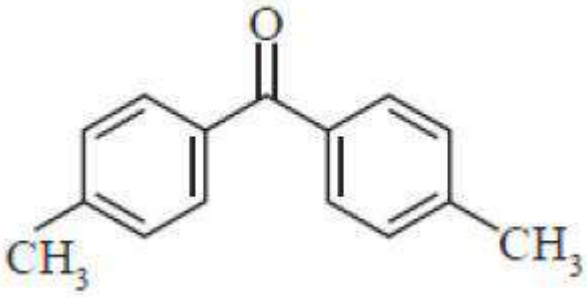
The major product Q of the following schemes is



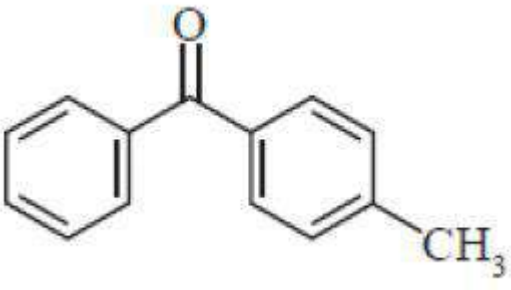
Options :



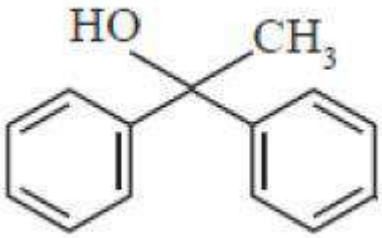
1. ✖



2. ✖



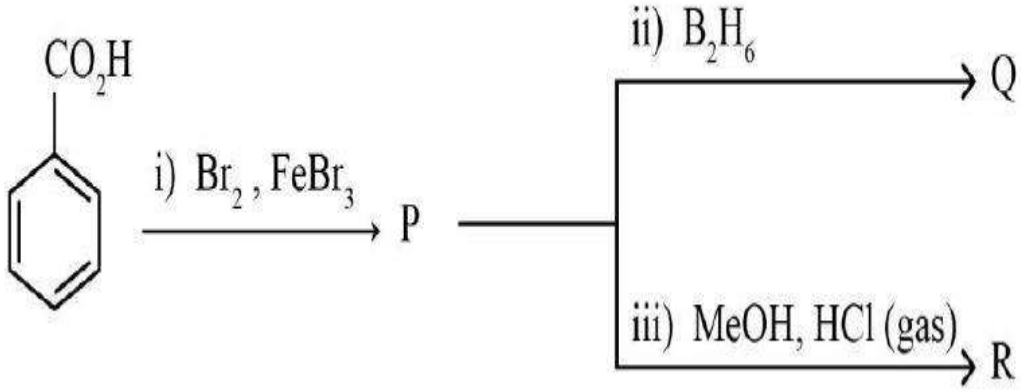
3. ✔



4. ✖

Question Number : 159 Question Id : 342604319 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 products Q and R from the following reactions, respectively are



Options :

Q



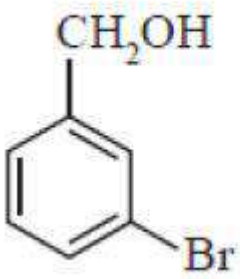
R



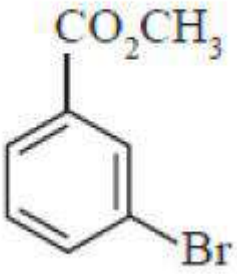
1. ✖

2. ✔

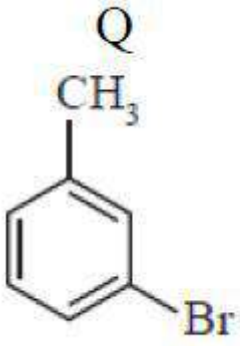
Q



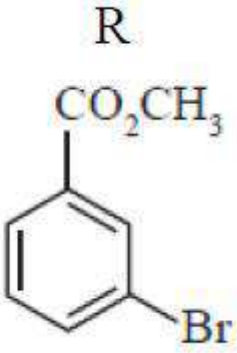
R



Q

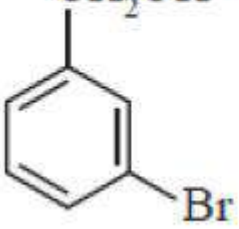


R

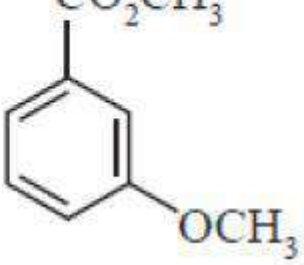


3. ✖

Q



R



4. ✖

Question Number : 160 Question Id : 342604320 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

An amine compound on reaction with benzenesulphonyl chloride gives an organic compound (P) which is highly acidic in nature. The compound P is

Options :

1. ✔



2. ✖



3. ✖



4. ✖

