

# National Testing Agency

<b>Question Paper Name :</b>	B TECH EG 17th March 2021 Shift 1
<b>Subject Name :</b>	B TECH EG
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<b>Total Marks :</b>	300
<b>Display Marks:</b>	Yes

## B TECH EG

<b>Group Number :</b>	1
<b>Group Id :</b>	86435128
<b>Group Maximum Duration :</b>	0
<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>	300
<b>Is this Group for Examiner? :</b>	No

## Physics Section A

<b>Section Id :</b>	864351163
<b>Section Number :</b>	1
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	20
<b>Number of Questions to be attempted :</b>	20
<b>Section Marks :</b>	80
<b>Mark As Answered Required? :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	864351163
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 1 Question Id : 8643512431 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

A car accelerates from rest at a constant rate  $\alpha$  for some time after which it decelerates at a constant rate  $\beta$  to come to rest. If the total time elapsed is  $t$  seconds, the total distance travelled is :

Options :

8643517291.  $\frac{2 \alpha \beta}{(\alpha + \beta)} t^2$

8643517292.  $\frac{\alpha \beta}{2(\alpha + \beta)} t^2$

8643517293.  $\frac{4 \alpha \beta}{(\alpha + \beta)} t^2$

8643517294.  $\frac{\alpha \beta}{4(\alpha + \beta)} t^2$

Question Number : 1 Question Id : 8643512431 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

એક કાર વિરામ સ્થિતિમાંથી અચળ દર  $\alpha$  થી પ્રવેગિત થાય છે. ત્યારબાદ તેટલા જ સમય માટે અચળ દર  $\beta$  થી પ્રતિ પ્રવેગિત થઈ વિરામસ્થિતિમાં આવે છે. જો પસાર થયેલો કુલ સમય  $t$  સેકન્ડ હોય તો કપાયેલ કુલ અંતર \_\_\_\_\_ હશે.

Options :

8643517291.  $\frac{2 \alpha \beta}{(\alpha + \beta)} t^2$

8643517292.  $\frac{\alpha \beta}{2(\alpha + \beta)} t^2$

8643517293.  $\frac{4 \alpha \beta}{(\alpha + \beta)} t^2$

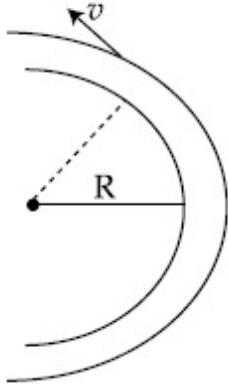
8643517294.  $\frac{\alpha \beta}{4(\alpha + \beta)} t^2$

Question Number : 2 Question Id : 8643512432 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A modern grand - prix racing car of mass  $m$  is travelling on a flat track in a circular arc of radius  $R$  with a speed  $v$ . If the coefficient of static friction between the tyres and the track is  $\mu_s$ , then the magnitude of negative lift  $F_L$  acting downwards on the car is : (Assume forces on the four tyres are identical and  $g$  = acceleration due to gravity)



Options :

8643517295.  $m \left( \frac{v^2}{\mu_s R} + g \right)$

8643517296.  $m \left( g - \frac{v^2}{\mu_s R} \right)$

8643517297.  $m \left( \frac{v^2}{\mu_s R} - g \right)$

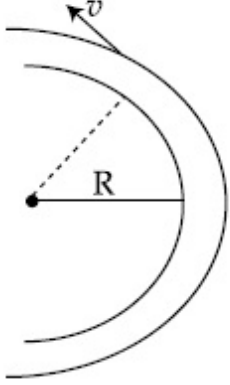
8643517298.  $- m \left( g + \frac{v^2}{\mu_s R} \right)$

Question Number : 2 Question Id : 8643512432 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

એક  $m$  દળ ધરાવતી અઘતન ગ્રાન્ડ-પ્રીક્ષ રેસીંગ કાર,  $R$  ત્રિજ્યાનાં વર્તુળાકાર સપાટ રસ્તા પર  $v$  જેટલી ઝડપથી ગતિ કરે છે. બે ટાયર અને રસ્તા વચ્ચે સ્થિત ઘર્ષણાંક  $\mu_s$  હોય તો કાર પર નીચે તરફ લાગતા ઋણ ઉત્પ્લાવક (lift)  $F_L$  નું મૂલ્ય \_\_\_\_\_ હશે. (આરેય ટાયરો પર લાગતું બળ સમાન ધારો અને  $g =$  ગુરુત્વપ્રવેગ)



Options :

8643517295.  $m \left( \frac{v^2}{\mu_s R} + g \right)$

8643517296.  $m \left( g - \frac{v^2}{\mu_s R} \right)$

8643517297.  $m \left( \frac{v^2}{\mu_s R} - g \right)$

8643517298.  $-m \left( g + \frac{v^2}{\mu_s R} \right)$

Question Number : 3 Question Id : 8643512433 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A Carnot's engine working between 400 K and 800 K has a work output of 1200 J per cycle. The amount of heat energy supplied to the engine from the source in each cycle is :

Options :

8643517299. 2400 J

8643517300. 1600 J

8643517301. 3200 J

8643517302. 1800 J

**Question Number : 3 Question Id : 8643512433 Question Type : MCQ Option Shuffling : Yes Is****Question Mandatory : No****Correct Marks : 4 Wrong Marks : 1**

400 K અને 800 K વચ્ચે કાર્યરત એક કાર્નો એન્જિન 1200 J પ્રતિ ચક્ર (cycle) આઉટપુટ આપે છે. સ્ત્રોત દ્વારા દર ચક્રીય પ્રક્રિયા દરમિયાન એન્જિનને પૂરી પડતી ઉષ્મા ઊર્જા \_\_\_\_\_ છે.

**Options :**

8643517299. 2400 J

8643517300. 1600 J

8643517301. 3200 J

8643517302. 1800 J

**Question Number : 4 Question Id : 8643512434 Question Type : MCQ Option Shuffling : Yes Is****Question Mandatory : No****Correct Marks : 4 Wrong Marks : 1**

A solenoid of 1000 turns per metre has a core with relative permeability 500. Insulated windings of the solenoid carry an electric current of 5 A. The magnetic flux density produced by the solenoid is : (permeability of free space =  $4\pi \times 10^{-7}$  H/m)

**Options :**8643517303.  $10^{-4}\pi$  T8643517304.  $2 \times 10^{-3}\pi$  T8643517305.  $\frac{\pi}{5}$  T8643517306.  $\pi$  T**Question Number : 4 Question Id : 8643512434 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

1000 આંટા ધરાવતાં એક સોલેનોઈડનો ગર્ભ 500 જેટલી સાપેક્ષ પારગમ્યતા (ના દ્રવ્ય) નો બનેલો છે. સોલેનોઈડનાં અલગ કરેલા (Insulated) આંટામાંથી પસાર થતો વિદ્યુતપ્રવાહ 5 A છે. સોલેનોઈડ દ્વારા ઉત્પન્ન ચુંબકીય ફ્લક્સ ઘનતા \_\_\_\_\_ છે. (મુક્ત અવકાશની પારગમ્યતા =  $4\pi \times 10^{-7} \text{ H/m}$ )

**Options :**

8643517303.  $10^{-4}\pi \text{ T}$

8643517304.  $2 \times 10^{-3}\pi \text{ T}$

8643517305.  $\frac{\pi}{5} \text{ T}$

8643517306.  $\pi \text{ T}$

**Question Number : 5 Question Id : 8643512435 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A current of 10 A exists in a wire of crosssectional area of 5 mm<sup>2</sup> with a drift velocity of  $2 \times 10^{-3} \text{ ms}^{-1}$ . The number of free electrons in each cubic meter of the wire is \_\_\_\_\_.

**Options :**

8643517307.  $2 \times 10^6$

8643517308.  $1 \times 10^{23}$

8643517309.  $625 \times 10^{25}$

8643517310.  $2 \times 10^{25}$

**Question Number : 5 Question Id : 8643512435 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

5 mm<sup>2</sup> આડછેદનું ક્ષેત્રફળ ધરાવતાં અને  $2 \times 10^{-3} \text{ ms}^{-1}$  નો ડ્રિફ્ટ-વેગ ધરાવતાં તારમાં 10 A નો પ્રવાહ છે. તારના દરેક ઘનમીટરમાં રહેલ મુક્ત ઇલેક્ટ્રોન્સની સંખ્યા \_\_\_\_\_ છે.

**Options :**

8643517307.  $2 \times 10^6$

8643517308.  $1 \times 10^{23}$

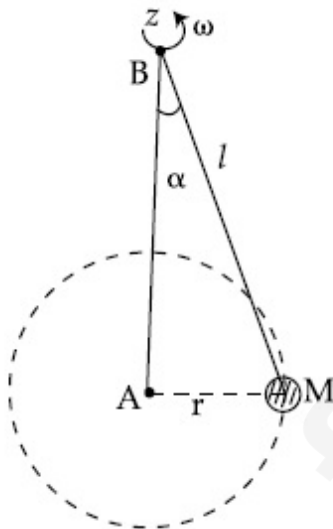
8643517309.  $625 \times 10^{25}$

8643517310.  $2 \times 10^{25}$

**Question Number : 6 Question Id : 8643512436 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A mass  $M$  hangs on a massless rod of length  $l$  which rotates at a constant angular frequency. The mass  $M$  moves with steady speed in a circular path of constant radius. Assume that the system is in steady circular motion with constant angular velocity  $\omega$ . The angular momentum of  $M$  about point  $A$  is  $L_A$  which lies in the positive  $z$  direction and the angular momentum of  $M$  about point  $B$  is  $L_B$ . The correct statement for this system is :



**Options :**

8643517311.  $L_A$  and  $L_B$  are both constant in magnitude and direction

8643517312.  $L_A$  is constant, both in magnitude and direction

8643517313.  $L_B$  is constant, both in magnitude and direction

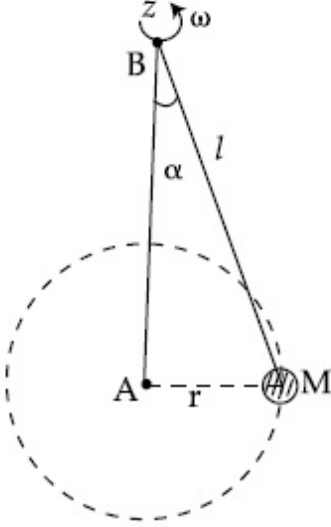
8643517314.  $L_B$  is constant in direction with varying magnitude

**Question Number : 6 Question Id : 8643512436 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

એક  $M$  દળ  $l$  લંબાઈનાં દળરહિત સળિયા, કે જે અચળ કોણીય આવૃત્તિ થી પરિભ્રમણ કરે છે, પર લટકાવેલ છે. એવું ધારો કે તંત્ર એ અચળ કોણીય વેગ  $\omega$  સાથે સ્થિત વર્તુળાકાર પથ પર ગતિમાં છે.  $M$  નું બિંદુ  $A$  આગળ કોણીય વેગમાન  $L_A$  કે જે ધન  $z$  દિશામાં અને  $M$  નું બિંદુ  $B$  આગળ કોણીય વેગમાન  $L_B$  છે. આ તંત્ર માટે સાચું વિધાન \_\_\_\_\_ છે.



**Options :**

8643517311.  $L_A$  અને  $L_B$  બંને મૂલ્ય અને દિશામાં અચળ છે.

8643517312.  $L_A$  એ મૂલ્ય અને દિશાથી અચળ છે.

8643517313.  $L_B$  એ મૂલ્ય અને દિશાથી અચળ છે.

8643517314.  $L_B$  દિશામાં અચળ અને બદલાતા મૂલ્યનું છે.

**Question Number : 7 Question Id : 8643512437 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

An AC current is given by  $I = I_1 \sin \omega t + I_2 \cos \omega t$ . A hot wire ammeter will give a reading :

**Options :**

8643517315.  $\frac{I_1 + I_2}{\sqrt{2}}$

8643517316.  $\frac{I_1 + I_2}{2\sqrt{2}}$

8643517317.  $\sqrt{\frac{I_1^2 + I_2^2}{2}}$

8643517318.  $\sqrt{\frac{I_1^2 - I_2^2}{2}}$

**Question Number : 7 Question Id : 8643512437 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

AC પ્રવાહ  $I = I_1 \sin \omega t + I_2 \cos \omega t$  થી દર્શાવાય છે. એક ગરમ-વાયર (hot wire) એમમીટર \_\_\_\_\_ અવલોકન આપશે.

**Options :**

8643517315.  $\frac{I_1 + I_2}{\sqrt{2}}$

8643517316.  $\frac{I_1 + I_2}{2\sqrt{2}}$

8643517317.  $\sqrt{\frac{I_1^2 + I_2^2}{2}}$

8643517318.  $\sqrt{\frac{I_1^2 - I_2^2}{2}}$

**Question Number : 8 Question Id : 8643512438 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A polyatomic ideal gas has 24 vibrational modes. What is the value of  $\gamma$  ?

**Options :**

8643517319. 10.3

8643517320. 1.30

8643517321. 1.03

8643517322. 1.37

**Question Number : 8 Question Id : 8643512438 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

એક બહુપરમાણ્વીય આદર્શ વાયુને 24 દોલન ગતિ અવસ્થા છે.  $\gamma$  નું મૂલ્ય કેટલું હશે ?

**Options :**

8643517319. 10.3

8643517320. 1.30

8643517321. 1.03

8643517322. 1.37

**Question Number : 9 Question Id : 8643512439 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

When two soap bubbles of radii  $a$  and  $b$  ( $b > a$ ) coalesce, the radius of curvature of common surface is :

**Options :**

8643517323.  $\frac{ab}{b-a}$ 8643517324.  $\frac{ab}{a+b}$ 8643517325.  $\frac{b-a}{ab}$ 8643517326.  $\frac{a+b}{ab}$ 

**Question Number : 9 Question Id : 8643512439 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

a અને b ( $b > a$ ) ત્રિજ્યાઓ ધરાવતાં સાબુના બે પરપોટાઓ ભેગા થાય છે, ત્યારે તેમના સામાન્ય પૃષ્ઠની વક્રતા ત્રિજ્યા \_\_\_\_\_ થશે.

**Options :**

8643517323.  $\frac{ab}{b-a}$

8643517324.  $\frac{ab}{a+b}$

8643517325.  $\frac{b-a}{ab}$

8643517326.  $\frac{a+b}{ab}$

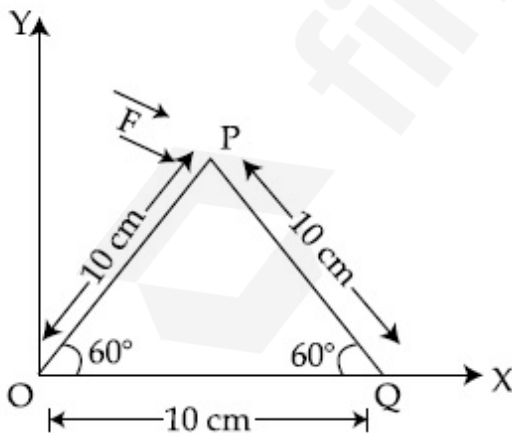
**Question Number : 10 Question Id : 8643512440 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A triangular plate is shown. A force  $\vec{F} = 4\hat{i} - 3\hat{j}$  is applied at point P. The torque at point

P with respect to point 'O' and 'Q' are :



**Options :**

8643517327.  $-15 - 20\sqrt{3}, 15 - 20\sqrt{3}$

8643517328.  $15 + 20\sqrt{3}, 15 - 20\sqrt{3}$

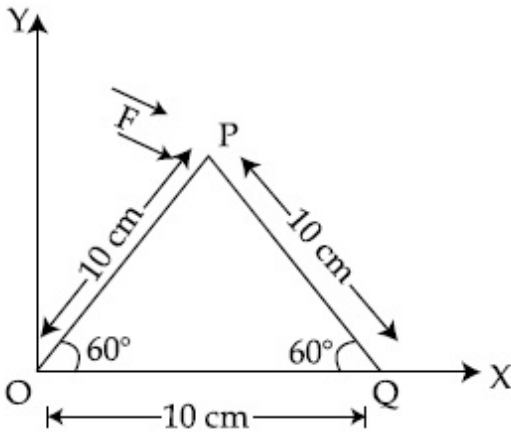
8643517329.  $15 - 20\sqrt{3}, 15 + 20\sqrt{3}$

8643517330.  $-15 + 20\sqrt{3}, 15 + 20\sqrt{3}$

**Question Number : 10 Question Id : 8643512440 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

એક ત્રિકોણાકાર તકતિ દર્શાવેલ છે. બિંદુ P આગળ  $\vec{F} = 4\hat{i} - 3\hat{j}$  લગાડવામાં આવે છે. બિંદુ P આગળ બિંદુ 'O' અને 'Q' ને સાપેક્ષે ટોર્ક \_\_\_\_\_ હશે.



**Options :**

8643517327.  $-15 - 20\sqrt{3}, 15 - 20\sqrt{3}$

8643517328.  $15 + 20\sqrt{3}, 15 - 20\sqrt{3}$

8643517329.  $15 - 20\sqrt{3}, 15 + 20\sqrt{3}$

8643517330.  $-15 + 20\sqrt{3}, 15 + 20\sqrt{3}$

**Question Number : 11 Question Id : 8643512441 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Two identical metal wires of thermal conductivities  $K_1$  and  $K_2$  respectively are connected in series. The effective thermal conductivity of the combination is :

**Options :**

$$\frac{K_1 K_2}{K_1 + K_2}$$

8643517331.

$$\frac{2K_1 K_2}{K_1 + K_2}$$

8643517332.

$$\frac{K_1 + K_2}{2K_1 K_2}$$

8643517333.

$$\frac{K_1 + K_2}{K_1 K_2}$$

8643517334.

**Question Number : 11 Question Id : 8643512441 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

અનુક્રમે  $K_1$  અને  $K_2$  જેટલી ઉષ્મીય વાહકતા ધરાવતાં બે એકસમાન ધાતુ તારોને શ્રેણીમાં જોડવામાં આવ્યા છે. સંયોજનની અસરકારક (સમાસ) ઉષ્મીય વાહકતા \_\_\_\_\_ છે.

**Options :**

$$\frac{K_1 K_2}{K_1 + K_2}$$

8643517331.

$$\frac{2K_1 K_2}{K_1 + K_2}$$

8643517332.

$$\frac{K_1 + K_2}{2K_1 K_2}$$

8643517333.

$$\frac{K_1 + K_2}{K_1 K_2}$$

8643517334.

**Question Number : 12 Question Id : 8643512442 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A boy is rolling a 0.5 kg ball on the frictionless floor with the speed of  $20 \text{ ms}^{-1}$ . The ball gets deflected by an obstacle on the way. After deflection it moves with 5% of its initial kinetic energy. What is the speed of the ball now ?

**Options :**

8643517335.  $1.00 \text{ ms}^{-1}$
8643517336.  $4.47 \text{ ms}^{-1}$
8643517337.  $14.41 \text{ ms}^{-1}$
8643517338.  $19.0 \text{ ms}^{-1}$

**Question Number : 12 Question Id : 8643512442 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

એક છોકરો  $0.5 \text{ kg}$  ના દડાને ઘર્ષણરહિત સપાટી ઉપર  $20 \text{ ms}^{-1}$  જેટલી ઝડપથી ફેરવે છે. રસ્તામાં અડચણને કારણે બોલ પ્રકેરિત (ફંટાય) થાય છે. આ રીતે ફંટાયા બાદ તે તેની પ્રારંભિક ગતિઊર્જાનાં 5% જેટલી ઊર્જાથી ગતિ કરે છે. અત્યારે બોલની ઝડપ કેટલી હશે ?

**Options :**

8643517335.  $1.00 \text{ ms}^{-1}$
8643517336.  $4.47 \text{ ms}^{-1}$
8643517337.  $14.41 \text{ ms}^{-1}$
8643517338.  $19.0 \text{ ms}^{-1}$

**Question Number : 13 Question Id : 8643512443 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The thickness at the centre of a plano convex lens is 3 mm and the diameter is 6 cm. If the speed of light in the material of the lens is  $2 \times 10^8 \text{ ms}^{-1}$ . The focal length of the lens is \_\_\_\_\_.

**Options :**

8643517339. 30 cm
8643517340. 15 cm
8643517341. 1.5 cm

8643517342. 0.30 cm

**Question Number : 13 Question Id : 8643512443 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

એક સમતલીય-બહિર્ગોળ (plano convex) લેન્સનાં કેન્દ્ર આગળ જાડાઈ 3 mm અને વ્યાસ 6 cm છે. જો લેન્સનાં દ્રવ્યમાં પ્રકાશની ઝડપ  $2 \times 10^8 \text{ ms}^{-1}$  હોય તો લેન્સની કેન્દ્રલંબાઈ \_\_\_\_\_ ની નજીકતમ થશે.

**Options :**

8643517339. 30 cm

8643517340. 15 cm

8643517341. 1.5 cm

8643517342. 0.30 cm

**Question Number : 14 Question Id : 8643512444 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which level of the single ionized carbon has the same energy as the ground state energy of hydrogen atom ?

**Options :**

8643517343. 1

8643517344. 4

8643517345. 6

8643517346. 8

**Question Number : 14 Question Id : 8643512444 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

એક-આયનીકૃત કાર્બનનાં કયા (ઊર્જા) સ્તરની ઊર્જા હાઈડ્રોજન પરમાણુની ધરાસ્થિતિ ઊર્જા જેટલી હશે ?

**Options :**

8643517343. 1

8643517344. 4

8643517345. 6

8643517346. 8

**Question Number : 15 Question Id : 8643512445 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Two ideal polyatomic gases at temperatures  $T_1$  and  $T_2$  are mixed so that there is no loss of energy. If  $F_1$  and  $F_2$ ,  $m_1$  and  $m_2$ ,  $n_1$  and  $n_2$  be the degrees of freedom, masses, number of molecules of the first and second gas respectively, the temperature of mixture of these two gases is :

**Options :**

8643517347. 
$$\frac{n_1 F_1 T_1 + n_2 F_2 T_2}{n_1 + n_2}$$

8643517348. 
$$\frac{n_1 F_1 T_1 + n_2 F_2 T_2}{F_1 + F_2}$$

8643517349. 
$$\frac{n_1 F_1 T_1 + n_2 F_2 T_2}{n_1 F_1 + n_2 F_2}$$

8643517350. 
$$\frac{n_1 T_1 + n_2 T_2}{n_1 + n_2}$$

**Question Number : 15 Question Id : 8643512445 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

$T_1$  અને  $T_2$  તાપમાને રહેલા બે આદર્શ બહુ પરમાણ્વીય વાયુને એવી રીતે ભેગા કરવામાં આવે છે કે બેથી ઊર્જા વ્યય થાય નહીં. જો  $F_1$  અને  $F_2$ ,  $m_1$  અને  $m_2$ ,  $n_1$  અને  $n_2$  પ્રથમ અને દ્વિતીય વાયુ માટે અનુક્રમે મુક્તતાનાં અંશો, દળો અને આણુઓની સંખ્યા હોય તો આ બે વાયુઓના મિશ્રણનું તાપમાન \_\_\_\_\_ હશે.

**Options :**

$$8643517347. \quad \frac{n_1 F_1 T_1 + n_2 F_2 T_2}{n_1 + n_2}$$

$$8643517348. \quad \frac{n_1 F_1 T_1 + n_2 F_2 T_2}{F_1 + F_2}$$

$$8643517349. \quad \frac{n_1 F_1 T_1 + n_2 F_2 T_2}{n_1 F_1 + n_2 F_2}$$

$$8643517350. \quad \frac{n_1 T_1 + n_2 T_2}{n_1 + n_2}$$

**Question Number : 16 Question Id : 8643512446 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

For what value of displacement the kinetic energy and potential energy of a simple harmonic oscillation become equal ?

**Options :**

$$8643517351. \quad x = \pm A$$

$$8643517352. \quad x = 0$$

$$8643517353. \quad x = \pm \frac{A}{\sqrt{2}}$$

$$8643517354. \quad x = \frac{A}{2}$$

**Question Number : 16 Question Id : 8643512446 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

सरण आवर्त दोलन माटे स्थानांतरनां क्या मूल्य माटे गतिउर्जा अने स्थिति उर्जा समान थशे ?

**Options :**

$$8643517351. \quad x = \pm A$$

$$8643517352. \quad x = 0$$

$$x = \pm \frac{A}{\sqrt{2}}$$

8643517353.

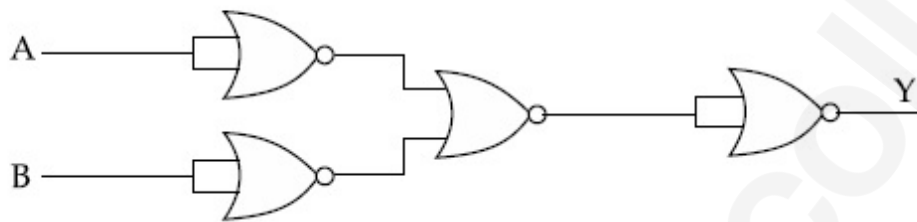
$$x = \frac{A}{2}$$

8643517354.

**Question Number : 17 Question Id : 8643512447 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The output of the given combination gates represents :



**Options :**

8643517355. AND Gate

8643517356. NOR Gate

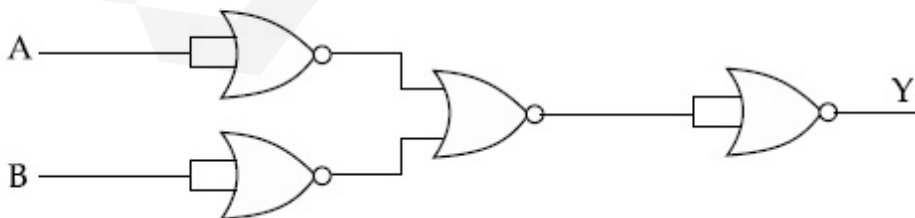
8643517357. NAND Gate

8643517358. XOR Gate

**Question Number : 17 Question Id : 8643512447 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

આપેલ ગેટ સંયોજનનો આઉટપુટ \_\_\_\_\_ દર્શાવે છે.



**Options :**

8643517355. AND ગેટ

8643517356. NOR ગેટ

8643517357. NAND ગેટ

8643517358. XOR ગેટ

**Question Number : 18 Question Id : 8643512448 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

An electron of mass  $m$  and a photon have same energy  $E$ . The ratio of wavelength of electron to that of photon is : ( $c$  being the velocity of light)

**Options :**

8643517359.  $\left(\frac{E}{2m}\right)^{1/2}$ 8643517360.  $c (2mE)^{1/2}$ 8643517361.  $\frac{1}{c} \left(\frac{2m}{E}\right)^{1/2}$ 8643517362.  $\frac{1}{c} \left(\frac{E}{2m}\right)^{1/2}$ 

**Question Number : 18 Question Id : 8643512448 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

$m$  દળ ધરાવતાં ઈલેક્ટ્રોન અને ફોટોનને સમાન ઊર્જા  $E$  છે. ઈલેક્ટ્રોન અને પ્રોટોનની તરંગલંબાઈનો ગુણોત્તર \_\_\_\_\_ છે. ( $c$  એ પ્રકાશનો વેગ છે)

**Options :**

8643517359.  $\left(\frac{E}{2m}\right)^{1/2}$ 8643517360.  $c (2mE)^{1/2}$

$$8643517361. \quad \frac{1}{c} \left( \frac{2m}{E} \right)^{1/2}$$

$$8643517362. \quad \frac{1}{c} \left( \frac{E}{2m} \right)^{1/2}$$

**Question Number : 19 Question Id : 8643512449 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The vernier scale used for measurement has a positive zero error of 0.2 mm. If while taking a measurement it was noted that '0' on the vernier scale lies between 8.5 cm and 8.6 cm, vernier coincidence is 6, then the correct value of measurement is \_\_\_\_\_ cm. (least count = 0.01 cm)

**Options :**

$$8643517363. \quad 8.58 \text{ cm}$$

$$8643517364. \quad 8.56 \text{ cm}$$

$$8643517365. \quad 8.54 \text{ cm}$$

$$8643517366. \quad 8.36 \text{ cm}$$

**Question Number : 19 Question Id : 8643512449 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

માપણી માટે વપરાતા વર્નિયર સ્કેલ ને 0.2 mm જેટલી ધન ત્રુટિ છે. ચોક્કસ માપણી દરમિયાન એવું નોંધવામાં આવ્યું કે વર્નિયર સ્કેલ પરનો '0' એ 8.5 cm અને 8.6 cm ની વચ્ચે આવેલ છે અને વર્નિયરનો 6 માં કાપો બરાબર બંધ બેસતો આવે છે. તો માપનનું સાચું મૂલ્ય \_\_\_\_\_ cm હશે. (લઘુત્તમ માપ શક્તિ = 0.01 cm)

**Options :**

$$8643517363. \quad 8.58 \text{ cm}$$

$$8643517364. \quad 8.56 \text{ cm}$$

$$8643517365. \quad 8.54 \text{ cm}$$

8643517366. 8.36 cm

**Question Number : 20 Question Id : 8643512450 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

If an electron is moving in the  $n^{\text{th}}$  orbit of the hydrogen atom, then its velocity ( $v_n$ ) for the  $n^{\text{th}}$  orbit is given as :

**Options :**

8643517367.  $v_n \propto n^2$

8643517368.  $v_n \propto n$

8643517369.  $v_n \propto \frac{1}{n^2}$

8643517370.  $v_n \propto \frac{1}{n}$

**Question Number : 20 Question Id : 8643512450 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

જો ઈલેક્ટ્રોન હાઈડ્રોજન પરમાણુની  $n$ -મી કક્ષામાં ભ્રમણ કરતો હોય તો  $n$ -મી કક્ષામાં તેનો વેગ ( $v_n$ ) \_\_\_\_\_ વડે આપી શકાય.

**Options :**

8643517367.  $v_n \propto n^2$

8643517368.  $v_n \propto n$

8643517369.  $v_n \propto \frac{1}{n^2}$

8643517370.  $v_n \propto \frac{1}{n}$

## Physics Section B

Section Id :	864351164
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	864351164
Question Shuffling Allowed :	Yes

Question Number : 21 Question Id : 8643512451 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

For VHF signal broadcasting, \_\_\_\_\_ km<sup>2</sup> of maximum service area will be covered by an antenna tower of height 30 m, if the receiving antenna is placed at ground. Let radius of the earth be 6400 km. (Round off to the Nearest Integer) (Take  $\pi$  as 3.14)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 21 Question Id : 8643512451 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

VHF સિગ્નલના પ્રસારણમાં, જો ગ્રહણ (receiving) એન્ટીનાને જમીન પર રાખવામાં આવે, તો 30 m ઊંચાઈ ધરાવતાં એન્ટીના ટોવરને કારણે \_\_\_\_\_ km<sup>2</sup> જેટલો મહત્તમ service વિસ્તાર આવરી શકાય છે. પૃથ્વીની ત્રિજ્યા 6400 km ધારો (નજીકતમ પૂર્ણાંકમાં લખો.) ( $\pi=3.14$  લો )

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 22 Question Id : 8643512452 Question Type : SA

**Correct Marks : 4 Wrong Marks : 0**

If  $2.5 \times 10^{-6}$  N average force is exerted by a light wave on a non - reflecting surface of  $30 \text{ cm}^2$  area during 40 minutes of time span, the energy flux of light just before it falls on the surface is \_\_\_\_\_  $\text{W/cm}^2$ . (Round off to the Nearest Integer)

(Assume complete absorption and normal incidence conditions are there)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 22 Question Id : 8643512452 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

એક પ્રકાશ તરંગ દ્વારા  $30 \text{ cm}^2$  જેટલું ક્ષેત્રફળ ધરાવતી એક અપરાવર્તક સપાટી પર 40 મિનીટનાં સમયગાળામાં પ્રવર્તતું સરેરાશ બળ  $2.5 \times 10^{-6}$  N છે. સપાટી ઉપર આપાત થાય તેના બરાબર પહેલા પ્રકાશ માટે ઊર્જા ફ્લક્સ \_\_\_\_\_  $\text{W/cm}^2$  છે. (નજીકતમ પૂર્ણાંકમાં લખો).

(સંપૂર્ણ શોષણ અને લંબ આપાત થાય છે તેવી સ્થિતિ ધારો.)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

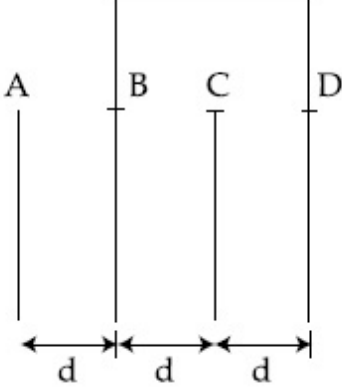
**Possible Answers :**

100

**Question Number : 23 Question Id : 8643512453 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

Four identical rectangular plates with length,  $l = 2$  cm and breadth,  $b = \frac{3}{2}$  cm are arranged as shown in figure. The equivalent capacitance between A and C is  $\frac{x\epsilon_0}{d}$ . The value of  $x$  is \_\_\_\_\_ . (Round off to the Nearest Integer)



**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

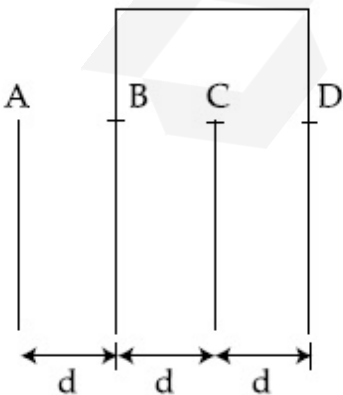
**Question Number :** 23 **Question Id :** 8643512453 **Question Type :** SA

**Correct Marks :** 4 **Wrong Marks :** 0

આકૃતિમાં દર્શાવ્યા અનુસાર  $l = 2$  cm લંબાઈ અને  $b = \frac{3}{2}$  cm જેટલી પહોળાઈ ધરાવતી ચાર એકસમાન લંબચોરસ

પ્લેટોને ગોઠવવામાં આવી છે. A અને C વચ્ચે સમતુલ્ય સંઘારકતા  $\frac{x\epsilon_0}{d}$  છે.  $x$  નું મૂલ્ય \_\_\_\_\_ થશે. (નજીકતમ

પૂર્ણાંકમાં લખો).



**Response Type :** Numeric

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 24 Question Id : 8643512454 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

The equivalent resistance of series combination of two resistors is 's'. When they are connected in parallel, the equivalent resistance is 'p'. If  $s = np$ , then the minimum value for n is \_\_\_\_\_. (Round off to the Nearest Integer)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 24 Question Id : 8643512454 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

બે અવરોધોનાં શ્રેણી સંયોજનનો સમતુલ્ય અવરોધ 's' છે. તેમને જ્યારે સમાંતરમાં જોડવામાં આવે છે ત્યારે સમતુલ્ય અવરોધ 'p' છે. જો  $s = np$  હોય તો n નું ન્યૂનતમ મૂલ્ય \_\_\_\_\_ હશે. (નજીકતમ પૂર્ણાંકમાં લખો)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 25 Question Id : 8643512455 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

A parallel plate capacitor whose capacitance C is 14 pF is charged by a battery to a potential difference  $V = 12$  V between its plates. The charging battery is now disconnected and a porcelain plate with  $k = 7$  is inserted between the plates, then the plate would oscillate back and forth between the plates with a constant mechanical energy of \_\_\_\_\_ pJ.

(Assume no friction)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 25 Question Id : 8643512455 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

14 pF જેટલી સંઘારકતા ધરાવતાં એક સમાંતર પ્લેટ કેપેસિટરને બેટરી દ્વારા તેની પ્લેટો વચ્ચે  $V = 12 \text{ V}$  નાં સ્થિતિમાન તફાવતથી વિદ્યુતભારીત કરવામાં આવે છે. હવે બેટરીને દૂર કરવામાં આવે છે, અને  $k = 7$  વાળી પાર્સેલીન પ્લેટને સંઘારકની પ્લેટોની વચ્ચે દાખલ કરવામાં આવે છે, તો \_\_\_\_\_ pJ જેટલી અચળ યાંત્રિક ઊર્જા સાથે આ પ્લેટ, બે પ્લેટોની વચ્ચે આગળ-પાછળ દોલન કરશે.

(ઘર્ષણ નથી તેમ ધારો)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 26 Question Id : 8643512456 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

The radius in kilometer to which the present radius of earth ( $R = 6400 \text{ km}$ ) to be compressed so that the escape velocity is increased 10 times is \_\_\_\_\_ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 26 Question Id : 8643512456 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

નિષ્ક્રમણ વેગ 10 ગણો વધે તે માટે પૃથ્વીની હાલની ત્રિજ્યા ( $R = 6400 \text{ km}$ ) ને દબાવીને \_\_\_\_\_ km જેટલી ત્રિજ્યા કરવી પડશે.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 27 Question Id : 8643512457 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

The angular speed of truck wheel is increased from 900 rpm to 2460 rpm in 26 seconds. The number of revolutions by the truck engine during this time is \_\_\_\_\_.

(Assuming the acceleration to be uniform).

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 27 Question Id : 8643512457 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

એક ટ્રકનાં પૈડાની કોણીય ઝડપ 26 સેકન્ડમાં 900 rpm થી વધારીને 2460 rpm કરવામાં આવે છે. આ સમયમાં ટ્રકનાં એન્જિનમાં થતા પરિભ્રમણોની સંખ્યા \_\_\_\_\_ છે.

(પ્રવેગ સમાંગ છે તેમ ધારો.)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

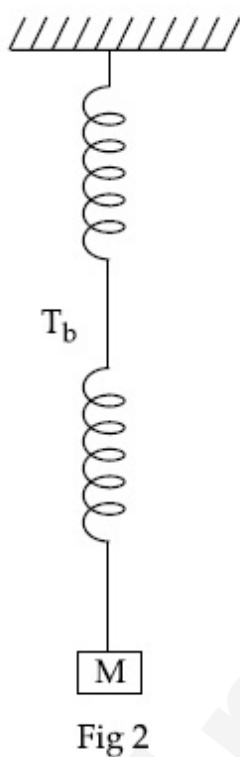
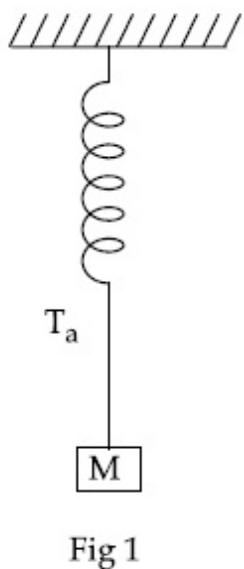
100

**Question Number : 28 Question Id : 8643512458 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

Consider two identical springs each of spring constant  $k$  and negligible mass compared to the mass  $M$  as shown. Fig. 1 shows one of them and Fig. 2 shows their series combination.

The ratios of time period of oscillation of the two SHM is  $T_b/T_a = \sqrt{x}$ , where value of  $x$  is \_\_\_\_\_ . (Round off to the Nearest Integer)



**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

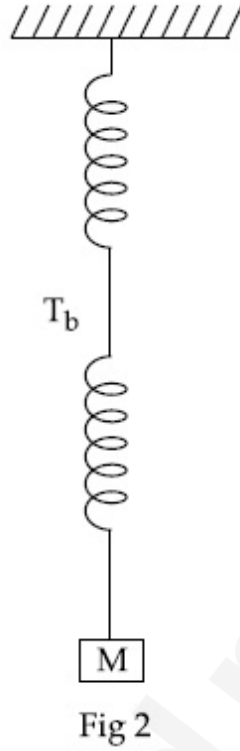
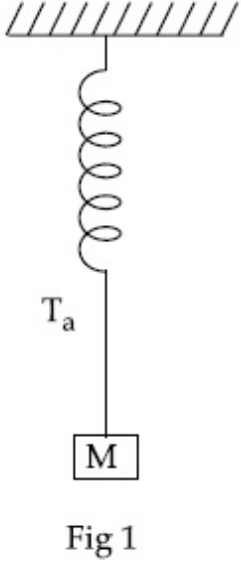
100

**Question Number :** 28 **Question Id :** 8643512458 **Question Type :** SA

**Correct Marks :** 4 **Wrong Marks :** 0

દર્શાવ્યા અનુસાર  $k$  જેટલો સ્પ્રિંગ અચળાંક ધરાવતી અને  $M$  દળની સરખામણીમાં અવગણ્ય દ્રવ્યમાન ધરાવતી બે એકસમાન સ્પ્રિંગો ધ્યાનમાં લો. આકૃતિ 1 તેમાંની એક દર્શાવે છે અને આકૃતિ 2 તેમનું શ્રેણી સંયોજન દર્શાવે છે. આ બે SHM સરળ આવર્ત દોલનો આ દોલનાં આવર્તકાળનો ગુણોત્તર  $T_b/T_a = \sqrt{x}$  છે; જ્યાં  $x$  નું મૂલ્ય \_\_\_\_\_ છે.

(નજીકતમ પૂર્ણાંકમાં લખો)



**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number :** 29 **Question Id :** 8643512459 **Question Type :** SA

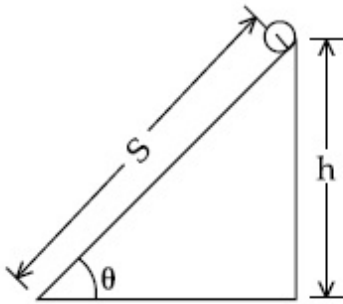
**Correct Marks :** 4 **Wrong Marks :** 0

The following bodies,

- (1) a ring
- (2) a disc
- (3) a solid cylinder
- (4) a solid sphere,

of same mass ' $m$ ' and radius ' $R$ ' are allowed to roll down without slipping simultaneously from the top of the inclined plane. The body which will reach first at the bottom of the inclined plane is \_\_\_\_\_.

[Mark the body as per their respective numbering given in the question]



**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number :** 29 **Question Id :** 8643512459 **Question Type :** SA

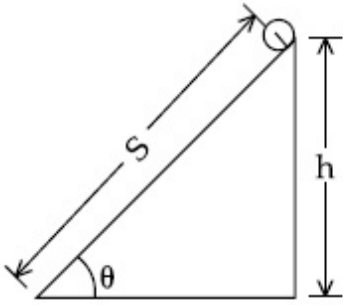
**Correct Marks :** 4 **Wrong Marks :** 0

સમાન દળ 'm' અને ત્રિજ્યા 'R' ધરાવતી નીચે દર્શાવેલ વસ્તુઓ

- (1) રીંગ
- (2) તકિત
- (3) ધન નળાકાર
- (4) ધન ગોળો

ને એકસાથે ઢળતા સમતલ (ઢોળાવ) ની ટોચ પરથી સરક્યા સિવાય ગબડાવવામાં આવે છે. ઢોળાવનાં તળિયે સૌ પ્રથમ પહોંચતી વસ્તુ \_\_\_\_\_ હશે.

[પ્રશ્નમાં દર્શાવેલ નંબર મુજબ વસ્તુને દર્શાવો.]



**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

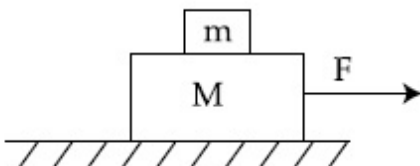
**Possible Answers :**

100

**Question Number :** 30 **Question Id :** 8643512460 **Question Type :** SA

**Correct Marks :** 4 **Wrong Marks :** 0

Two blocks ( $m=0.5$  kg and  $M=4.5$  kg) are arranged on a horizontal frictionless table as shown in figure. The coefficient of static friction between the two blocks is  $\frac{3}{7}$ . Then the maximum horizontal force that can be applied on the larger block so that the blocks move together is \_\_\_\_\_ N. (Round off to the Nearest Integer) [Take  $g$  as  $9.8$   $\text{ms}^{-2}$ ]



**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

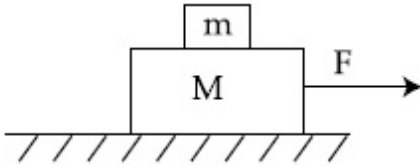
100

**Question Number :** 30 **Question Id :** 8643512460 **Question Type :** SA

**Correct Marks :** 4 **Wrong Marks :** 0

દર્શાવ્યા મુજબ બે ચોસલા ( $m = 0.5 \text{ kg}$  અને  $M = 4.5 \text{ kg}$ ) ને ઘર્ષણરહિત સમક્ષિતિજ ટેબલની સપાટી ઉપર ગોઠવવામાં આવ્યા છે. બે ચોસલાઓ વચ્ચે સ્થિતઘર્ષણાંક  $\frac{3}{7}$  છે. બંને ચોસલાઓ એકી સાથે ગતિ કરે તે માટે મોટા ચોસલાને લગાવવું

પડતું મહત્તમ સમક્ષિતિજ બળ \_\_\_\_\_ N હશે. (નજીકતમ પૂર્ણાંકમાં લખો.) [ $g = 9.8 \text{ ms}^{-2}$  લો]



**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

## Chemistry Section A

<b>Section Id :</b>	864351165
<b>Section Number :</b>	3
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	20
<b>Number of Questions to be attempted :</b>	20
<b>Section Marks :</b>	80
<b>Mark As Answered Required? :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	864351165
<b>Question Shuffling Allowed :</b>	Yes

Question Number : 31 Question Id : 8643512461 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A central atom in a molecule has two lone pairs of electrons and forms three single bonds.  
The shape of this molecule is :

Options :

8643517381. planar triangular

8643517382. T-shaped

8643517383. see-saw

8643517384. trigonal pyramidal

Question Number : 31 Question Id : 8643512461 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

એક આણુનો મધ્યસ્થ પરમાણુ બે અબંધકારક ઈલેક્ટ્રોનનાં યુગ્મો ધરાવે છે અને તે ત્રણ એકલ (single) બંધો બનાવે છે. તો આ આણુનો આકાર શોધો.

Options :

8643517381. સમતલીય સમત્રિકોણીય

8643517382. T-આકારનો

8643517383. ચીંચવો (see-saw)

8643517384. ત્રિકોણીય પિરામિડલ

Question Number : 32 Question Id : 8643512462 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A colloidal system consisting of a gas dispersed in a solid is called a/an :

Options :

8643517385. aerosol

8643517386. solid sol

8643517387. foam

8643517388. gel

**Question Number : 32 Question Id : 8643512462 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

વાયુનું ઘનમાં થતું વિક્ષેપન ઘરાવતી એક કલિલમય પ્રણાલીને શું કહે છે ?

**Options :**

8643517385. એરોસોલ

8643517386. ઘન સોલ

8643517387. ફોમ (ફીણ)

8643517388. જેલ

**Question Number : 33 Question Id : 8643512463 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The absolute value of the electron gain enthalpy of halogens satisfies :

**Options :**

8643517389.  $F > Cl > Br > I$

8643517390.  $Cl > F > Br > I$

8643517391.  $Cl > Br > F > I$

8643517392.  $I > Br > Cl > F$

**Question Number : 33 Question Id : 8643512463 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

Correct Marks : 4 Wrong Marks : 1

હેલોજનોની ઈલેક્ટ્રોન પ્રાપ્તિ એન્થાલ્પીનું નિરપેક્ષ મૂલ્ય સંતોષે છે જે :

Options :

8643517389.  $F > Cl > Br > I$

8643517390.  $Cl > F > Br > I$

8643517391.  $Cl > Br > F > I$

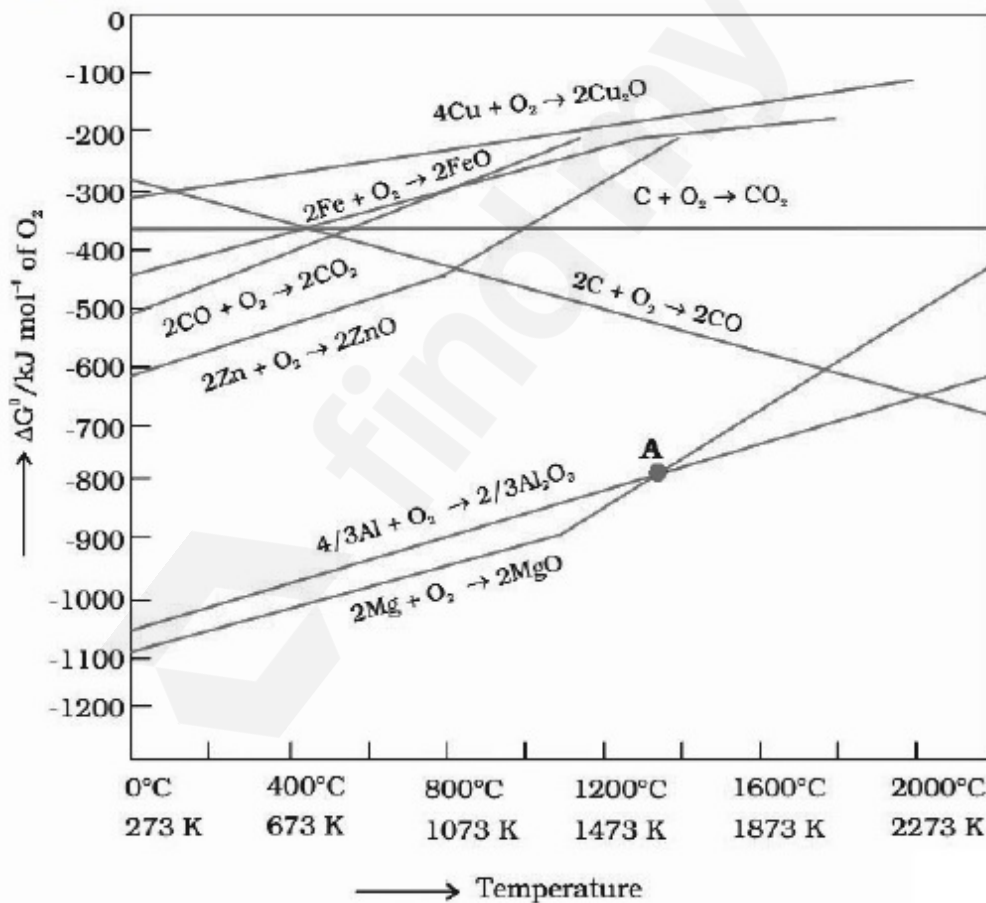
8643517392.  $I > Br > Cl > F$

Question Number : 34 Question Id : 8643512464 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The point of intersection and sudden increase in the slope, in the diagram given below, respectively, indicates :



Options :

8643517393.  $\Delta G < 0$  and decomposition of the metal oxide

8643517394.  $\Delta G > 0$  and decomposition of the metal oxide

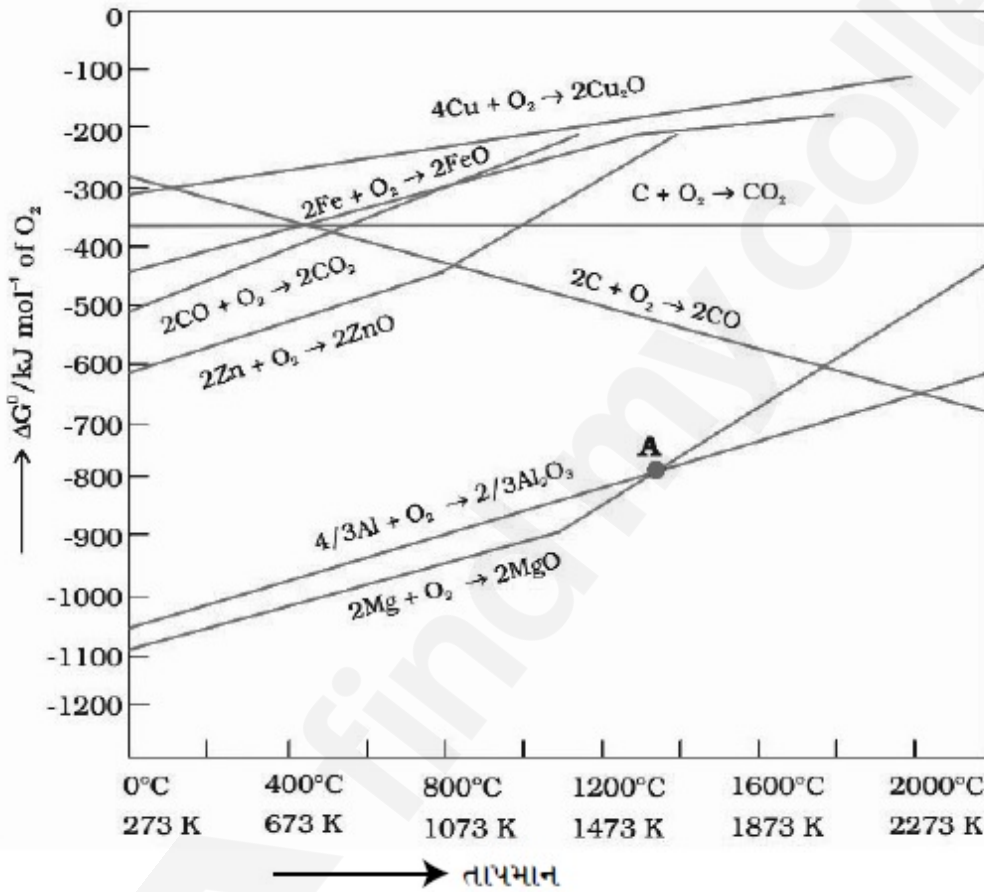
8643517395.  $\Delta G = 0$  and melting or boiling point of the metal oxide

8643517396.  $\Delta G = 0$  and reduction of the metal oxide

Question Number : 34 Question Id : 8643512464 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

નિમ્ન ડાયાગ્રામમાં છેદનબિંદુ અને ઢાળમાં અચાનક વધારો, અનુક્રમે શું સૂચવે છે ?



Options :

8643517393.  $\Delta G < 0$  અને ધાતુ ઓક્સાઈડનું વિઘટન

8643517394.  $\Delta G > 0$  અને ધાતુ ઓક્સાઈડનું વિઘટન

8643517395.  $\Delta G = 0$  અને ધાતુ ઓક્સાઈડનાં ગલન અથવા ઉત્કલન બિંદુ

8643517396.  $\Delta G = 0$  અને ધાતુ ઓક્સાઈડનું રિડક્શન

**Question Number : 35 Question Id : 8643512465 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The **INCORRECT** statement(s) about heavy water is (are)

- (A) used as a moderator in nuclear reactor
- (B) obtained as a by-product in fertilizer industry
- (C) used for the study of reaction mechanism
- (D) has a higher dielectric constant than water

Choose the correct answer from the options given below :

**Options :**

8643517397. (C) only

8643517398. (B) only

8643517399. (D) only

8643517400. (B) and (D) only

**Question Number : 35 Question Id : 8643512465 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

ભારે પાણીનાં સંદર્ભમાં અસત્ય વિધાન(નો) શોધો.

- (A) કેન્દ્રીય ભટ્ટીમાં વિમંદક (moderator) તરીકેનો ઉપયોગ
- (B) ખાતર ઉદ્યોગ (fertilizer industry) માં ઉપ-પેદાશ તરીકે મેળવવામાં આવે છે.
- (C) પ્રક્રિયાની ક્રિયાવિધીનાં અભ્યાસમાં ઉપયોગ કરવામાં આવે છે.
- (D) તે પાણી કરતાં ખૂબ જ વધારે ડાયઈલેક્ટ્રીક અચળાંક ધરાવે છે.

નીચે આપેલા વિકલ્પોમાંથી સાચો જવાબ પસંદ કરો.

**Options :**

8643517397. ફક્ત (C)

8643517398. ફક્ત (B)

8643517399. ફક્ત (D)

8643517400. ફક્ત (B) અને (D)

**Question Number : 36 Question Id : 8643512466 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The correct order of conductivity of ions in water is :

**Options :**

8643517401.  $\text{Cs}^+ > \text{Rb}^+ > \text{K}^+ > \text{Na}^+$

8643517402.  $\text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$

8643517403.  $\text{K}^+ > \text{Na}^+ > \text{Cs}^+ > \text{Rb}^+$

8643517404.  $\text{Rb}^+ > \text{Na}^+ > \text{K}^+ > \text{Li}^+$

**Question Number : 36 Question Id : 8643512466 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

પાણીમાં આયનોની વાહકતાનો સાચો ક્રમ શોધો.

**Options :**

8643517401.  $\text{Cs}^+ > \text{Rb}^+ > \text{K}^+ > \text{Na}^+$

8643517402.  $\text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$

8643517403.  $\text{K}^+ > \text{Na}^+ > \text{Cs}^+ > \text{Rb}^+$

8643517404.  $\text{Rb}^+ > \text{Na}^+ > \text{K}^+ > \text{Li}^+$

**Question Number : 37 Question Id : 8643512467 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which of the following compound CANNOT act as a Lewis base ?

Options :

8643517405.  $\text{ClF}_3$

8643517406.  $\text{PCl}_5$

8643517407.  $\text{NF}_3$

8643517408.  $\text{SF}_4$

Question Number : 37 Question Id : 8643512467 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

નીચે આપેલામાંથી કયું સંયોજન લુઈસ બેઈઝ તરીકે વર્તશે નહીં ?

Options :

8643517405.  $\text{ClF}_3$

8643517406.  $\text{PCl}_5$

8643517407.  $\text{NF}_3$

8643517408.  $\text{SF}_4$

Question Number : 38 Question Id : 8643512468 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

What is the spin-only magnetic moment value (BM) of a divalent metal ion with atomic number 25, in its aqueous solution ?

Options :

8643517409. 5.0

8643517410. 5.26

8643517411. 5.92

8643517412. zero

**Question Number : 38 Question Id : 8643512468 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

પરમાણુ ક્રમાંક 25 ધરાવતાં દ્વિસંયોજક ધાતુ આયનનું સ્પીન-ફક્ત ચુંબકીય ચાકમાત્રા (BM) નું મૂલ્ય તેના જલીય દ્રાવણમાં શોધો.

**Options :**

8643517409. 5.0

8643517410. 5.26

8643517411. 5.92

8643517412. શૂન્ય

**Question Number : 39 Question Id : 8643512469 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Given below are two statements :

**Statement I :** Potassium permanganate on heating at 573 K forms potassium manganate.

**Statement II :** Both potassium permanganate and potassium manganate are tetrahedral and paramagnetic in nature.

In the light of the above statements, choose the most appropriate answer from the options given below :

**Options :**

8643517413. Both statement I and statement II are false

8643517414. Both statement I and statement II are true

8643517415. Statement I is true but statement II is false

8643517416. Statement I is false but statement II is true

**Question Number : 39 Question Id : 8643512469 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

નીચે બે વિધાનો આપેલા છે.

વિધાન I : 573 K પર પોટેશિયમ પરમેંગેનેટને ગરમ કરતાં પોટેશિયમ મેંગેનેટ બનાવે છે.

વિધાન II : બંને પોટેશિયમ પરમેંગેનેટ અને પોટેશિયમ મેંગેનેટ સમચતુષ્ફલકીય અને તેની પ્રકૃતિ અનુચુંબકીય છે.

ઉપરનાં વિધાનોનાં સંદર્ભમાં, નીચે આપેલા વિકલ્પોમાંથી સૌથી વધુ બંધબેસતો જવાબ પસંદ કરો.

**Options :**

8643517413. બંને વિધાન I અને વિધાન II ખોટા છે.

8643517414. બંને વિધાન I અને વિધાન II સાચાં છે.

8643517415. વિધાન I સાચું છે પણ વિધાન II ખોટું છે.

8643517416. વિધાન I ખોટું છે પણ વિધાન II સાચું છે.

**Question Number : 40 Question Id : 8643512470 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Reducing smog is a mixture of :

**Options :**

8643517417. Smoke, fog and O<sub>3</sub>

8643517418. Smoke, fog and SO<sub>2</sub>

8643517419. Smoke, fog and N<sub>2</sub>O<sub>3</sub>

8643517420. Smoke, fog and CH<sub>2</sub>=CH-CHO

**Question Number : 40 Question Id : 8643512470 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

રિડ્યુસીંગ ધૂમ્ર-ધુમ્મસ એ નીચેનામાંનું મિશ્રણ છે :

**Options :**

8643517417. ધૂમાડો, ધુમ્મસ અને  $O_3$

8643517418. ધૂમાડો, ધુમ્મસ અને  $SO_2$

8643517419. ધૂમાડો, ધુમ્મસ અને  $N_2O_3$

8643517420. ધૂમાડો, ધુમ્મસ અને  $CH_2 = CH - CHO$

**Question Number : 41 Question Id : 8643512471 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Given below are two statements :

Statement I : Retardation factor ( $R_f$ ) can be measured in meter/centimeter.

Statement II :  $R_f$  value of a compound remains constant in all solvents.

Choose the most appropriate answer from the options given below :

**Options :**

8643517421. Both statement I and statement II are true

8643517422. Both statement I and statement II are false

8643517423. Statement I is true but statement II is false

8643517424. Statement I is false but statement II is true

**Question Number : 41 Question Id : 8643512471 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

નીચે બે વિધાનો આપેલા છે :

વિધાન I : રિટાર્ડેશન અવયવ (Retardation factor ( $R_f$ )) મીટર/સેન્ટીમીટરમાં માપી શકાય છે.

વિધાન II : સંયોજનની  $R_f$  મૂલ્ય બધાંજ દ્રાવકોમાં અચળ રહે છે.

નીચે આપેલા વિકલ્પોમાંથી સૌથી વધુ બંધબેસતો જવાબ પસંદ કરો.

**Options :**

8643517421. બંને વિધાન I અને વિધાન II સાચા છે.

8643517422. બંને વિધાન I અને વિધાન II ખોટા છે.

8643517423. વિધાન I સાચું છે પણ વિધાન II ખોટું છે.

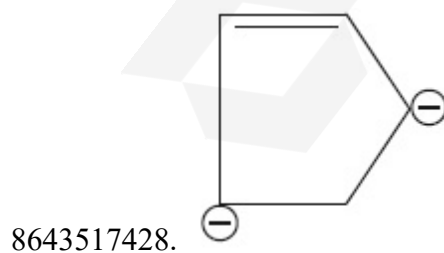
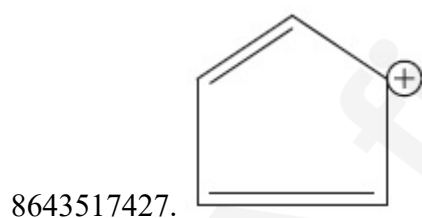
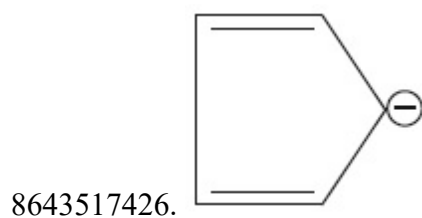
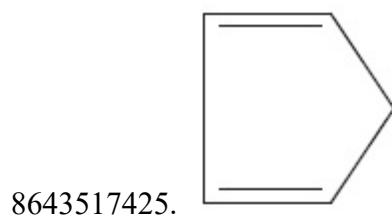
8643517424. વિધાન I ખોટું છે પણ વિધાન II સાચું છે.

Question Number : 42 Question Id : 8643512472 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following is an aromatic compound ?

Options :

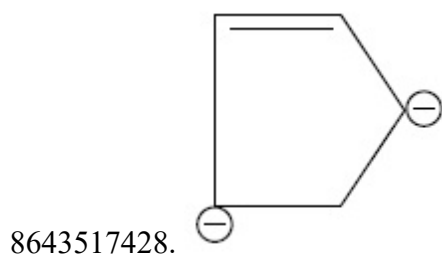
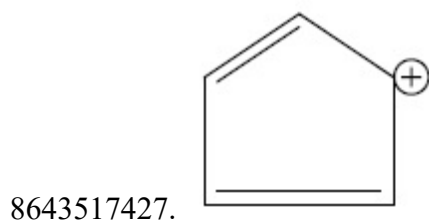
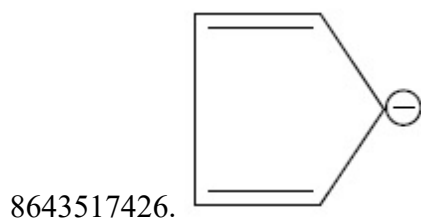
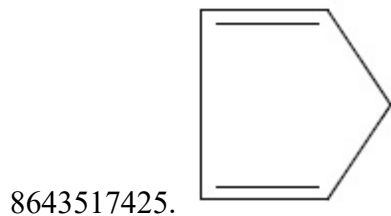


Question Number : 42 Question Id : 8643512472 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

નીચે આપેલામાંથી કયું એક એરોમેટિક સંયોજન છે ?

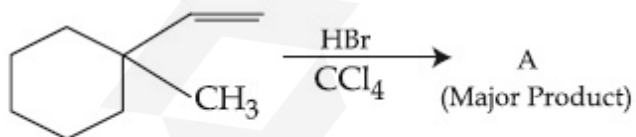
Options :



Question Number : 43 Question Id : 8643512473 Question Type : MCQ Option Shuffling : Yes Is

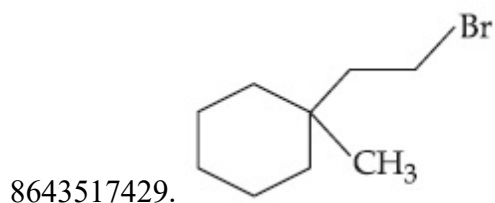
Question Mandatory : No

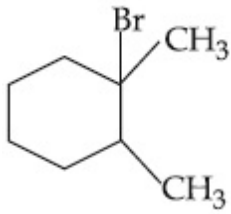
Correct Marks : 4 Wrong Marks : 1



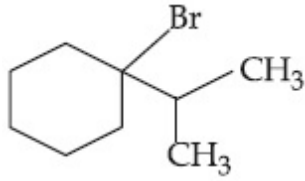
Product "A" in the above chemical reaction is :

Options :

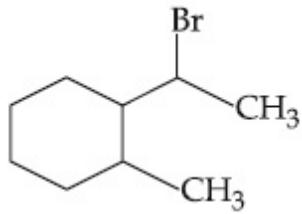




8643517430.



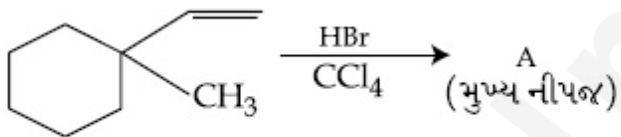
8643517431.



8643517432.

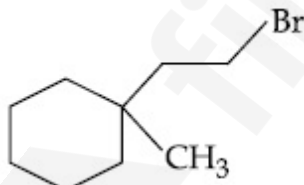
Question Number : 43 Question Id : 8643512473 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

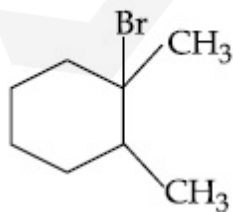


ઉપરની રાસાયણિક પ્રક્રિયામાં નીપજ "A" શોધો.

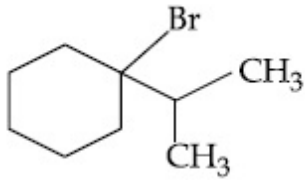
Options :



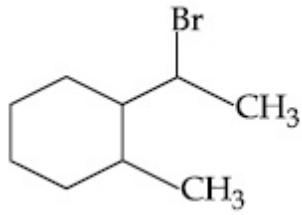
8643517429.



8643517430.



8643517431.



8643517432.

Question Number : 44 Question Id : 8643512474 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



The above reaction requires which of the following reaction conditions ?

Options :

8643517433. 623 K, Cu, 300 atm

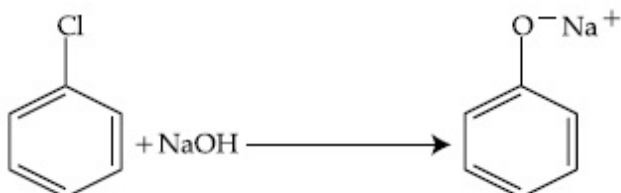
8643517434. 573 K, Cu, 300 atm

8643517435. 623 K, 300 atm

8643517436. 573 K, 300 atm

Question Number : 44 Question Id : 8643512474 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



ઉપરની પ્રક્રિયામાં, નીચે આપેલ પ્રક્રિયા પરિસ્થિતિમાંથી કઈ જરૂરી અને છે ?

Options :

8643517433. 623 K, Cu, 300 atm

8643517434. 573 K, Cu, 300 atm

8643517435. 623 K, 300 atm

8643517436. 573 K, 300 atm

**Question Number : 45 Question Id : 8643512475 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Mesityl oxide is a common name of :

**Options :**

8643517437. 4-Methyl pent-3-en-2-one

8643517438. 2,4-Dimethyl pentan-3-one

8643517439. 2-Methyl cyclohexanone

8643517440. 3-Methyl cyclohexane carbaldehyde

**Question Number : 45 Question Id : 8643512475 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

મેસિટાઈલઓક્સાઈડ એ નીચેનામાંથી એકનું સામાન્ય નામ છે જે શોધો.

**Options :**

8643517437. 4-મિથાઈલ પેન્ટ-3-ઈન-2-ઓન

8643517438. 2,4-ડાયમિથાઈલ પેન્ટેન-3-ઓન

8643517439. 2-મિથાઈલ સાયક્લોહેક્ઝેનોન

8643517440. 3-મિથાઈલ સાયક્લોહેક્ઝેન કાર્બાલ્ડીહાઈડ

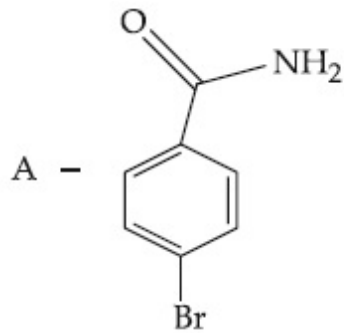
Question Number : 46 Question Id : 8643512476 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

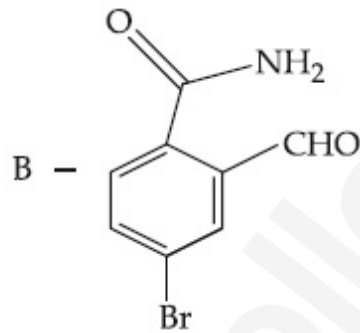
Hoffmann bromamide degradation of benzamide gives product A, which upon heating with  $\text{CHCl}_3$  and  $\text{NaOH}$  gives product B.

The structures of A and B are :

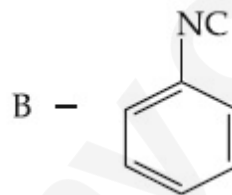
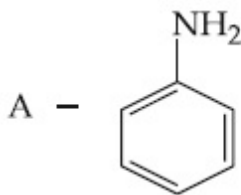
Options :



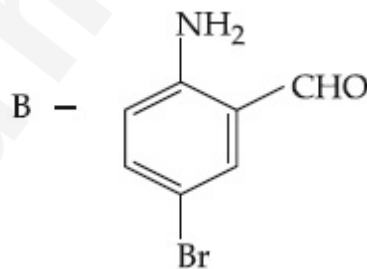
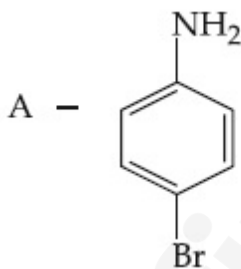
8643517441.



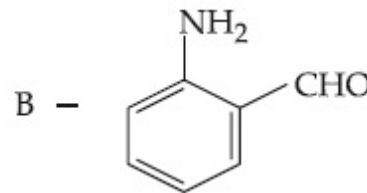
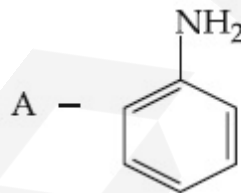
8643517442.



8643517443.



8643517444.

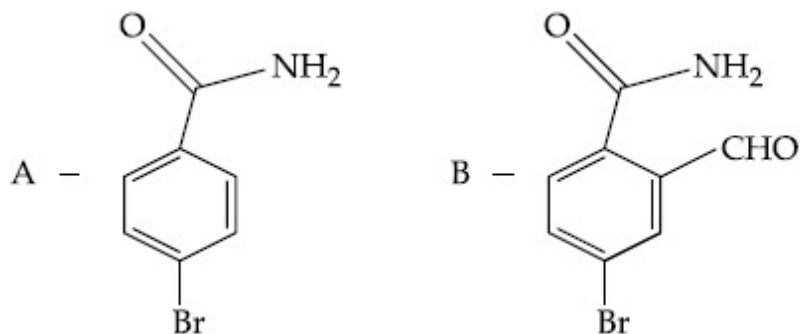


Question Number : 46 Question Id : 8643512476 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

બેન્ઝામાઈડનું હોફમાન બ્રોમેમાઈડ ડિગ્રેડેશન કરતાં નીપજ A આપે છે. જેની  $\text{CHCl}_3$  અને  $\text{NaOH}$  સાથે ગરમ કરતાં નીપજ B આપે છે. તો બંધારણ A અને B \_\_\_\_\_ શોધો.

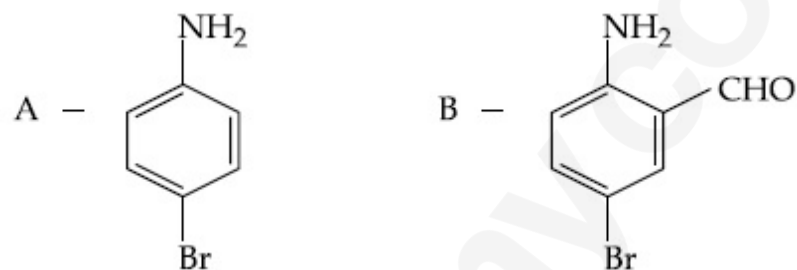
Options :



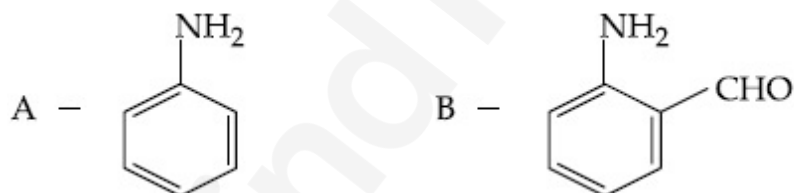
8643517441.



8643517442.



8643517443.

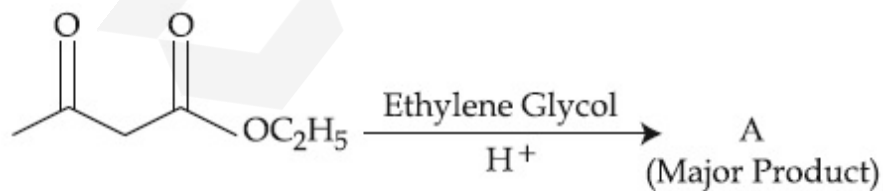


8643517444.

Question Number : 47 Question Id : 8643512477 Question Type : MCQ Option Shuffling : Yes Is

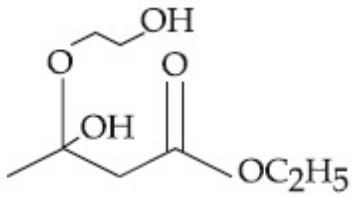
Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

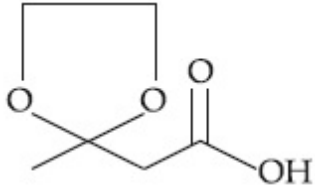


The product "A" in the above reaction is :

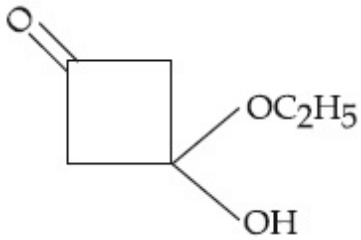
Options :



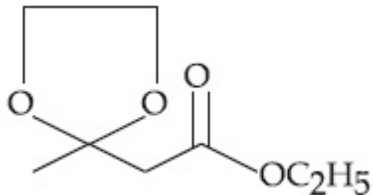
8643517445.



8643517446.



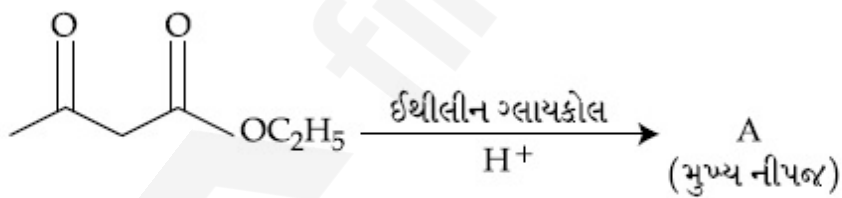
8643517447.



8643517448.

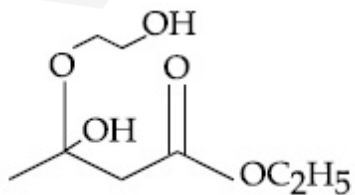
Question Number : 47 Question Id : 8643512477 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

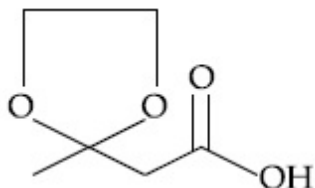


ઉપરની પ્રક્રિયામાં નીપજ "A" શોધો.

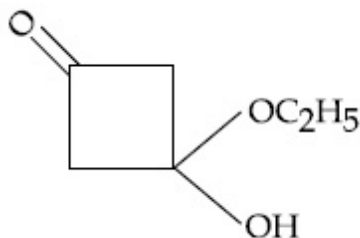
Options :



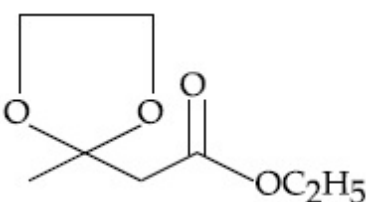
8643517445.



8643517446.



8643517447.



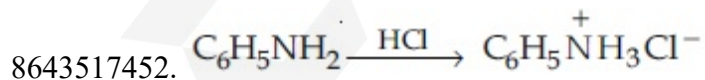
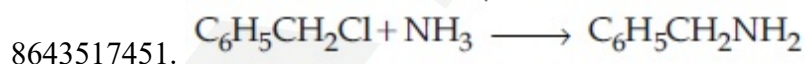
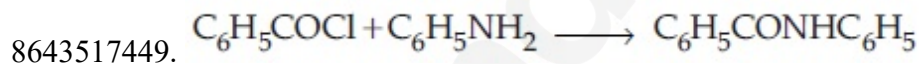
8643517448.

Question Number : 48 Question Id : 8643512478 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following reaction is an example of ammonolysis ?

Options :

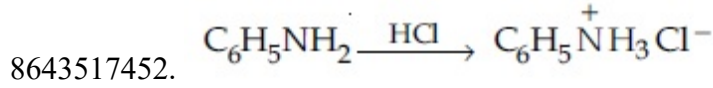
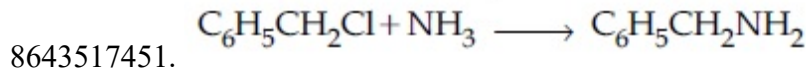
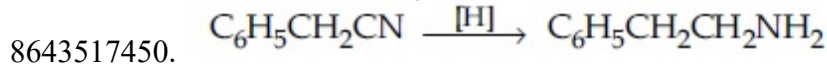
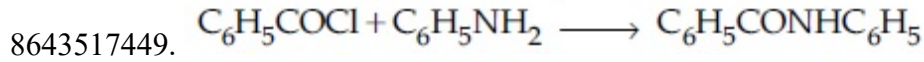


Question Number : 48 Question Id : 8643512478 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

નીચે આપેલામાંથી કઈ એક પ્રક્રિયા એમોનોલિસિસનું ઉદાહરણ છે ?

Options :



**Question Number : 49 Question Id : 8643512479 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

With respect to drug-enzyme interaction, identify the wrong statement.

**Options :**

8643517453. Competitive inhibitor binds to the enzyme's active site

8643517454. Allosteric inhibitor changes the enzyme's active site

8643517455. Allosteric inhibitor competes with the enzyme's active site

8643517456. Non-Competitive inhibitor binds to the allosteric site

**Question Number : 49 Question Id : 8643512479 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

औषध-उत्सेचक पारस्परिक क्रियानां संदर्भमां, ખોટું વિધાન ઓળખો.

**Options :**

8643517453. ઉત્સેચકનાં સક્રિય સ્થાન સાથે સ્પર્ધાત્મક અવરોધક (Competitive inhibitor) જોડાય છે.

8643517454. બાહ્ય (અન્યત્ર) ત્રિપરિમાણી અવરોધક (Allosteric inhibitor) ઉત્સેચકોનાં સક્રિય સ્થાનને બદલે છે.

8643517455. બાહ્ય (અન્યત્ર) ત્રિપરિમાણી અવરોધક ઉત્સેચક કાર્યદ્રવ (enzyme substrate) સાથે સ્પર્ધા કરે છે.

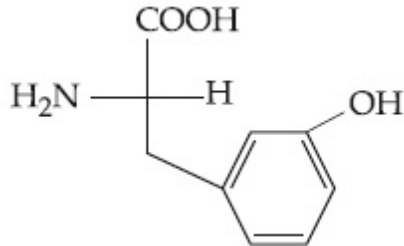
8643517456. નોન-સ્પર્ધાત્મક અવરોધક તે બાહ્ય (અન્યત્ર) ત્રિપરિમાણીનાં સ્થાન સાથે જોડાય છે.

**Question Number : 50 Question Id : 8643512480 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

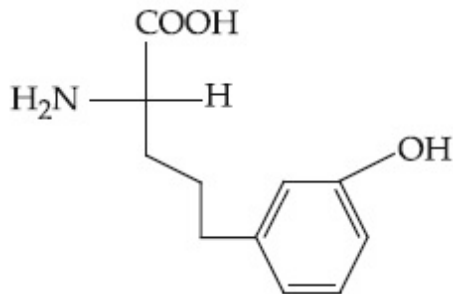
**Correct Marks : 4 Wrong Marks : 1**

Which of the following is correct structure of tyrosine ?

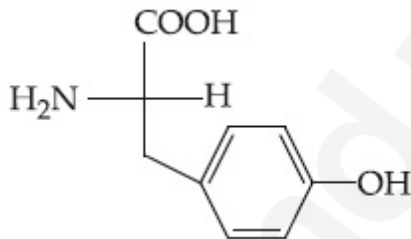
**Options :**



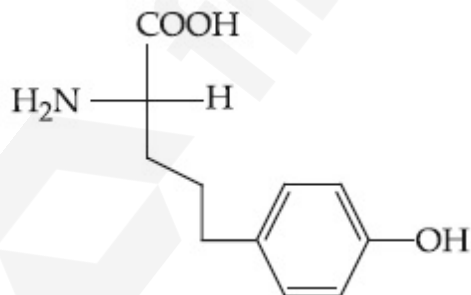
8643517457.



8643517458.



8643517459.



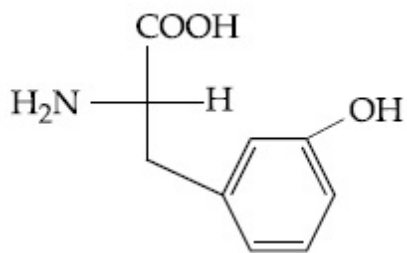
8643517460.

**Question Number : 50 Question Id : 8643512480 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

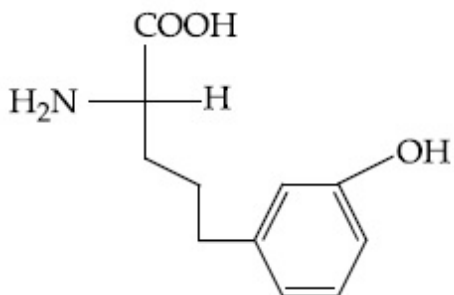
**Correct Marks : 4 Wrong Marks : 1**

ટાયરોસીનનું સાચું બંધારણ નીચે આપેલામાંથી કયું છે ?

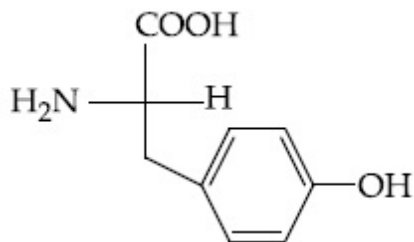
Options :



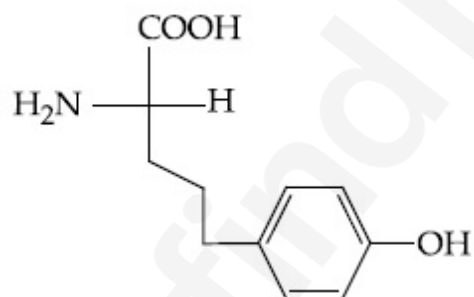
8643517457.



8643517458.



8643517459.



8643517460.

## Chemistry Section B

Section Id :	864351166
Section Number :	4
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Mark As Answered Required? :	Yes
Sub-Section Number :	1

Sub-Section Id :

864351166

Question Shuffling Allowed :

Yes

Question Number : 51 Question Id : 8643512481 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The mole fraction of a solute in a 100 molal aqueous solution is \_\_\_\_\_  $\times 10^{-2}$ .  
(Round off to the Nearest Integer).

[Given : Atomic masses : H : 1.0 u, O : 16.0 u]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 51 Question Id : 8643512481 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

100 મોલલ જલીય દ્રાવણમાં દ્રાવ્યનાં મોલ અંશ \_\_\_\_\_  $\times 10^{-2}$  છે. (નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

[આપેલ : પરમાણ્વીય દળો : H : 1.0 u, O : 16.0 u]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 52 Question Id : 8643512482 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The pressure exerted by a non-reactive gaseous mixture of 6.4 g of methane and 8.8 g of carbon dioxide in a 10 L vessel at 27°C is \_\_\_\_\_ kPa.

(Round off to the Nearest Integer).

[Assume gases are ideal,  $R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$ 

Atomic masses : C : 12.0 u, H : 1.0 u, O : 16.0 u]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

**Possible Answers :**

100

**Question Number : 52 Question Id : 8643512482 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

27°C પર 10 L વાળા પાત્રમાં 6.4 g મિથેન અને 8.8 g કાર્બન ડાયોક્સાઈડનાં નોન-સક્રિય (પ્રક્રિયા ન થાય તેવું) વાયુમય મિશ્રણ વડે ભાગતું દબાણ \_\_\_\_\_ kPa છે.

(નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

[આદર્શ વાયુ ધારી લો,  $R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$

પરમાણ્વીય દળો : C : 12.0 u, H : 1.0 u, O : 16.0 u]

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 53 Question Id : 8643512483 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

A certain orbital has  $n = 4$  and  $m_L = -3$ . The number of radial nodes in this orbital is \_\_\_\_\_. (Round off to the Nearest Integer).

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 53 Question Id : 8643512483 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

એક નિશ્ચિત કક્ષક  $n = 4$  અને  $m_L = -3$  ધરાવે છે. આ કક્ષકમાં ત્રિજ્યાકીય નોડ્સની સંખ્યા \_\_\_\_\_ છે.

(નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number : 54 Question Id : 8643512484 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

The standard enthalpies of formation of  $\text{Al}_2\text{O}_3$  and  $\text{CaO}$  are  $-1675 \text{ kJ mol}^{-1}$  and  $-635 \text{ kJ mol}^{-1}$  respectively.

For the reaction

$3\text{CaO} + 2\text{Al} \rightarrow 3\text{Ca} + \text{Al}_2\text{O}_3$  the standard reaction enthalpy  $\Delta_r H^0 = \underline{\hspace{2cm}}$  kJ.

(Round off to the Nearest Integer).

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number : 54 Question Id : 8643512484 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

$\text{Al}_2\text{O}_3$  અને  $\text{CaO}$  ની પ્રમાણિત સર્જન એન્થાલ્પીઓ અનુક્રમે  $-1675 \text{ kJ mol}^{-1}$  અને  $-635 \text{ kJ mol}^{-1}$  છે.

$3\text{CaO} + 2\text{Al} \rightarrow 3\text{Ca} + \text{Al}_2\text{O}_3$  પ્રક્રિયા માટે, પ્રમાણિત પ્રક્રિયા એન્થાલ્પી  $\Delta_r H^0 = \underline{\hspace{2cm}}$  kJ. છે.

(નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number : 55 Question Id : 8643512485 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

The oxygen dissolved in water exerts a partial pressure of 20 kPa in the vapour above water.

The molar solubility of oxygen in water is  $\underline{\hspace{2cm}} \times 10^{-5} \text{ mol dm}^{-3}$ .

(Round off to the Nearest Integer).

[Given : Henry's law constant =  $K_H = 8.0 \times 10^4 \text{ kPa}$  for  $\text{O}_2$ .

Density of water with dissolved oxygen =  $1.0 \text{ kg dm}^{-3}$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number : 55 Question Id : 8643512485 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

પાણીમાં ઓક્સિજનને દ્રાવ્ય કરતાં પાણી ઉપર બાષ્પમાં 20 kPa નું આંશિક દબાણ લાગુ પડે છે. પાણીમાં ઓક્સિજનની મોલર દ્રાવ્યતાં \_\_\_\_\_  $\times 10^{-5}$  mol dm<sup>-3</sup> છે.

(નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

[આપેલ : હેન્ડ્રી નિયમ અચળાંક =  $K_H = O_2$  માટે  $8.0 \times 10^4$  kPa

પાણીમાં ઓગળેલ ઓક્સિજન સાથે પાણીની ઘનતાં =  $1.0 \text{ kg dm}^{-3}$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number : 56 Question Id : 8643512486 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

0.01 moles of a weak acid HA ( $K_a = 2.0 \times 10^{-6}$ ) is dissolved in 1.0 L of 0.1 M HCl solution.

The degree of dissociation of HA is \_\_\_\_\_  $\times 10^{-5}$  (Round off to the Nearest Integer).

[Neglect volume change on adding HA.

Assume degree of dissociation  $\ll 1$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number : 56 Question Id : 8643512486 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

નિર્બળ એસિડ HA ( $K_a = 2.0 \times 10^{-6}$ ) નાં 0.01 મોલ્સને 0.1 M HCl નાં 1.0 L નાં દ્રાવણમાં ઓગાળવામાં આવે છે.

HA નો વિયોજન અંશ \_\_\_\_\_  $\times 10^{-5}$  છે. (નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

[HA ને ઉમેરતાં કદનાં ફેરફારને અવગણવો.

ધારી લો કે વિયોજન અંશ  $\ll 1$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number :** 57 **Question Id :** 8643512487 **Question Type :** SA

**Correct Marks :** 4 **Wrong Marks :** 0

15 mL of aqueous solution of  $Fe^{2+}$  in acidic medium completely reacted with 20 mL of 0.03 M aqueous  $Cr_2O_7^{2-}$ . The molarity of the  $Fe^{2+}$  solution is \_\_\_\_\_  $\times 10^{-2}$  M. (Round off to the Nearest Integer).

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number :** 57 **Question Id :** 8643512487 **Question Type :** SA

**Correct Marks :** 4 **Wrong Marks :** 0

એસિડિક માધ્યમમાં,  $Fe^{2+}$  નું 15 mL જલીય દ્રાવણ 0.03 M જલીય  $Cr_2O_7^{2-}$  નાં 20 mL સાથે સંપૂર્ણ પ્રક્રિયા કરે છે.  $Fe^{2+}$  દ્રાવણની મોલારિટી \_\_\_\_\_  $\times 10^{-2}$  M છે. (નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

Question Number : 58 Question Id : 8643512488 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

For a certain first order reaction 32% of the reactant is left after 570 s. The rate constant of this reaction is \_\_\_\_\_  $\times 10^{-3} \text{ s}^{-1}$ . (Round off to the Nearest Integer).

[Given :  $\log_{10}2 = 0.301$ ,  $\ln 10 = 2.303$ ]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 58 Question Id : 8643512488 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

એક નિશ્ચિત પ્રથમ ક્રમ પ્રક્રિયા માટે 570 s પછી 32% પ્રક્રિયક બાકી રહે છે. તો આ પ્રક્રિયાનો વેગ અચળાંક \_\_\_\_\_  $\times 10^{-3} \text{ s}^{-1}$  છે. (નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

[આપેલ :  $\log_{10}2 = 0.301$ ,  $\ln 10 = 2.303$ ]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 59 Question Id : 8643512489 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The reaction of white phosphorus on boiling with alkali in inert atmosphere resulted in the formation of product 'A'. The reaction of 1 mol of 'A' with excess of  $\text{AgNO}_3$  in aqueous medium gives \_\_\_\_\_ mol(s) of Ag. (Round off to the Nearest Integer).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 59 Question Id : 8643512489 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ઊક્ષળતા સફેદ ફોસ્ફરસની નિષ્ક્રિય વાતાવરણે આલ્કલી સાથેની પ્રક્રિયા કરતાં પરિણામે નીચળ 'A' નું સર્જન (બને) થાય છે. 1 મોલ 'A' ની સાથે વધુ પડતાં  $\text{AgNO}_3$  ની જલીય માધ્યમમાં પ્રક્રિયા કરતાં Ag નાં \_\_\_\_\_ જ મોલ(સ) પ્રાપ્ત થાય છે.

(નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

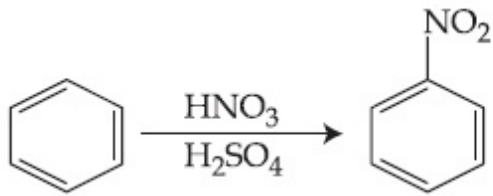
Text Areas : PlainText

Possible Answers :

100

Question Number : 60 Question Id : 8643512490 Question Type : SA

Correct Marks : 4 Wrong Marks : 0



In the above reaction, 3.9 g of benzene on nitration gives 4.92 g of nitrobenzene. The percentage yield of nitrobenzene in the above reaction is \_\_\_\_\_. (Round off to the Nearest Integer).

(Given atomic mass : C : 12.0 u, H : 1.0 u, O : 16.0 u, N : 14.0 u)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

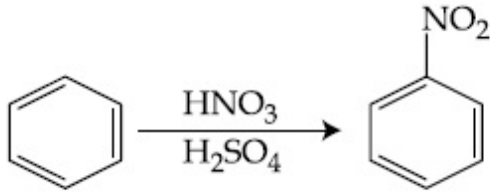
Text Areas : PlainText

Possible Answers :

100

Question Number : 60 Question Id : 8643512490 Question Type : SA

Correct Marks : 4 Wrong Marks : 0



ઉપરની પ્રક્રિયામાં, 3.9 ગ્રામ બેન્ઝિનનું નાઈટ્રેશન કરતાં 4.92 ગ્રામ નાઈટ્રોબેન્ઝિન આપે છે. ઉપરની પ્રક્રિયામાં નાઈટ્રોબેન્ઝિનની નીપજ ટકાવારી \_\_\_\_\_% છે. (નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

(આપેલ પરમાણ્વીય દળો : C : 12.0 u, H : 1.0 u, O : 16.0 u, N : 14.0 u)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

## Mathematics Section A

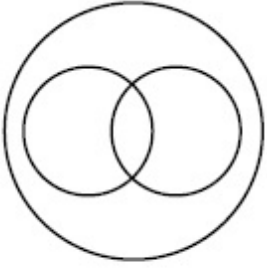
<b>Section Id :</b>	864351167
<b>Section Number :</b>	5
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	20
<b>Number of Questions to be attempted :</b>	20
<b>Section Marks :</b>	80
<b>Mark As Answered Required? :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	864351167
<b>Question Shuffling Allowed :</b>	Yes

**Question Number :** 61 **Question Id :** 8643512491 **Question Type :** MCQ **Option Shuffling :** Yes Is

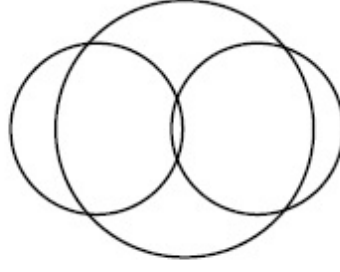
**Question Mandatory :** No

**Correct Marks :** 4 **Wrong Marks :** 1

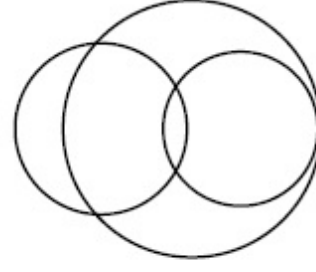
In a school, there are three types of games to be played. Some of the students play two types of games, but none play all the three games. Which Venn diagrams can justify the above statement ?



P



Q



R

Options :

8643517471. P and Q

8643517472. P and R

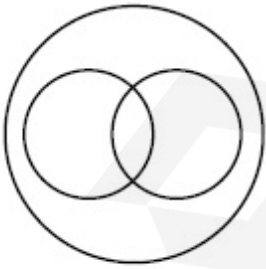
8643517473. Q and R

8643517474. None of these

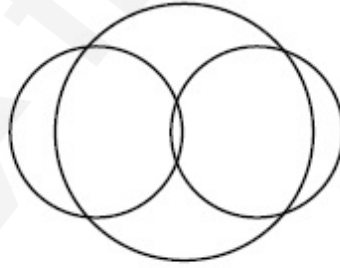
Question Number : 61 Question Id : 8643512491 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

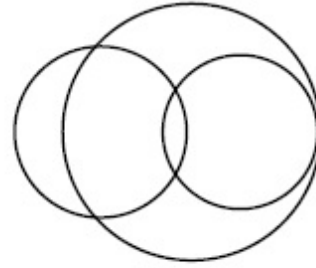
શાળામાં ત્રણ પ્રકારની રમત રમાડવામાં આવે છે. કેટલાંક વિદ્યાર્થીઓ બે પ્રકારની રમત રમે છે, પરંતુ કોઈપણ ત્રણેય રમતો રમતા નથી. કઈ વેન આકૃતિઓ ઉપરોક્ત કથનને દર્શાવે છે ?



P



Q



R

Options :

8643517471. P અને Q

8643517472. P અને R

8643517473. Q અને R

8643517474. આમાનાં કોઈ નહીં

**Question Number : 62 Question Id : 8643512492 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The area of the triangle with vertices  $A(z)$ ,  $B(iz)$  and  $C(z + iz)$  is :

**Options :**

8643517475.  $\frac{1}{2} |z + iz|^2$

8643517476.  $\frac{1}{2} |z|^2$

8643517477.  $\frac{1}{2}$

8643517478. 1

**Question Number : 62 Question Id : 8643512492 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

શિરોબિંદુ  $A(z)$ ,  $B(iz)$  અને  $C(z + iz)$  વાળા ત્રિકોણનું ક્ષેત્રફળ \_\_\_\_\_ છે.

**Options :**

8643517475.  $\frac{1}{2} |z + iz|^2$

8643517476.  $\frac{1}{2} |z|^2$

8643517477.  $\frac{1}{2}$

8643517478. 1

**Question Number : 63 Question Id : 8643512493 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

If  $A = \begin{pmatrix} 0 & \sin\alpha \\ \sin\alpha & 0 \end{pmatrix}$  and  $\det\left(A^2 - \frac{1}{2}I\right) = 0$ , then a possible value of  $\alpha$  is :

**Options :**

8643517479.  $\frac{\pi}{4}$

8643517480.  $\frac{\pi}{3}$

8643517481.  $\frac{\pi}{6}$

8643517482.  $\frac{\pi}{2}$

**Question Number : 63 Question Id : 8643512493 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

જો  $A = \begin{pmatrix} 0 & \sin\alpha \\ \sin\alpha & 0 \end{pmatrix}$  અને  $\det\left(A^2 - \frac{1}{2}I\right) = 0$ , તો  $\alpha$  ની શક્ય કિંમત \_\_\_\_\_ છે.

**Options :**

8643517479.  $\frac{\pi}{4}$

8643517480.  $\frac{\pi}{3}$

8643517481.  $\frac{\pi}{6}$

8643517482.  $\frac{\pi}{2}$

Question Number : 64 Question Id : 8643512494 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The system of equations  $kx + y + z = 1$ ,  $x + ky + z = k$  and  $x + y + zk = k^2$  has no solution if  $k$  is equal to :

Options :

8643517483. 0

8643517484. 1

8643517485. -1

8643517486. -2

Question Number : 64 Question Id : 8643512494 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

જો  $k = \underline{\hspace{2cm}}$  હોય, તો સમીકરણ સંહિતિ  $kx + y + z = 1$ ,  $x + ky + z = k$  અને  $x + y + zk = k^2$  ને ઉકેલ નથી.

Options :

8643517483. 0

8643517484. 1

8643517485. -1

8643517486. -2

Question Number : 65 Question Id : 8643512495 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Team 'A' consists of 7 boys and  $n$  girls and Team 'B' has 4 boys and 6 girls. If a total of 52 single matches can be arranged between these two teams when a boy plays against a boy and a girl plays against a girl, then  $n$  is equal to :

Options :

8643517487. 2

8643517488. 4

8643517489. 5

8643517490. 6

**Question Number : 65 Question Id : 8643512495 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

ટીમ 'A' માં 7 છોકરાઓ અને  $n$  છોકરીઓ છે તથા ટીમ 'B' માં 4 છોકરાઓ અને 6 છોકરીઓ છે. જ્યારે છોકરો એ છોકરાની સામે રમે તથા છોકરી એ છોકરીની સામે રમે ત્યારે આ બંને ટીમ વચ્ચે કુલ 52 એકની એક સાથેની મેચનું આયોજન થઈ શકે, તો  $n =$  \_\_\_\_\_.

**Options :**

8643517487. 2

8643517488. 4

8643517489. 5

8643517490. 6

**Question Number : 66 Question Id : 8643512496 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

If the fourth term in the expansion of  $(x + x^{\log_2 x})^7$  is 4480, then the value of  $x$  where  $x \in \mathbb{N}$  is equal to :

**Options :**

8643517491. 1

8643517492. 2

8643517493. 3

8643517494. 4

**Question Number : 66 Question Id : 8643512496 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

જો  $(x + x^{\log_2 x})^7$  નાં વિસ્તરણનું ચોથું પદ 4480 હોય, તો  $x \in \mathbb{N}$  માટે  $x$  નું મૂલ્ય \_\_\_\_\_ છે.

**Options :**

8643517491. 1

8643517492. 2

8643517493. 3

8643517494. 4

**Question Number : 67 Question Id : 8643512497 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The value of  $4 + \frac{1}{5 + \frac{1}{4 + \frac{1}{5 + \frac{1}{4 + \dots \infty}}}}$  is :

**Options :**

8643517495.  $2 + \frac{2}{5}\sqrt{30}$

8643517496.  $2 + \frac{4}{\sqrt{5}}\sqrt{30}$

8643517497.  $5 + \frac{2}{5}\sqrt{30}$

8643517498.  $4 + \frac{4}{\sqrt{5}}\sqrt{30}$

**Question Number : 67 Question Id : 8643512497 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

$$4 + \frac{1}{5 + \frac{1}{4 + \frac{1}{5 + \frac{1}{4 + \dots \infty}}}} \text{ નું મૂલ્ય } \underline{\hspace{2cm}} \text{ છે.}$$

**Options :**

8643517495.  $2 + \frac{2}{5}\sqrt{30}$

8643517496.  $2 + \frac{4}{\sqrt{5}}\sqrt{30}$

8643517497.  $5 + \frac{2}{5}\sqrt{30}$

8643517498.  $4 + \frac{4}{\sqrt{5}}\sqrt{30}$

**Question Number : 68 Question Id : 8643512498 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

If  $\cot^{-1}(\alpha) = \cot^{-1}2 + \cot^{-1}8 + \cot^{-1}18 + \cot^{-1}32 + \dots$  upto 100 terms, then  $\alpha$  is :

**Options :**

8643517499. 1.00

8643517500. 1.01

8643517501. 1.02

8643517502. 1.03

**Question Number : 68 Question Id : 8643512498 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

જો  $\cot^{-1}(\alpha) = \cot^{-1}2 + \cot^{-1}8 + \cot^{-1}18 + \cot^{-1}32 + \dots$  100 પદો સુધી હોય તો  $\alpha = \underline{\hspace{2cm}}$ .

**Options :**

8643517499. 1.00

8643517500. 1.01

8643517501. 1.02

8643517502. 1.03

**Question Number : 69 Question Id : 8643512499 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The inverse of  $y = 5^{\log x}$  is :

**Options :**

8643517503.  $x = 5^{\frac{1}{\log y}}$

8643517504.  $x = y^{\frac{1}{\log 5}}$

8643517505.  $x = 5^{\log y}$

8643517506.  $x = y^{\log 5}$

**Question Number : 69 Question Id : 8643512499 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

$y = 5^{\log x}$  નું વ્યસ્ત \_\_\_\_\_ છે.

**Options :**

8643517503.  $x = 5^{\frac{1}{\log y}}$

8643517504.  $x = y^{\frac{1}{\log 5}}$

8643517505.  $x = 5^{\log y}$

8643517506.  $x = y^{\log 5}$

**Question Number : 70 Question Id : 8643512500 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The value of  $\lim_{x \rightarrow 0^+} \frac{\cos^{-1}(x - [x]^2) \cdot \sin^{-1}(x - [x]^2)}{x - x^3}$ , where  $[x]$  denotes the greatest integer  $\leq x$  is :

**Options :**

8643517507.  $\frac{\pi}{4}$

8643517508. 0

8643517509.  $\frac{\pi}{2}$

8643517510.  $\pi$

**Question Number : 70 Question Id : 8643512500 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

જો  $[x]$  એ મહત્તમ પૂર્ણાંક  $\leq x$  દર્શાવે, તો  $\lim_{x \rightarrow 0^+} \frac{\cos^{-1}(x - [x]^2) \cdot \sin^{-1}(x - [x]^2)}{x - x^3}$  નું મૂલ્ય \_\_\_\_\_ છે.

**Options :**

8643517507.  $\frac{\pi}{4}$

8643517508. 0

8643517509.  $\frac{\pi}{2}$

8643517510.  $\pi$ 

Question Number : 71 Question Id : 8643512501 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following statements is incorrect for the function  $g(\alpha)$  for  $\alpha \in \mathbb{R}$  such that

$$g(\alpha) = \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin^{\alpha} x}{\cos^{\alpha} x + \sin^{\alpha} x} dx$$

Options :

8643517511.  $g(\alpha)$  is a strictly increasing function

8643517512.  $g(\alpha)$  is a strictly decreasing function

8643517513.  $g(\alpha)$  has an inflection point at  $\alpha = -\frac{1}{2}$

8643517514.  $g(\alpha)$  is an even function

Question Number : 71 Question Id : 8643512501 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

જો  $\alpha \in \mathbb{R}$  હોય તો વિધેય  $g(\alpha)$  માટે નીચેનાં વિધાનો પૈકી કયા સાચાં નથી, જ્યાં

$$g(\alpha) = \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin^{\alpha} x}{\cos^{\alpha} x + \sin^{\alpha} x} dx$$

Options :

8643517511.  $g(\alpha)$  ચુસ્ત વધતું વિધેય છે.

8643517512.  $g(\alpha)$  ચુસ્ત ઘટતું વિધેય છે.

8643517513.  $\alpha = -\frac{1}{2}$  પાસે  $g(\alpha)$  ને પરિવૃત્તિ બિંદુ છે.

8643517514.  $g(\alpha)$  સમ વિધેય છે.

**Question Number : 72 Question Id : 8643512502 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which of the following is true for  $y(x)$  that satisfies the differential equation

$$\frac{dy}{dx} = xy - 1 + x - y; y(0) = 0 :$$

**Options :**

8643517515.  $y(1) = e^{-\frac{1}{2}} - 1$

8643517516.  $y(1) = e^{\frac{1}{2}} - 1$

8643517517.  $y(1) = e^{\frac{1}{2}} - e^{-\frac{1}{2}}$

8643517518.  $y(1) = 1$

**Question Number : 72 Question Id : 8643512502 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

જો  $y(x)$  એ વિકલ સમીકરણ  $\frac{dy}{dx} = xy - 1 + x - y; y(0) = 0$  નું સમાધાન કરે, તો નીચેનાંમાંથી કયું સાચું છે ?

**Options :**

8643517515.  $y(1) = e^{-\frac{1}{2}} - 1$

8643517516.  $y(1) = e^{\frac{1}{2}} - 1$

8643517517.  $y(1) = e^{\frac{1}{2}} - e^{-\frac{1}{2}}$

8643517518.  $y(1) = 1$

**Question Number : 73 Question Id : 8643512503 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

In a triangle PQR, the co-ordinates of the points P and Q are  $(-2, 4)$  and  $(4, -2)$  respectively. If the equation of the perpendicular bisector of PR is  $2x - y + 2 = 0$ , then the centre of the circumcircle of the  $\Delta PQR$  is :

**Options :**

8643517519.  $(1, 4)$

8643517520.  $(0, 2)$

8643517521.  $(-1, 0)$

8643517522.  $(-2, -2)$

**Question Number : 73 Question Id : 8643512503 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ત્રિકોણ PQR માં બિંદુઓ P અને Q નાં યામ અનુક્રમે  $(-2, 4)$  અને  $(4, -2)$  છે. જો PR નાં લંબ દ્વિભાજકનું સમીકરણ  $2x - y + 2 = 0$  હોય, તો  $\Delta PQR$  નાં પરિવૃત્ત વર્તુળનું કેન્દ્ર \_\_\_\_\_ છે.

**Options :**

8643517519.  $(1, 4)$

8643517520.  $(0, 2)$

8643517521.  $(-1, 0)$

8643517522.  $(-2, -2)$

**Question Number : 74 Question Id : 8643512504 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The line  $2x - y + 1 = 0$  is a tangent to the circle at the point  $(2, 5)$  and the centre of the circle lies on  $x - 2y = 4$ . Then, the radius of the circle is :

Options :

8643517523.  $5\sqrt{3}$

8643517524.  $5\sqrt{4}$

8643517525.  $4\sqrt{5}$

8643517526.  $3\sqrt{5}$

Question Number : 74 Question Id : 8643512504 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

રેખા  $2x - y + 1 = 0$  એ  $(2, 5)$  બિંદુ પાસે વર્તુળનો સ્પર્શક છે તથા વર્તુળનું કેન્દ્ર  $x - 2y = 4$  પર આવેલ છે. તો વર્તુળની ત્રિજ્યા \_\_\_\_\_ છે.

Options :

8643517523.  $5\sqrt{3}$

8643517524.  $5\sqrt{4}$

8643517525.  $4\sqrt{5}$

8643517526.  $3\sqrt{5}$

Question Number : 75 Question Id : 8643512505 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Choose the incorrect statement about the two circles whose equations are given below :

$$x^2 + y^2 - 10x - 10y + 41 = 0 \text{ and}$$

$$x^2 + y^2 - 16x - 10y + 80 = 0$$

Options :

8643517527. Circles have two intersection points.

8643517528. Both circles pass through the centre of each other.

8643517529. Both circles' centres lie inside region of one another.

8643517530. Distance between two centres is the average of radii of both the circles.

**Question Number : 75 Question Id : 8643512505 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

નીચે આપેલ સમીકરણો વાળા બે વર્તુળો માટે ખોટું વિધાન પસંદ કરો :

$$x^2 + y^2 - 10x - 10y + 41 = 0 \text{ અને}$$

$$x^2 + y^2 - 16x - 10y + 80 = 0.$$

**Options :**

8643517527. વર્તુળોનાં બે છેદ બિંદુઓ છે.

8643517528. બંને વર્તુળો એક-બીજાનાં કેન્દ્રમાંથી પસાર થાય છે.

8643517529. બંને વર્તુળોનાં કેન્દ્ર એક-બીજાનાં પ્રદેશની અંદર આવેલ છે.

8643517530. બંને કેન્દ્રો વચ્ચેનું અંતર એ બંને વર્તુળોની ત્રિજ્યાનાં સરેરાશ જેટલું છે.

**Question Number : 76 Question Id : 8643512506 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The equation of the plane which contains the  $y$ -axis and passes through the point  $(1, 2, 3)$  is :

**Options :**

8643517531.  $3x + z = 6$

8643517532.  $x + 3z = 10$

8643517533.  $x + 3z = 0$

8643517534.  $3x - z = 0$

Question Number : 76 Question Id : 8643512506 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$y$ -અક્ષ ને સમાવતા તથા બિંદુ (1, 2, 3) માંથી પસાર થતાં સમતલનું સમીકરણ \_\_\_\_\_ છે.

Options :

8643517531.  $3x + z = 6$

8643517532.  $x + 3z = 10$

8643517533.  $x + 3z = 0$

8643517534.  $3x - z = 0$

Question Number : 77 Question Id : 8643512507 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the Boolean expression  $(p \Rightarrow q) \Leftrightarrow (q * (\sim p))$  is a tautology, then the Boolean expression  $p * (\sim q)$  is equivalent to :

Options :

8643517535.  $P \Rightarrow q$

8643517536.  $P \Rightarrow \sim q$

8643517537.  $q \Rightarrow P$

8643517538.  $\sim q \Rightarrow P$

Question Number : 77 Question Id : 8643512507 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

જો બૂલીય અભિવ્યક્તિ  $(p \Rightarrow q) \Leftrightarrow (q * (\sim p))$  એ નિત્સસત્ય હોય, તો બૂલીય અભિવ્યક્તિ  $p * (\sim q)$  એ \_\_\_\_\_ ને સમાનાર્થી છે.

Options :

8643517535.  $P \Rightarrow q$

8643517536.  $P \Rightarrow \sim Q$

8643517537.  $Q \Rightarrow P$

8643517538.  $\sim Q \Rightarrow P$

**Question Number : 78 Question Id : 8643512508 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Let  $\vec{a} = 2\hat{i} - 3\hat{j} + 4\hat{k}$  and  $\vec{b} = 7\hat{i} + \hat{j} - 6\hat{k}$ .

If  $\vec{r} \times \vec{a} = \vec{r} \times \vec{b}$ ,  $\vec{r} \cdot (\hat{i} + 2\hat{j} + \hat{k}) = -3$ , then  $\vec{r} \cdot (2\hat{i} - 3\hat{j} + \hat{k})$  is equal to :

**Options :**

8643517539. 8

8643517540. 10

8643517541. 12

8643517542. 13

**Question Number : 78 Question Id : 8643512508 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

ધારો કે  $\vec{a} = 2\hat{i} - 3\hat{j} + 4\hat{k}$  અને  $\vec{b} = 7\hat{i} + \hat{j} - 6\hat{k}$ .

જો  $\vec{r} \times \vec{a} = \vec{r} \times \vec{b}$ ,  $\vec{r} \cdot (\hat{i} + 2\hat{j} + \hat{k}) = -3$  હોય, તો  $\vec{r} \cdot (2\hat{i} - 3\hat{j} + \hat{k}) = \underline{\hspace{2cm}}$ .

**Options :**

8643517539. 8

8643517540. 10

8643517541. 12

8643517542. 13

**Question Number : 79 Question Id : 8643512509 Question Type : MCQ Option Shuffling : Yes Is****Question Mandatory : No****Correct Marks : 4 Wrong Marks : 1**

Two dices are rolled. If both dices have six faces numbered 1, 2, 3, 5, 7 and 11, then the probability that the sum of the numbers on the top faces is less than or equal to 8 is :

**Options :**8643517543.  $\frac{5}{12}$ 8643517544.  $\frac{4}{9}$ 8643517545.  $\frac{17}{36}$ 8643517546.  $\frac{1}{2}$ **Question Number : 79 Question Id : 8643512509 Question Type : MCQ Option Shuffling : Yes Is****Question Mandatory : No****Correct Marks : 4 Wrong Marks : 1**

બે પાસાઓને ફેંકવામાં આવે છે. બે બંને પાસાઓની છ બાજુઓ પર 1, 2, 3, 5, 7 તથા 11 અંકિત હોય, તો મથાળાની બાજુ પરનાં અંકોનો સરવાળો 8 કે તેથી નાના હોવાની સંભાવના \_\_\_\_\_ છે.

**Options :**8643517543.  $\frac{5}{12}$ 8643517544.  $\frac{4}{9}$ 8643517545.  $\frac{17}{36}$

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

8643517546.

**Question Number : 80 Question Id : 8643512510 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The sum of possible values of  $x$  for  $\tan^{-1}(x + 1) + \cot^{-1}\left(\frac{1}{x - 1}\right) = \tan^{-1}\left(\frac{8}{31}\right)$  is :

**Options :**

$$-\frac{33}{4}$$

8643517547.

$$-\frac{32}{4}$$

8643517548.

$$-\frac{31}{4}$$

8643517549.

$$-\frac{30}{4}$$

8643517550.

**Question Number : 80 Question Id : 8643512510 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

$\tan^{-1}(x + 1) + \cot^{-1}\left(\frac{1}{x - 1}\right) = \tan^{-1}\left(\frac{8}{31}\right)$  માટેની  $x$  ની શક્ય કિંમતોનો સરવાળો \_\_\_\_\_ છે.

**Options :**

$$-\frac{33}{4}$$

8643517547.

$$-\frac{32}{4}$$

8643517548.

$$-\frac{31}{4}$$

8643517549.

8643517550.  $-\frac{30}{4}$

## Mathematics Section B

Section Id :	864351168
Section Number :	6
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	864351168
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 8643512511 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The maximum value of  $z$  in the following equation  $z = 6xy + y^2$ , where  $3x + 4y \leq 100$  and  $4x + 3y \leq 75$  for  $x \geq 0$  and  $y \geq 0$  is \_\_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 81 Question Id : 8643512511 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$x \geq 0$  અને  $y \geq 0$  માટે જ્યારે  $3x + 4y \leq 100$  અને  $4x + 3y \leq 75$  હોય, ત્યારે સમીકરણ  $z = 6xy + y^2$  માં  $z$  નું મહત્તમ મૂલ્ય \_\_\_\_\_ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

**Question Number : 82 Question Id : 8643512512 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

If  $A = \begin{bmatrix} 2 & 3 \\ 0 & -1 \end{bmatrix}$ , then the value of  $\det(A^4) + \det(A^{10} - (\text{Adj}(2A))^{10})$  is equal to \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 82 Question Id : 8643512512 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

જો  $A = \begin{bmatrix} 2 & 3 \\ 0 & -1 \end{bmatrix}$  હોય, તો  $\det(A^4) + \det(A^{10} - (\text{Adj}(2A))^{10}) =$  \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 83 Question Id : 8643512513 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

If  $(2021)^{3762}$  is divided by 17, then the remainder is \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 83 Question Id : 8643512513 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

(2021)<sup>3762</sup> ને 17 વડે ભાગતાં શેષ \_\_\_\_\_ મળે છે.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number :** 84 **Question Id :** 8643512514 **Question Type :** SA

**Correct Marks :** 4 **Wrong Marks :** 0

If the function  $f(x) = \frac{\cos(\sin x) - \cos x}{x^4}$  is continuous at each point in its domain and

$f(0) = \frac{1}{k}$ , then k is \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number :** 84 **Question Id :** 8643512514 **Question Type :** SA

**Correct Marks :** 4 **Wrong Marks :** 0

જો વિધેય  $f(x) = \frac{\cos(\sin x) - \cos x}{x^4}$  તેના પ્રદેશનાં પ્રત્યેક બિંદુઓ પાસે સતત હોય અને  $f(0) = \frac{1}{k}$  હોય, તો

k = \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number :** 85 **Question Id :** 8643512515 **Question Type :** SA

**Correct Marks :** 4 **Wrong Marks :** 0

If  $[ \cdot ]$  represents the greatest integer function, then the value of

$$\left| \int_0^{\sqrt{\frac{\pi}{2}}} [x^2] - \cos x \, dx \right| \text{ is } \underline{\hspace{2cm}}.$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number :** 85 **Question Id :** 8643512515 **Question Type :** SA

**Correct Marks :** 4 **Wrong Marks :** 0

जे  $[ \cdot ]$  महत्तम पूर्णांक विधेय दशवि, तो

$$\left| \int_0^{\sqrt{\frac{\pi}{2}}} [x^2] - \cos x \, dx \right| = \underline{\hspace{2cm}}.$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number :** 86 **Question Id :** 8643512516 **Question Type :** SA

**Correct Marks :** 4 **Wrong Marks :** 0

The minimum distance between any two points  $P_1$  and  $P_2$  while considering point  $P_1$  on one circle and point  $P_2$  on the other circle for the given circles' equations

$$x^2 + y^2 - 10x - 10y + 41 = 0$$

$$x^2 + y^2 - 24x - 10y + 160 = 0 \text{ is } \underline{\hspace{2cm}}.$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number : 86 Question Id : 8643512516 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

આપેલ વર્તુળો  $x^2 + y^2 - 10x - 10y + 41 = 0$  અને  $x^2 + y^2 - 24x - 10y + 160 = 0$  માટે બિંદુ  $P_1$  ને એક વર્તુળ પર તથા બિંદુ  $P_2$  ને બીજા વર્તુળ પર લેતાં બિંદુઓ  $P_1$  અને  $P_2$  વચ્ચેનું ન્યૂનતમ અંતર \_\_\_\_\_ મળે છે.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 87 Question Id : 8643512517 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

If the equation of the plane passing through the line of intersection of the planes  $2x - 7y + 4z - 3 = 0$ ,  $3x - 5y + 4z + 11 = 0$  and the point  $(-2, 1, 3)$  is  $ax + by + cz - 7 = 0$ , then the value of  $2a + b + c - 7$  is \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

**Question Number : 87 Question Id : 8643512517 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

બે સમતલો  $2x - 7y + 4z - 3 = 0$  અને  $3x - 5y + 4z + 11 = 0$  ની છેદ રેખા તથા બિંદુ  $(-2, 1, 3)$  માંથી પસાર થતાં સમતલનું સમીકરણ  $ax + by + cz - 7 = 0$  હોય, તો  $2a + b + c - 7$  નું મૂલ્ય \_\_\_\_\_ છે.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

100

Question Number : 88 Question Id : 8643512518 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let there be three independent events  $E_1, E_2$  and  $E_3$ . The probability that only  $E_1$  occurs is  $\alpha$ , only  $E_2$  occurs is  $\beta$  and only  $E_3$  occurs is  $\gamma$ . Let 'p' denote the probability of none of events occurs that satisfies the equations  $(\alpha - 2\beta)p = \alpha\beta$  and  $(\beta - 3\gamma)p = 2\beta\gamma$ . All the given probabilities are assumed to lie in the interval  $(0, 1)$ .

Then,  $\frac{\text{Probability of occurrence of } E_1}{\text{Probability of occurrence of } E_3}$  is equal to \_\_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 88 Question Id : 8643512518 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ધારો કે  $E_1, E_2$  અને  $E_3$  ત્રણ નિરપેક્ષ ઘટનાઓ છે. ફક્ત  $E_1$  ઘટવાની સંભાવના  $\alpha$ , ફક્ત  $E_2$  ઘટવાની સંભાવના  $\beta$  તથા ફક્ત  $E_3$  ઘટવાની સંભાવના  $\gamma$  છે. સમીકરણો  $(\alpha - 2\beta)p = \alpha\beta$  અને  $(\beta - 3\gamma)p = 2\beta\gamma$  નું સમાધાન કરતી કોઈપણ ઘટના ન ઘટે તેની સંભાવના ધારો કે 'p' દર્શાવે છે. આપેલ ત્રણેય સંભાવનાઓ અંતરાલ  $(0, 1)$  માં આવશે એવું ધારીએ

તો,  $\frac{E_1 \text{ ઘટવાની સંભાવના}}{E_3 \text{ ઘટવાની સંભાવના}} = \underline{\hspace{2cm}}$ .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 89 Question Id : 8643512519 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If  $f(x) = \sin\left(\cos^{-1}\left(\frac{1 - 2^{2x}}{1 + 2^{2x}}\right)\right)$  and its first derivative with respect to  $x$  is  $-\frac{b}{a}\log_e 2$  when

$x = 1$ , where  $a$  and  $b$  are integers, then the minimum value of  $|a^2 - b^2|$  is \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number : 89 Question Id : 8643512519 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

જો  $f(x) = \sin\left(\cos^{-1}\left(\frac{1-2^{2x}}{1+2^{2x}}\right)\right)$  હોય અને  $x=1$  હોય ત્યારે  $x$ -સાપેક્ષ તેનું પ્રથમ વિકલિત  $-\frac{b}{a}\log_e 2$  હોય,

જ્યાં  $a$  અને  $b$  પૂર્ણાંકો છે, તો  $|a^2 - b^2|$  નું ન્યૂનતમ મૂલ્ય \_\_\_\_\_ છે.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Number : 90 Question Id : 8643512520 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

If  $\vec{a} = \alpha \hat{i} + \beta \hat{j} + 3\hat{k}$ ,

$\vec{b} = -\beta \hat{i} - \alpha \hat{j} - \hat{k}$  and

$\vec{c} = \hat{i} - 2\hat{j} - \hat{k}$

such that  $\vec{a} \cdot \vec{b} = 1$  and  $\vec{b} \cdot \vec{c} = -3$ , then  $\frac{1}{3}((\vec{a} \times \vec{b}) \cdot \vec{c})$  is equal to \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

Question Number : 90 Question Id : 8643512520 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$$\vec{a} = \alpha \hat{i} + \beta \hat{j} + 3\hat{k},$$

$$\vec{b} = -\beta \hat{i} - \alpha \hat{j} - \hat{k} \text{ અને}$$

$$\vec{c} = \hat{i} - 2\hat{j} - \hat{k} \text{ હોય તથા}$$

$$\vec{a} \cdot \vec{b} = 1 \text{ અને } \vec{b} \cdot \vec{c} = -3, \text{ તો } \frac{1}{3}((\vec{a} \times \vec{b}) \cdot \vec{c}) = \underline{\hspace{2cm}}.$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100