

National Testing Agency

Question Paper Name :	B TECH EO 17th March 2021 Shift 2
Subject Name :	B TECH EO
Creation Date :	2021-03-18 10:47:31
Duration :	180
Number of Questions :	90
Total Marks :	300
Display Marks:	Yes

B TECH EO

Group Number :	1
Group Id :	86435149
Group Maximum Duration :	0
Group Minimum Duration :	180
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	300
Is this Group for Examiner? :	No

Physics Section A

Section Id :	864351289
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	864351289
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 8643514321 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

A carrier signal $C(t) = 25 \sin(2.512 \times 10^{10}t)$ is amplitude modulated by a message signal $m(t) = 5 \sin(1.57 \times 10^8t)$ and transmitted through an antenna. What will be the bandwidth of the modulated signal ?

Options :

86435112961. 50 MHz

86435112962. 8 GHz

86435112963. 2.01 GHz

86435112964. 1987.5 MHz

Question Number : 1 Question Id : 8643514321 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଗୋଟିଏ ବାହକ ସଂକେତ $C(t) = 25 \sin(2.512 \times 10^{10}t)$ କୁ ଏକ ସମ୍ବାଦ ସଂକେତ $m(t) = 5 \sin(1.57 \times 10^8t)$ ଦ୍ୱାରା ଆୟାମ ମଡୁଲେନ କରାଗଲା ଏବଂ ଗୋଟିଏ ଆଣ୍ଟେନା ମଧ୍ୟଦେଇ ସଞ୍ଚାରଣ କରାଗଲା । ମଡୁଲେନ ସଂକେତଟିର ବ୍ୟାଣ୍ଡ ପ୍ରସ୍ଥ କେତେ ହେବ ?

Options :

86435112961. 50 MHz

86435112962. 8 GHz

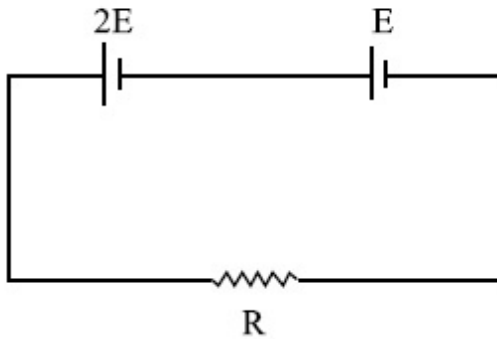
86435112963. 2.01 GHz

86435112964. 1987.5 MHz

Question Number : 2 Question Id : 8643514322 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two cells of emf $2E$ and E with internal resistance r_1 and r_2 respectively are connected in series to an external resistor R (see figure). The value of R , at which the potential difference across the terminals of the first cell becomes zero is



Options :

86435112965. $\frac{r_1}{2} - r_2$

86435112966. $\frac{r_1}{2} + r_2$

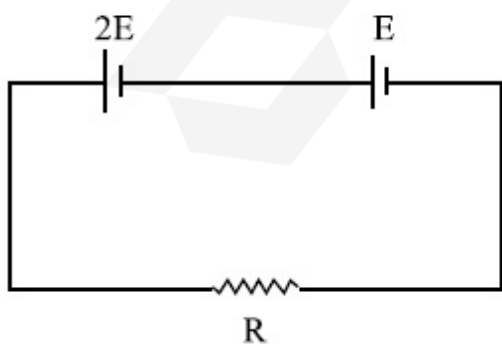
86435112967. $r_1 - r_2$

86435112968. $r_1 + r_2$

Question Number : 2 Question Id : 8643514322 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଥାକ୍ରମେ ଆଭ୍ୟନ୍ତରୀକ ପ୍ରତିରୋଧ r_1 ଏବଂ r_2 ଥିବା ଇ.ଏମ୍.ଏଫ $2E$ ଓ E ବିଶିଷ୍ଟ ଦୁଇଟି ବିଦ୍ୟୁତ୍ କୋଷକୁ ଗୋଟିଏ ବାହ୍ୟ ପ୍ରତିରୋଧ (R) ସହ ଶ୍ରେଣୀରେ ସଂଯୋଗ କରାଗଲା (ଚିତ୍ରଦେଖ) । ଯେତେବେଳେ ପ୍ରଥମ କୋଷର ମେରୁ ଦୁଇଟି ମଧ୍ୟରେ ବିଭବ ପାର୍ଥକ୍ୟ ଶୂନ୍ୟ (ଜିରୋ) ହୋଇଥାଏ, ସେତେବେଳେ R ର ମୂଲ୍ୟ ହେଉଛି :



Options :

86435112965. $\frac{r_1}{2} - r_2$

$$\frac{r_1}{2} + r_2$$

86435112966.

$$r_1 - r_2$$

86435112967.

$$r_1 + r_2$$

86435112968.

Question Number : 3 Question Id : 8643514323 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A sound wave of frequency 245 Hz travels with the speed of 300 ms^{-1} along the positive x -axis. Each point of the wave moves to and fro through a total distance of 6 cm. What will be the mathematical expression of this travelling wave ?

Options :

$$Y(x, t) = 0.03 [\sin 5.1x - (0.2 \times 10^3)t]$$

86435112969.

$$Y(x, t) = 0.03 [\sin 5.1x - (1.5 \times 10^3)t]$$

86435112970.

$$Y(x, t) = 0.06 [\sin 5.1x - (1.5 \times 10^3)t]$$

86435112971.

$$Y(x, t) = 0.06 [\sin 0.8x - (0.5 \times 10^3)t]$$

86435112972.

Question Number : 3 Question Id : 8643514323 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

245 Hz ଆବୃତ୍ତିର ଏକ ଶବ୍ଦ ତରଙ୍ଗ 300 ms^{-1} ବେଗରେ ଧନାତ୍ମକ x -ଅକ୍ଷ ଦିଗରେ ଗତି କରୁଅଛି । ତରଙ୍ଗଟିର ପ୍ରତ୍ୟେକ ବିନ୍ଦୁ ସର୍ବାଧିକ ଆଗକୁ ପଛକୁ 6 cm ଦୂରତାକୁ ଗତି କରୁଛି । ଏହି ଗତିଶୀଳ ତରଙ୍ଗଟିର ଗାଣିତିକ ବ୍ୟାଞ୍ଜକଟି କ'ଣ ହେବ ?

Options :

$$Y(x, t) = 0.03 [\sin 5.1x - (0.2 \times 10^3)t]$$

86435112969.

$$Y(x, t) = 0.03 [\sin 5.1x - (1.5 \times 10^3)t]$$

86435112970.

$$Y(x, t) = 0.06 [\sin 5.1x - (1.5 \times 10^3)t]$$

86435112971.

86435112972. $Y(x, t) = 0.06 [\sin 0.8x - (0.5 \times 10^3)t]$

Question Number : 4 Question Id : 8643514324 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A geostationary satellite is orbiting around an arbitrary planet 'P' at a height of $11R$ above the surface of 'P', R being the radius of 'P'. The time period of another satellite in hours at a height of $2R$ from the surface of 'P' is _____. 'P' has the time period of 24 hours.

Options :

86435112973. 5

86435112974. $6\sqrt{2}$

86435112975. 3

86435112976. $\frac{6}{\sqrt{2}}$

Question Number : 4 Question Id : 8643514324 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଗୋଟିଏ ଭୂସ୍ଥିର ଉପଗ୍ରହ ଏକ ସ୍ୱେଚ୍ଛାଚାରୀ ଉପଗ୍ରହ ଚାରିପଟେ P ଠାରୁ $11R$ ଉଚ୍ଚତାରେ ରହି ପରିକ୍ରମଣ କରୁଅଛି, R ହେଉଛି ପୃଥିବୀର P ର ବ୍ୟାସାର୍ଦ୍ଧ । P ଠାରୁ $2R$ ଉଚ୍ଚତାରେ ଥିବା ଆଉ ଏକ ଉପଗ୍ରହର ଆବର୍ତ୍ତକାଳ ଘଣ୍ଟାରେ ହେବ _____ । P ର ଆବର୍ତ୍ତକାଳ ହେଉଛି 24 ଘଣ୍ଟା ।

Options :

86435112973. 5

86435112974. $6\sqrt{2}$

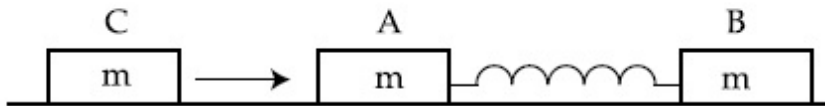
86435112975. 3

86435112976. $\frac{6}{\sqrt{2}}$

Question Number : 5 Question Id : 8643514325 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two identical blocks A and B each of mass m resting on the smooth horizontal floor are connected by a light spring of natural length L and spring constant K . A third block C of mass m moving with a speed v along the line joining A and B collides with A. The maximum compression in the spring is



Options :

86435112977. $\sqrt{\frac{m}{2K}}$

86435112978. $v\sqrt{\frac{m}{2K}}$

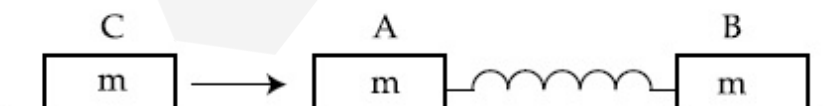
86435112979. $\sqrt{\frac{mv}{K}}$

86435112980. $\sqrt{\frac{mv}{2K}}$

Question Number : 5 Question Id : 8643514325 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଏକ ଭୂସମାନ୍ତର ମସୃଣ ପୃଷ୍ଠରେ ଛିର ଅବସ୍ଥାରେ ଥିବା ପ୍ରତ୍ୟେକ m ବସ୍ତୁରୁ ବିଶିଷ୍ଟ ଦୁଇଟି ଏକାଭଳି ବ୍ଲକ୍ A ଏବଂ B କୁ ସାଧାରଣ ଦୈର୍ଘ୍ୟ L ଏବଂ ସ୍ପ୍ରିଙ୍ଗ୍ ଧୂଳାକ K ଥିବା ଏକ ହାଲୁକା ସ୍ପ୍ରିଙ୍ଗ୍ ଦ୍ୱାରା ସଂଯୁକ୍ତ କରାଯାଇଛି । A ଏବଂ B କୁ ଯୋଗ କରୁଥିବା ରେଖା ଦିଗରେ v ବେଗରେ ଗତିକରୁଥିବା m ବସ୍ତୁରୁ ବିଶିଷ୍ଟ ଏକ ଚୂତୀୟ ବ୍ଲକ୍ C ଟି ବ୍ଲକ୍ A ସହ ଧକ୍କା ହେଲା । ସ୍ପ୍ରିଙ୍ଗ୍ରେ ହେଉଥିବା ସର୍ବାଧିକ ସଂକୋଚନ ହେବ :



Options :

86435112977. $\sqrt{\frac{m}{2K}}$

86435112978. $v\sqrt{\frac{m}{2K}}$

86435112979. $\sqrt{\frac{mv}{K}}$

86435112980. $\sqrt{\frac{mv}{2K}}$

Question Number : 6 Question Id : 8643514326 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two particles A and B of equal masses are suspended from two massless springs of spring constants K_1 and K_2 respectively. If the maximum velocities during oscillations are equal, the ratio of the amplitude of A and B is

Options :

86435112981. $\frac{K_1}{K_2}$

86435112982. $\sqrt{\frac{K_1}{K_2}}$

86435112983. $\frac{K_2}{K_1}$

86435112984. $\sqrt{\frac{K_2}{K_1}}$

Question Number : 6 Question Id : 8643514326 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ସମାନ ବସ୍ତୁ ବିଶିଷ୍ଟ ଦୁଇଟି କଣିକା A ଏବଂ B କୁ ଯଥାକ୍ରମେ ସ୍ପ୍ରିଙ୍ଗ ଧ୍ରୁବାଙ୍କ K_1 ଏବଂ K_2 ଥିବା ଦୁଇଟି ବସ୍ତୁତ୍ୱହୀନ ସ୍ପ୍ରିଙ୍ଗରେ ଝୁଲାଇଯାଇଛି । ଯଦି ବୋଳନ ସମୟରେ ସର୍ବାଧିକ ପରିବେଗ ଦୁଇଟି ସମାନ ହୁଏ, ତେବେ A ଏବଂ B ର ଆୟାମର ଅନୁପାତ ହେବ :

Options :

86435112981. $\frac{K_1}{K_2}$

86435112982. $\sqrt{\frac{K_1}{K_2}}$

86435112983. $\frac{K_2}{K_1}$

86435112984. $\sqrt{\frac{K_2}{K_1}}$

Question Number : 7 Question Id : 8643514327 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II

List - I

List - II

- | | |
|-----------------------------------------------------------------------------------|--------------------------------------------------|
| (a) Phase difference between current and voltage in a purely resistive AC circuit | (i) $\frac{\pi}{2}$; current leads voltage |
| (b) Phase difference between current and voltage in a pure inductive AC circuit | (ii) zero |
| (c) Phase difference between current and voltage in a pure capacitive AC circuit | (iii) $\frac{\pi}{2}$; current lags voltage |
| (d) Phase difference between current and voltage in an LCR series circuit | (iv) $\tan^{-1}\left(\frac{X_C - X_L}{R}\right)$ |

Choose the most appropriate answer from the options given below :

Options :

86435112985. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

86435112986. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

86435112987. (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

86435112988. (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

Question Number : 7 Question Id : 8643514327 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ତାଲିକା - I ସହ ତାଲିକା - II କୁ ମିଳାଅ :

ତାଲିକା - I

ତାଲିକା - II

(a) ଗୋଟିଏ ବିଶୁଦ୍ଧ ବିଦ୍ୟୁତ୍ ପ୍ରତିରୋଧୀ AC

(i) $\frac{\pi}{2}$; ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ବିଭବ ପାର୍ଥକ୍ୟ ଠାରୁ ଆଗେଇଥାଏ ।

ପରିପଥରେ ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ଏବଂ ବିଭବ ପାର୍ଥକ୍ୟ ମଧ୍ୟରେ କଳାତର ।

(b) ଗୋଟିଏ ବିଶୁଦ୍ଧ ପ୍ରଶୋଦନ ପରିପଥରେ

(ii) ଶୂନ୍ୟ (ଜିରୋ)

ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ଏବଂ ବିଭବ ପାର୍ଥକ୍ୟ ମଧ୍ୟରେ କଳାତର ।

(c) ଗୋଟିଏ ବିଶୁଦ୍ଧ ଧାରିତା ପରିପଥରେ ବିଦ୍ୟୁତ୍

(iii) $\frac{\pi}{2}$; ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ବିଭବ ପାର୍ଥକ୍ୟ ଠାରୁ ପଛେଇଥାଏ ।

ସ୍ରୋତ ଏବଂ ବିଭବ ପାର୍ଥକ୍ୟ ମଧ୍ୟରେ କଳାତର ।

(d) ଶ୍ରେଣୀରେ ସଂଯୁକ୍ତ LCR ପରିପଥରେ ବିଦ୍ୟୁତ୍

(iv) $\tan^{-1}\left(\frac{X_C - X_L}{R}\right)$

ସ୍ରୋତ ଏବଂ ବିଭବ ପାର୍ଥକ୍ୟ ମଧ୍ୟରେ କଳାତର ।

ତଳେ ଦିଆଯାଇଥିବା ବିକଳଗୁଡ଼ିକ ମଧ୍ୟରୁ ସର୍ବାଧିକ ଉପଯୁକ୍ତ ଉତ୍ତରଟି ବାଛି :

Options :

86435112985. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

86435112986. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

86435112987. (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

86435112988. (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

Question Number : 8 Question Id : 8643514328 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

What happens to the inductive reactance and the current in a purely inductive circuit if the frequency is halved ?

Options :

86435112989. Inductive reactance will be doubled and current will be halved.

86435112990. Inductive reactance will be halved and current will be doubled.

86435112991. Both, inductive reactance and current will be halved.

86435112992. Both, inducting reactance and current will be doubled.

Question Number : 8 Question Id : 8643514328 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି ଗୋଟିଏ ବିଶୁଦ୍ଧ ପ୍ରଶୋଦନ ପରିପଥରେ ଆବୃତ୍ତି ଅଧା ହୋଇଯାଏ, ତେବେ ପ୍ରଶୋଦନ ପ୍ରତିଘାତ ଓ ବିଦ୍ୟୁତ୍ ସ୍ରୋତରେ କିଭଳି ପରିବର୍ତ୍ତନ ହେବ ?

Options :

86435112989. ପ୍ରଶୋଦନ ପ୍ରତିଘାତ ଦୁଇଗୁଣ ହୋଇଯିବ ଏବଂ ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ଅଧା ହେବ ।

86435112990. ପ୍ରଶୋଦନ ପ୍ରତିଘାତ ଅଧା ହୋଇଯିବ ଏବଂ ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ଦୁଇଗୁଣ ହୋଇଯିବ ।

86435112991. ଉଭୟ, ପ୍ରଶୋଦନ ପ୍ରତିଘାତ ଓ ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ଅଧା ହୋଇଯିବ ।

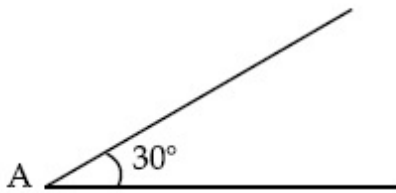
86435112992. ଉଭୟ, ପ୍ରଶୋଦନ ପ୍ରତିଘାତ ଓ ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ଦୁଇଗୁଣ ହୋଇଯିବ ।

Question Number : 9 Question Id : 8643514329 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A sphere of mass 2 kg and radius 0.5 m is rolling with an initial speed of 1 ms^{-1} goes up an inclined plane which makes an angle of 30° with the horizontal plane, without slipping. How long will the sphere take to return to the starting point A ?



Options :

86435112993. 0.60 s

86435112994. 0.57 s

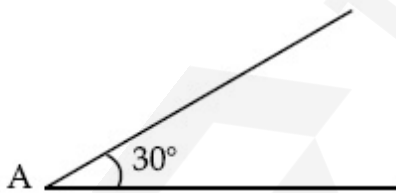
86435112995. 0.52 s

86435112996. 0.80 s

Question Number : 9 Question Id : 8643514329 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଭୂସମାନ୍ତର ସମତଳ ସହ 30° କୋଣ କରୁଥିବା ଗୋଟିଏ ଆନତ ପୃଷ୍ଠରେ 2 kg ବସ୍ତୁ ଓ 0.5 m ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ ଏକ ଗୋଲକ ପ୍ରାରମ୍ଭିକ ବେଗ 1 ms^{-1} ରେ ନିମ୍ନ ଗତିଗୁଡ଼ି ଯାଉଅଛି । ଗୋଲକଟି ମୂଳ ସ୍ଥାନ A କୁ ଫେରି ଆସିବା ପାଇଁ କେତେ ସମୟ ନେବ ?



Options :

86435112993. 0.60 s

86435112994. 0.57 s

86435112995. 0.52 s

86435112996. 0.80 s

Question Number : 10 Question Id : 8643514330 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A rubber ball is released from a height of 5 m above the floor. It bounces back repeatedly, always rising to $\frac{81}{100}$ of the height through which it falls. Find the average speed of the ball.

(Take $g = 10 \text{ ms}^{-2}$)

Options :

86435112997. 2.0 ms^{-1}

86435112998. 2.50 ms^{-1}

86435112999. 3.0 ms^{-1}

86435113000. 3.50 ms^{-1}

Question Number : 10 Question Id : 8643514330 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଭୂପୃଷ୍ଠରୁ 5 m ଉଚ୍ଚତାରୁ ଗୋଟିଏ ରବର ବଲକୁ ଛଡ଼ାଗଲା । ଏହା ବାରମ୍ବାର ଡେଇଁ ଚାଲିଲା, ସବୁବେଳେ ଏହା ଖସୁଥିବା ଉଚ୍ଚତାର $\frac{81}{100}$ ଭାଗକୁ ଉଠିଥାଏ । ବଲଟିର ହାରାହାରି ବେଗ ନିରୂପଣ କର । (ଧର $g = 10 \text{ ms}^{-2}$)

Options :

86435112997. 2.0 ms^{-1}

86435112998. 2.50 ms^{-1}

86435112999. 3.0 ms^{-1}

86435113000. 3.50 ms^{-1}

Question Number : 11 Question Id : 8643514331 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The velocity of a particle is $v = v_0 + gt + Ft^2$. Its position is $x = 0$ at $t = 0$; then its displacement after time ($t = 1$) is :

Options :

86435113001. $v_0 + \frac{g}{2} + F$

86435113002. $v_0 + 2g + 3F$

86435113003. $v_0 + \frac{g}{2} + \frac{F}{3}$

86435113004. $v_0 + g + F$

Question Number : 11 Question Id : 8643514331 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଗୋଟିଏ କଣିକାର ପରିବେଗ $v = v_0 + gt + Ft^2$ ଅଟେ । $t = 0$ ସମୟରେ ଏହାର ଅବସ୍ଥାନ $x = 0$ ଅଟେ, ତେବେ ($t = 1$) ସମୟ ପରେ ଏହାର ବିସ୍ଥାପନ ହେବ :

Options :

86435113001. $v_0 + \frac{g}{2} + F$

86435113002. $v_0 + 2g + 3F$

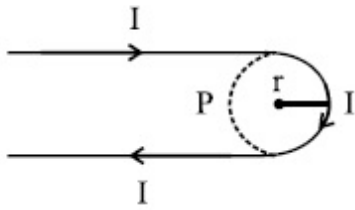
86435113003. $v_0 + \frac{g}{2} + \frac{F}{3}$

86435113004. $v_0 + g + F$

Question Number : 12 Question Id : 8643514332 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A hairpin like shape as shown in figure is made by bending a long current carrying wire. What is the magnitude of a magnetic field at point P which lies on the centre of the semicircle ?



Options :

86435113005. $\frac{\mu_0 I}{2\pi r}(2 - \pi)$

86435113006. $\frac{\mu_0 I}{2\pi r}(2 + \pi)$

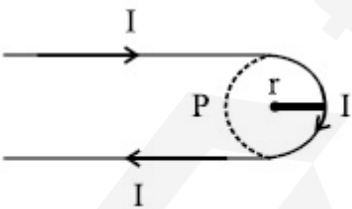
86435113007. $\frac{\mu_0 I}{4\pi r}(2 + \pi)$

86435113008. $\frac{\mu_0 I}{4\pi r}(2 - \pi)$

Question Number : 12 Question Id : 8643514332 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଗୋଟିଏ ଲମ୍ବା ବିଦ୍ୟୁତ୍ ସ୍ରୋତବାହୀ ତାରକୁ ଯୋଡ଼ାଯାଇ ହେୟାର ପିନ୍ ଆକାରର କରାଗଲା (ଚିତ୍ରରେ ଦେଖାଇଲା ପରି) । ଅର୍ଦ୍ଧବୃତ୍ତର କେନ୍ଦ୍ରରେ ଅବସ୍ଥିତ P ବିନ୍ଦୁଠାରେ ବୃତ୍ତକୀୟ କ୍ଷେତ୍ରର ପରିମାଣ କେତେହେବ ?



Options :

86435113005. $\frac{\mu_0 I}{2\pi r}(2 - \pi)$

86435113006. $\frac{\mu_0 I}{2\pi r}(2 + \pi)$

86435113007. $\frac{\mu_0 I}{4\pi r}(2 + \pi)$

86435113008. $\frac{\mu_0 I}{4\pi r}(2 - \pi)$

Question Number : 13 Question Id : 8643514333 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The atomic hydrogen emits a line spectrum consisting of various series. Which series of hydrogen atomic spectra is lying in the visible region ?

Options :

86435113009. Paschen series

86435113010. Balmer series

86435113011. Lyman series

86435113012. Brackett series

Question Number : 13 Question Id : 8643514333 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଉଦ୍ୟାନ ପରମାଣୁ ବିଭିନ୍ନ ପର୍ଯ୍ୟାୟ ଶ୍ରେଣୀରେ ଗଠିତ ବର୍ଣ୍ଣାଳୀ ରେଖା ନିଃସୂତ କରିଥାଏ । ଉଦ୍ୟାନ ପରମାଣବିକ ବର୍ଣ୍ଣାଳୀର କେଉଁ ପର୍ଯ୍ୟାୟ ଶ୍ରେଣୀ ଦୃଶ୍ୟମାନ କ୍ଷେତ୍ରରେ ରହିଥାଏ ?

Options :

86435113009. ପାଶ୍ଚେନ ପର୍ଯ୍ୟାୟ ଶ୍ରେଣୀ

86435113010. ବାଲମର ପର୍ଯ୍ୟାୟ ଶ୍ରେଣୀ

86435113011. ଲାଇମାନ ପର୍ଯ୍ୟାୟ ଶ୍ରେଣୀ

86435113012. ବ୍ରାକେଟ୍ ପର୍ଯ୍ୟାୟ ଶ୍ରେଣୀ

Question Number : 14 Question Id : 8643514334 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two identical photocathodes receive the light of frequencies f_1 and f_2 respectively. If the velocities of the photo-electrons coming out are v_1 and v_2 respectively, then

Options :

86435113013.
$$v_1 - v_2 = \left[\frac{2h}{m}(f_1 - f_2) \right]^{\frac{1}{2}}$$

86435113014.
$$v_1^2 - v_2^2 = \frac{2h}{m}[f_1 - f_2]$$

86435113015.
$$v_1 + v_2 = \left[\frac{2h}{m}(f_1 + f_2) \right]^{\frac{1}{2}}$$

86435113016.
$$v_1^2 + v_2^2 = \frac{2h}{m}[f_1 + f_2]$$

Question Number : 14 Question Id : 8643514334 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଦୁଇଟି ଏକାଭଳି ଆଲୋକ ସଂବେଦୀ ବିମୁକ୍ତାଗ୍ର (ଫଟୋ କାଥୋଡ୍) f_1 ଏବଂ f_2 ଆବୃତ୍ତିର ଆଲୋକ ଗ୍ରହଣ କରୁଛନ୍ତି । ଯଦି ବାହାରୁଥିବା ଫଟୋ-ଇଲେକ୍ଟ୍ରନ୍‌ର ପରିବେଗ ଦୁଇଟି ଯଥାକ୍ରମେ v_1 ଏବଂ v_2 ହୁଏ, ତେବେ :

Options :

86435113013.
$$v_1 - v_2 = \left[\frac{2h}{m}(f_1 - f_2) \right]^{\frac{1}{2}}$$

86435113014.
$$v_1^2 - v_2^2 = \frac{2h}{m}[f_1 - f_2]$$

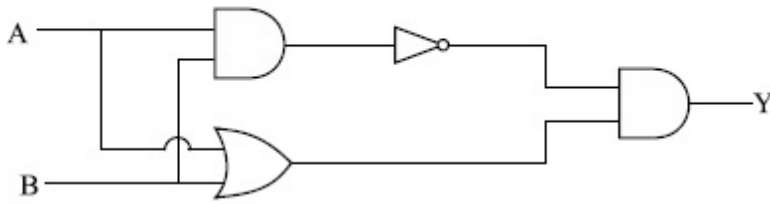
86435113015.
$$v_1 + v_2 = \left[\frac{2h}{m}(f_1 + f_2) \right]^{\frac{1}{2}}$$

86435113016.
$$v_1^2 + v_2^2 = \frac{2h}{m}[f_1 + f_2]$$

Question Number : 15 Question Id : 8643514335 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which one of the following will be the output of the given circuit ?



Options :

86435113017. AND Gate

86435113018. NAND Gate

86435113019. XOR Gate

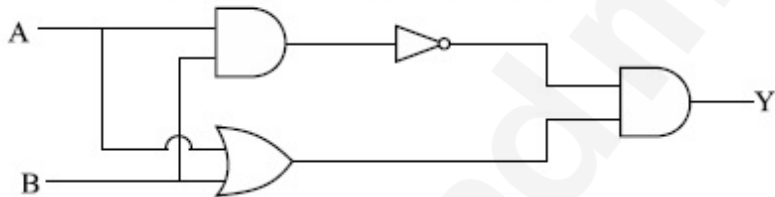
86435113020. NOR Gate

Question Number : 15 Question Id : 8643514335 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନୋକ୍ତ କେଉଁଟି ଦତ୍ତ ପରିପଥର ବହିର୍ବେଶ ଅଟେ ?



Options :

86435113017. AND ଗେଟ୍

86435113018. NAND ଗେଟ୍

86435113019. XOR ଗେଟ୍

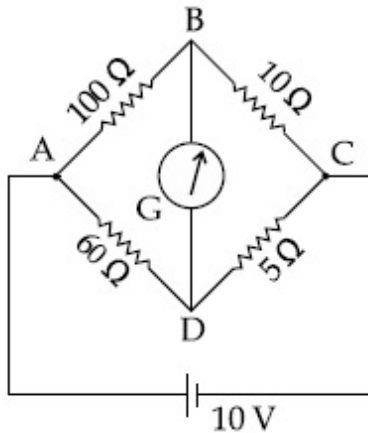
86435113020. NOR ଗେଟ୍

Question Number : 16 Question Id : 8643514336 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The four arms of a Wheatstone bridge have resistances as shown in the figure. A galvanometer of $15\ \Omega$ resistance is connected across BD. Calculate the current through the galvanometer when a potential difference of $10\ \text{V}$ is maintained across AC.



Options :

86435113021. $2.44\ \mu\text{A}$

86435113022. $2.44\ \text{mA}$

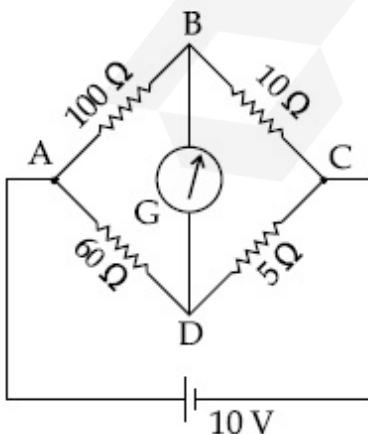
86435113023. $4.87\ \mu\text{A}$

86435113024. $4.87\ \text{mA}$

Question Number : 16 Question Id : 8643514336 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଚିତ୍ରରେ ଦର୍ଶାଯାଇଥିବା ଅନୁସାରେ ଗୋଟିଏ ଦୁଇଟି ସ୍କୋର୍ ବ୍ରିଜ୍‌ର ଚାରି ବାହୁରେ ବିଦ୍ୟୁତ୍ ପ୍ରତିରୋଧ ରହିଅଛି । BD ମଧ୍ୟରେ ଏକ $15\ \Omega$ ପ୍ରତିରୋଧ ଥିବା ଗାଲଭାନୋମିଟର ଲଗାଯାଇଛି । ଯେତେବେଳେ AC ମଧ୍ୟରେ $10\ \text{V}$ ର ବିଭବ ପାର୍ଥକ୍ୟ ଚାଲୁକରାଯାଏ, ଗାଲଭାନୋମିଟର ମଧ୍ୟ ଦେଇ ଯାଉଥିବା ବିଦ୍ୟୁତ୍ ସ୍ରୋତ କଳନା କର ।



Options :

86435113021. 2.44 μA

86435113022. 2.44 mA

86435113023. 4.87 μA

86435113024. 4.87 mA

Question Number : 17 Question Id : 8643514337 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A block of mass 1 kg attached to a spring is made to oscillate with an initial amplitude of 12 cm. After 2 minutes the amplitude decreases to 6 cm. Determine the value of the damping constant for this motion. (take $\ln 2 = 0.693$)

Options :

86435113025. $1.16 \times 10^2 \text{ kg s}^{-1}$ 86435113026. $0.69 \times 10^2 \text{ kg s}^{-1}$ 86435113027. $5.7 \times 10^{-3} \text{ kg s}^{-1}$ 86435113028. $3.3 \times 10^2 \text{ kg s}^{-1}$

Question Number : 17 Question Id : 8643514337 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଗୋଟିଏ ସ୍ପ୍ରିଙ୍ଗରେ ସଂଯୁକ୍ତ 1 kg ବସ୍ତୁର ବିଶିଷ୍ଟ ଏକ ବ୍ଲକ୍କୁ 12 cm ର ପ୍ରାରମ୍ଭିକ ଆୟାମରେ ଦୋଳନ କରାଗଲା । 2 ମିନିଟ୍ ପରେ ଆୟାମ 6 cm କୁ କମିଗଲା । ଏହି ଗତି ପାଇଁ ଆୟାମ ହ୍ରାସ ଧ୍ରୁବାଙ୍କ ନିର୍ଣ୍ଣୟ କର । (ଧର $\ln 2 = 0.693$)

Options :

86435113025. $1.16 \times 10^2 \text{ kg s}^{-1}$ 86435113026. $0.69 \times 10^2 \text{ kg s}^{-1}$ 86435113027. $5.7 \times 10^{-3} \text{ kg s}^{-1}$

86435113028. $3.3 \times 10^2 \text{ kg s}^{-1}$

Question Number : 18 Question Id : 8643514338 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If one mole of the polyatomic gas is having two vibrational modes and β is the ratio of molar

specific heats for polyatomic gas $\left(\beta = \frac{C_P}{C_V} \right)$ then the value of β is :

Options :

86435113029. 1.25

86435113030. 1.2

86435113031. 1.35

86435113032. 1.02

Question Number : 18 Question Id : 8643514338 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି ଏକ ମୋଲର ଗୋଟିଏ ବହୁ ପରମାଣୁ ବିଶିଷ୍ଟ ଗ୍ୟାସର ଦୁଇଟି କମ୍ପନ ଜଙ୍ଗ ରହିଥାଏ ଏବଂ ବହୁ ପରମାଣୁ ବିଶିଷ୍ଟ ଗ୍ୟାସର

ମୋଲାର ବିଶିଷ୍ଟ ତାପଧାରିତା ଗୁଡ଼ିକର ଅନୁପାତ $\left(\beta = \frac{C_P}{C_V} \right)$ ହୁଏ ତେବେ β ର ମୂଲ୍ୟ ଅଟେ :

Options :

86435113029. 1.25

86435113030. 1.2

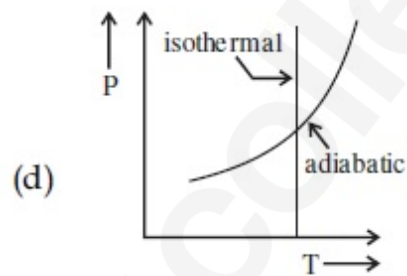
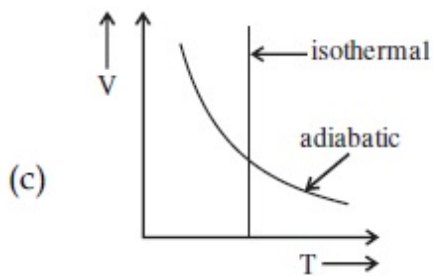
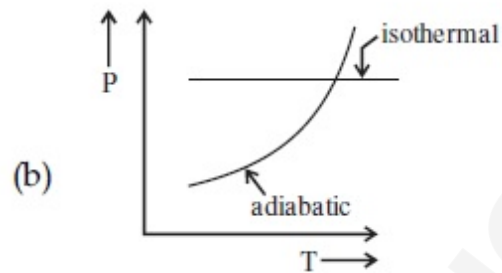
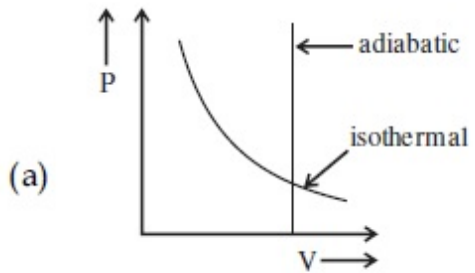
86435113031. 1.35

86435113032. 1.02

Question Number : 19 Question Id : 8643514339 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which one is the correct option for the two different thermodynamic processes ?



Options :

86435113033. (a) only

86435113034. (b) and (c)

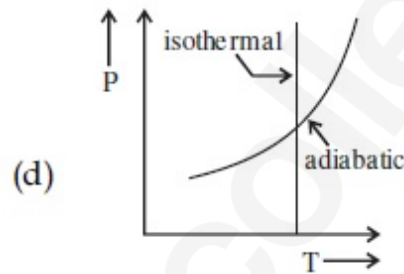
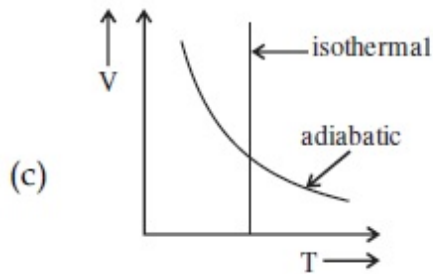
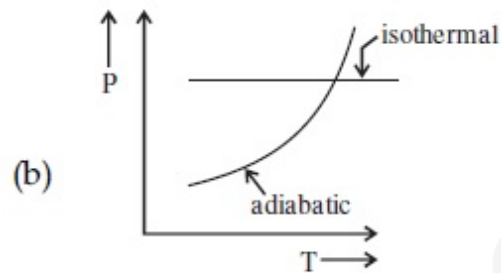
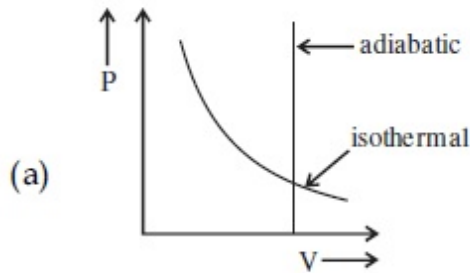
86435113035. (c) and (a)

86435113036. (c) and (d)

Question Number : 19 Question Id : 8643514339 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଦୁଇଟି ଭିନ୍ନ ତାପଗତିକ ପ୍ରକ୍ରିୟା ପାଇଁ କେଉଁଟି ସଠିକ୍ ବିକଳ୍ପ ଅଟେ ?



Options :

86435113033. କେବଳ (a)

86435113034. (b) ଏବଂ (c)

86435113035. (c) ଏବଂ (a)

86435113036. (c) ଏବଂ (d)

Question Number : 20 Question Id : 8643514340 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An object is located at 2 km beneath the surface of the water. If the fractional compression

$\frac{\Delta V}{V}$ is 1.36%, the ratio of hydraulic stress to the corresponding hydraulic strain will be

_____.

[Given : density of water is 1000 kgm^{-3} and $g = 9.8 \text{ ms}^{-2}$.]

Options :

86435113037. $1.96 \times 10^7 \text{ Nm}^{-2}$

86435113038. $1.44 \times 10^7 \text{ Nm}^{-2}$ 86435113039. $2.26 \times 10^9 \text{ Nm}^{-2}$ 86435113040. $1.44 \times 10^9 \text{ Nm}^{-2}$

Question Number : 20 Question Id : 8643514340 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଗୋଟିଏ ବସ୍ତୁ ଜଳପୃଷ୍ଠରୁ 2 km ଡାଳେ ଅବସ୍ଥିତ । ଯଦି 1.36% ଭଗ୍ନାଂଶିକ ସଂକୋଚନ $\frac{\Delta V}{V}$ ହୁଏ, ତେବେ ଉଦ୍‌ଚାଳିତ ପ୍ରତିବଳ

ସହ ଅନୁରୂପ ଉଦ୍‌ଚାଳିତ ବିଚ୍ଚିର ଅନୁପାତ ହେବ :

(ପ୍ରଦତ୍ତ : ଜଳର ସାନ୍ଦ୍ରତା 1000 kgm^{-3} ଏବଂ $g = 9.8 \text{ ms}^{-2}$)

Options :

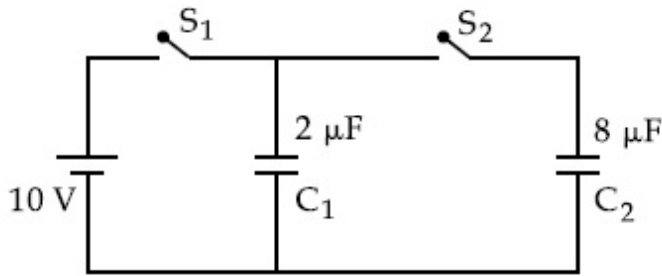
86435113037. $1.96 \times 10^7 \text{ Nm}^{-2}$ 86435113038. $1.44 \times 10^7 \text{ Nm}^{-2}$ 86435113039. $2.26 \times 10^9 \text{ Nm}^{-2}$ 86435113040. $1.44 \times 10^9 \text{ Nm}^{-2}$

Physics Section B

Section Id :	864351290
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 :	864351290
Question Shuffling Allowed :	Yes

Question Number : 21 Question Id : 8643514341 Question Type : SA Correct Marks : 4 Wrong Marks : 0

A $2 \mu\text{F}$ capacitor C_1 is first charged to a potential difference of 10 V using a battery. Then the battery is removed and the capacitor is connected to an uncharged capacitor C_2 of $8 \mu\text{F}$. The charge in C_2 on equilibrium condition is _____ μC . (Round off to the Nearest Integer)



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

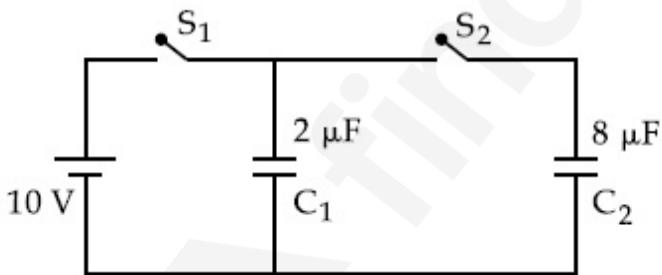
Possible Answers :

100

Question Number : 21 **Question Id :** 8643514341 **Question Type :** SA

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

ପ୍ରଥମେ ଗୋଟିଏ ବ୍ୟାଟେରୀ ବ୍ୟବହାର କରାଯାଇ $2 \mu\text{F}$ ବିଶିଷ୍ଟ ଏକ ଧାରିତ୍ର C_1 କୁ 10 V ର ବିଭବ ପାର୍ଥକ୍ୟକୁ ଚାର୍ଜିତ କରାଗଲା । ଏହାପରେ ବ୍ୟାଟେରୀକୁ କାଢ଼ି ଦିଆଗଲା ଏବଂ ଧାରିତ୍ରଟିକୁ $8 \mu\text{F}$ ବିଶିଷ୍ଟ ଏକ ଚାର୍ଜହୀନ ଧାରିତ୍ର C_2 ସହ ସଂଯୋଗ କରାଗଲା । ସଂତୁଳନ ଅବସ୍ଥାରେ C_2 ରେ ଥିବା ଚାର୍ଜର ପରିମାଣ _____ μC ଅଟେ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପ୍ରକାଶ କର)



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

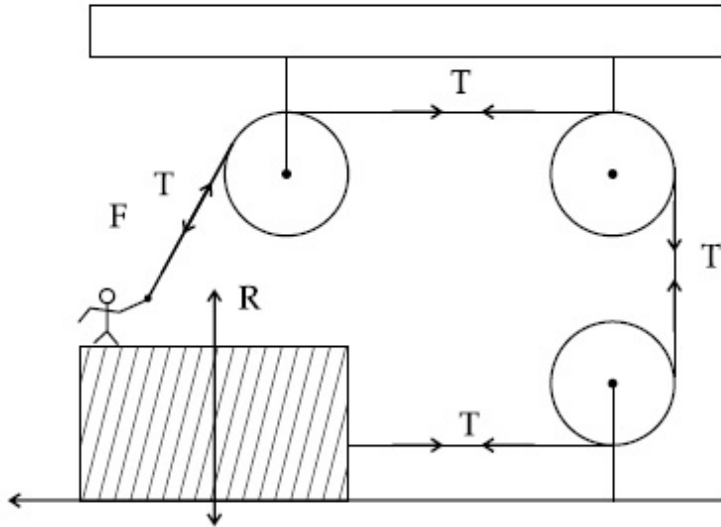
100

Question Number : 22 **Question Id :** 8643514342 **Question Type :** SA

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

A boy of mass 4 kg is standing on a piece of wood having mass 5 kg. If the coefficient of friction between the wood and the floor is 0.5, the maximum force that the boy can exert on the rope so that the piece of wood does not move from its place is _____ N. (Round off to the Nearest Integer)

[Take $g = 10 \text{ ms}^{-2}$]



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

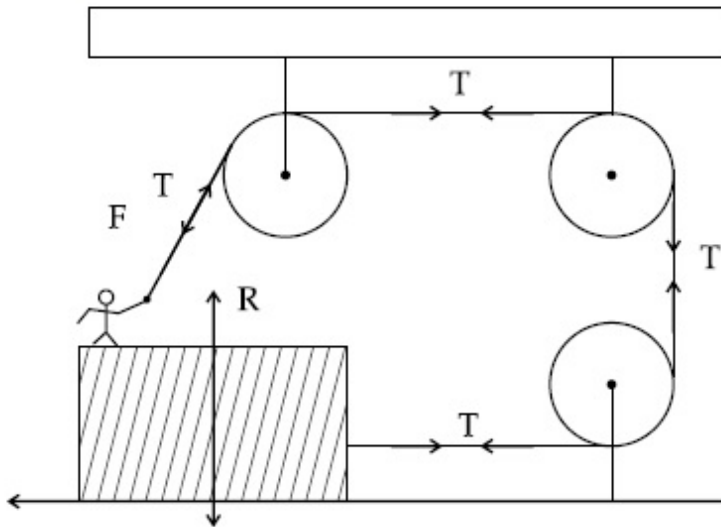
100

Question Number : 22 **Question Id :** 8643514342 **Question Type :** SA

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

5 kg ବସ୍ତୁର ଥିବା ଏକ କାଠଖଣ୍ଡ ଉପରେ 4 kg ବସ୍ତୁର ଥିବା ଏକ ବାଳକ ଛିଡ଼ା ହୋଇଛି । ଯଦି କାଠ ଏବଂ ପୃଷ୍ଠତଳ ମଧ୍ୟରେ ଘର୍ଷଣ ଧ୍ରୁବୀକ 0.5 ହୁଏ, କାଠଟି ଏହାର ସ୍ଥାନରୁ ଘୁଞ୍ଚି ନଥିବା ଅବସ୍ଥିତିରେ ବାଳକଟି ଦଉଡ଼ିଟିରେ ପକାଇଥିବା ସର୍ବାଧିକ ବଳ ହେଉଛି _____ N । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପ୍ରକାଶ କର)

[ଧର $g = 10 \text{ ms}^{-2}$]



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 23 **Question Id :** 8643514343 **Question Type :** SA

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

The image of an object placed in air formed by a convex refracting surface is at a distance of

10 m behind the surface. The image is real and is at $\frac{2}{3}$ of the distance of the object from

the surface. The wavelength of light inside the surface is $\frac{2}{3}$ times the wavelength in air. The

radius of the curved surface is $\frac{x}{13}$ m . The value of 'x' is _____.

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 : 8643514343 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଗେଟିଏ ଉତ୍ତଳ ପୃଷ୍ଠ ଦ୍ୱାରା ପୃଷ୍ଠତଳ ଠାରୁ 10 m ପଛରେ ସୃଷ୍ଟି ହେଉଥିବା (ବାୟୁମଣ୍ଡଳରେ ରଖା ଯାଇଥିବା) ପ୍ରତିବିମ୍ବଟି ବାସ୍ତବ

ଏବଂ ବସ୍ତୁଟିର ଭୂପୃଷ୍ଠରୁ ଦୂରତ୍ୱର $\frac{2}{3}$ ଗୁଣ ଅଟେ । ପୃଷ୍ଠତଳ ମଧ୍ୟରେ ଆଲୋକର ତରଙ୍ଗ ଦୈର୍ଘ୍ୟ ବାୟୁମଣ୍ଡଳରେ ତରଙ୍ଗ ଦୈର୍ଘ୍ୟର

$\frac{2}{3}$ ଗୁଣ ଅଟେ । ବକ୍ରପୃଷ୍ଠତଳଟିର ବ୍ୟାସାର୍ଦ୍ଧ ହେଉଛି $\frac{x}{13}$ m । x ର ମୂଲ୍ୟ ହେଉଛି _____ ।

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 : 8643514344 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The electric field intensity produced by the radiation coming from a 100 W bulb at a distance of 3 m is E. The electric field intensity produced by the radiation coming from 60 W at the same distance is

$\sqrt{\frac{x}{5}}$ E. Where the value of $x =$ _____.

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 : 8643514344 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

3 m ଦୂରତାରେ ରହିଥିବା 100 W ବଲ୍‌ବରୁ ଆସୁଥିବା ବିକିରଣ ଦ୍ୱାରା ଉତ୍ପନ୍ନ ବୈଦ୍ୟୁତିକ କ୍ଷେତ୍ରର ଚାନ୍ଦ୍ରତା E ଅଟେ । ସେହି

ଏକା ଦୂରତାରେ ରହିଥିବା 60 W ବଲ୍‌ବରୁ ନିର୍ଗତ ବିକିରଣ ଦ୍ୱାରା ଉତ୍ପନ୍ନ ବୈଦ୍ୟୁତିକ କ୍ଷେତ୍ରର ଚାନ୍ଦ୍ରତା ହେବ $\sqrt{\frac{x}{5}} E$,

ଯେଉଁଠାରେ $x = \underline{\hspace{2cm}}$ ଅଟେ ।

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 :** 8643514345 **Question Type :** SA

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

Seawater at a frequency $f = 9 \times 10^2$ Hz, has permittivity $\epsilon = 80\epsilon_0$ and resistivity

$\rho = 0.25 \Omega\text{m}$. Imagine a parallel plate capacitor is immersed in seawater and is driven by an

alternating voltage source $V(t) = V_0 \sin(2\pi ft)$. Then the conduction current density

becomes 10^x times the displacement current density after time $t = \frac{1}{800}$ s. The value of x is

_____.

(Given : $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$)

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 :** 8643514345 **Question Type :** SA

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

$f = 9 \times 10^2$ Hz ଆବୃତ୍ତିରେ ସମୁଦ୍ର ଜଳର ପରାବୈଦ୍ୟୁତାଙ୍କ $\epsilon = 80\epsilon_0$ ଏବଂ ପ୍ରତିରୋଧକତା $\rho = 0.25 \Omega\text{m}$. ରହିଛି । କଞ୍ଚନା କର ଗୋଟିଏ ସମାନ୍ତର ପାତକାଳା ଧାରିତ୍ରକୁ ସମୁଦ୍ର ଜଳରେ ବୁଡ଼ାଗଲା ଏବଂ ଏକ ପ୍ରତ୍ୟାବର୍ତ୍ତୀ ବିଭବ ଉତ୍ସ

$V(t) = V_0 \sin(2\pi ft)$ ଦ୍ୱାରା ଚଳାଗଲା । ଏଥିଯୋଗୁଁ $t = \frac{1}{800}$ S ପରେ ପରିବାହିତା ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ସାନ୍ତତା ବିସ୍ଥାପନ

ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ସାନ୍ତତାର 10^x ଗୁଣ ହୋଇଯାଏ । x ର ମୂଲ୍ୟ ଅଟେ _____ ।

(ଦତ୍ତ : $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$)

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 :** 8643514346 **Question Type :** SA

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

The electric field in a region is given by $\vec{E} = \frac{2}{5}E_0\hat{i} + \frac{3}{5}E_0\hat{j}$ with $E_0 = 4.0 \times 10^3 \frac{\text{N}}{\text{C}}$. The

flux of this field through a rectangular surface area 0.4 m^2 parallel to the Y–Z plane is _____ $\text{Nm}^2 \text{C}^{-1}$.

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 :** 8643514346 **Question Type :** SA

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

ଗୋଟିଏ ସ୍ଥାନରେ $E_0 = 4.0 \times 10^3 \frac{\text{N}}{\text{C}}$ ସହ ବୈଦ୍ୟୁତିକ କ୍ଷେତ୍ର $\vec{E} = \frac{2}{5}E_0\hat{i} + \frac{3}{5}E_0\hat{j}$ ଦ୍ୱାରା ଦିଆଯାଇଛି । Y–Z

ପୃଷ୍ଠକୁ ସମାନ୍ତରରେ ଥିବା 0.4 m^2 କ୍ଷେତ୍ରଫଳ ବିଶିଷ୍ଟ ଏକ ଆୟତାକାର ପୃଷ୍ଠତଳ ମଧ୍ୟଦେଇ ଯାଉଥିବା ଏହି କ୍ଷେତ୍ରଚିର ଅଭିବାହ ହେଉଛି _____ $\text{Nm}^2 \text{C}^{-1}$.

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 : 8643514347 Question Type : SA

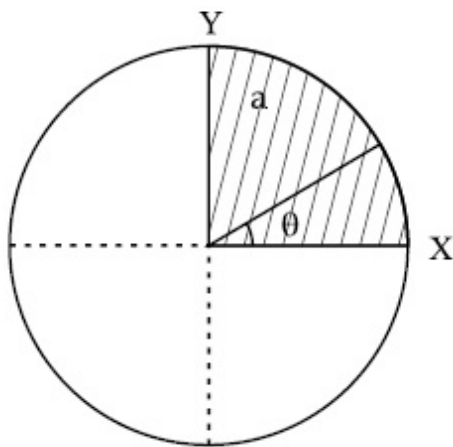
Correct Marks : 4 Wrong Marks : 0

The disc of mass M with uniform surface mass density σ is shown in the figure. The centre of

mass of the quarter disc (the shaded area) is at the position $\frac{x}{3} \frac{a}{\pi}, \frac{x}{3} \frac{a}{\pi}$ where

x is _____. (Round off to the Nearest Integer)

[a is an area as shown in the figure]



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

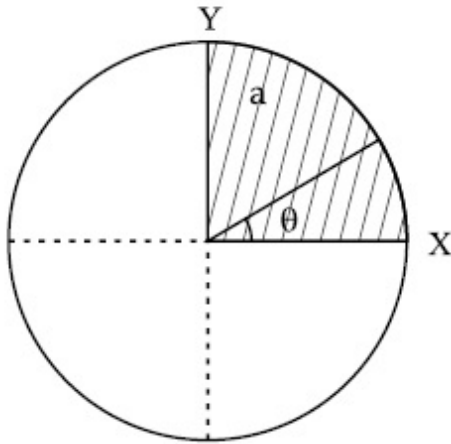
Question Number : 27 Question Id : 8643514347 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଚିତ୍ରଟିରେ ପୃଷ୍ଠଭାଗରୁ σ ଥିବା ଗୋଟିଏ M ବସ୍ତୁର ବିଶିଷ୍ଟ ଏକ ଡିସ୍କକୁ ଦର୍ଶାଯାଇଅଛି । ଚତୁର୍ଥାଂଶ ଡିସ୍କ (ଚିତ୍ରିତ କ୍ଷେତ୍ର) ର ବସ୍ତୁର

କେନ୍ଦ୍ର $\left(\frac{x}{3}, \frac{a}{\pi}, \frac{x}{3}, \frac{a}{\pi}\right)$ ରେ ଅବସ୍ଥିତ । ଯେଉଁଠି x ହେଉଛି _____ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ)

(ଚିତ୍ରରେ ଦର୍ଶାଯାଇଥିବା କ୍ଷେତ୍ରର କ୍ଷେତ୍ରଫଳ a ଅଟେ)



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 :** 8643514348 **Question Type :** SA

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

A body of mass 1 kg rests on a horizontal floor with which it has a coefficient of static friction $\frac{1}{\sqrt{3}}$. It is desired to make the body move by applying the minimum possible force

F N. The value of F will be _____. (Round off to the Nearest Integer)

[Take $g = 10 \text{ ms}^{-2}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 28 Question Id : 8643514348 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

1 kg ବସ୍ତୁ ବିଶିଷ୍ଟ ଏକ ବସ୍ତୁଟି ଗୋଟିଏ ଭୂସମାନ୍ତର ପୃଷ୍ଠରେ ରହିଅଛି ଯାହା ସହ ଏହାର ଛିର ଘର୍ଷଣ ଧୁବାଙ୍କ ଅଟେ $\frac{1}{\sqrt{3}}$ ।

ସର୍ବନିମ୍ନ ସାମ୍ବନ୍ଧ୍ୟ ବଳ F N ପ୍ରୟୋଗ କରି ବସ୍ତୁଟିକୁ ଗତିଶୀଳ କରାଯିବାକୁ ଛିର କରାଗଲା । F ର ମୂଲ୍ୟ ହେବ _____
(ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ)

[ଧର $g = 10 \text{ ms}^{-2}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 29 Question Id : 8643514349 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A particle of mass m moves in a circular orbit in a central potential field $U(r) = U_0 r^4$. If

Bohr's quantization conditions are applied, radii of possible orbitals r_n vary with $n^{\frac{1}{\alpha}}$, where α is _____.

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 : 8643514349 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଏକ କେନ୍ଦ୍ରୀୟ ବିଭବ କ୍ଷେତ୍ର $U(r) = U_0 r^4$ ରେ m ବସ୍ତୁ ବିଶିଷ୍ଟ ଏକ କଣିକାଟିଏ ବୃତ୍ତାକାର କକ୍ଷରେ ଗତି କରୁଅଛି । ଯଦି ବୋହରଙ୍କ ବିଭକ୍ତିକରଣ (କ୍ୱାଣ୍ଟାଇଜେସନ) ସର୍ତ୍ତାବଳୀକୁ ପ୍ରୟୋଗ କରାଯାଏ, ସାମ୍ବନ୍ଧ୍ୟ ଅର୍ବିତାଲ ଗୁଡ଼ିକର ବ୍ୟାସାର୍ଦ୍ଧ r_n ଗୁଡ଼ିକ $n^{\frac{1}{\alpha}}$ ଆକାରରେ ପରବର୍ତ୍ତିତ ହୋଇଥାଏ, ଯେଉଁଠାରେ α _____ ଅଟେ ।

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 : 8643514350 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Suppose you have taken a dilute solution of oleic acid in such a way that its concentration

becomes 0.01 cm^3 of oleic acid per cm^3 of the solution. Then you make a thin film of this

solution (monomolecular thickness) of area 4 cm^2 by considering 100 spherical drops of

radius $\left(\frac{3}{40\pi}\right)^{\frac{1}{3}} \times 10^{-3} \text{ cm}$. Then the thickness of oleic acid layer will be $x \times 10^{-14} \text{ m}$.

Where x is _____.

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 : 8643514350 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଧରାଯାଉ ତୁମେ ଓଲିକ୍ ଏସିଡ୍‌ର ଏକ କ୍ଷୀଣାକୃତ ଦ୍ରବଣ ଏମିତି ଆକାରରେ ନେଲ ଯେ, ଏହାର ଗାଢତା 0.01 cm^3 ଓଲିକ୍ ଏସିଡ୍

ପ୍ରତି ଏକ cm^3 ଦ୍ରବଣ ହେଲା । ଏହାପରେ ତୁମେ $\left(\frac{3}{40\pi}\right)^{\frac{1}{3}} \times 10^{-3} \text{ cm}$ ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ 100 ଗୋଲାକାର ଚୋପାକୁ

ବିବେଚନା କରି ଏହି ଦ୍ରବଣର 4 cm^2 କ୍ଷେତ୍ରଫଳ ବିଶିଷ୍ଟ ଏକ ପତଳା ଆସ୍ତରଣ (ଏକ-ଆଣବିକ ମୋନୋଲେୟର) ତିଆରି କଲ । ତେବେ ଓଲିକ୍ ଏସିଡ୍ ଆସ୍ତରଣର ମୋନୋଲେୟର $x \times 10^{-14} \text{ m}$ ହେବ, ଯେଉଁଠାରେ x ର ମୂଲ୍ୟ ଅଟେ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Chemistry Section A

Section Id :	864351291
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	864351291
Question Shuffling Allowed :	Yes

Question Number : 31 Question Id : 8643514351 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Amongst the following, the linear species is :

Options :

86435113051. N_3^-

86435113052. NO_2

86435113053. O_3

86435113054. Cl_2O

Question Number : 31 Question Id : 8643514351 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଅଣୁମାନକ ମଧ୍ୟରୁ ସରଳରେଖିକ ଅଣୁ ହେଉଛି :

Options :

86435113051. N_3^-

86435113052. NO_2

86435113053. O_3

86435113054. Cl_2O

Question Number : 32 Question Id : 8643514352 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

During which of the following processes, does entropy decrease ?

- (A) Freezing of water to ice at 0°C
- (B) Freezing of water to ice at -10°C
- (C) $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$
- (D) Adsorption of $\text{CO}(\text{g})$ on lead surface.
- (E) Dissolution of NaCl in water

Choose the correct answer from the options given below :

Options :

86435113055. (A), (B), (C) and (D) only

86435113056. (A), (C) and (E) only

86435113057. (A) and (E) only

86435113058. (B) and (C) only

Question Number : 32 Question Id : 8643514352 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନଲିଖିତ ମଧ୍ୟରୁ କେଉଁ ପ୍ରଣାଳୀରେ ଏଣ୍ଟ୍ରୋପି ହ୍ରାସ ପାଏ ?

- (A) 0°C ତାପମାତ୍ରାରେ ଜଳର ବରଫକୁ ହିମିକରଣ ।
- (B) -10°C ତାପମାତ୍ରାରେ ଜଳର ବରଫକୁ ହିମିକରଣ ।
- (C) $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$
- (D) ଲେଡ୍ ଉପରିଭାଗରେ $\text{CO}(\text{g})$ ର ଅଧିଶୋଷଣ ।
- (E) ଜଳରେ NaCl ର ଦ୍ରବଣ ।

ନିମ୍ନଲିଖିତ ବିକଳ୍ପ ମଧ୍ୟରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛି :

Options :

86435113055. (A), (B), (C) ଏବଂ (D) କେବଳ

86435113056. (A), (C) ଏବଂ (E) କେବଳ

86435113057. (A) ଏବଂ (E) କେବଳ

86435113058. (B) ଏବଂ (C) କେବଳ

Question Number : 33 Question Id : 8643514353 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

For the coagulation of a negative sol, the species below, that has the highest flocculating power is :

Options :

86435113059. Ba^{2+}

86435113060. Na^{+}

86435113061. PO_4^{3-}

86435113062. SO_4^{2-}

Question Number : 33 Question Id : 8643514353 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଏକ ବିଯୁକ୍ତାତ୍ମକ ସଲର ଜମାଟିକରଣ ପାଇଁ ସର୍ବାଧିକ ଫ୍ଲୋକୁଲେଟିଙ୍ଗ୍ କ୍ଷମତା ଥିବା ନିମ୍ନପ୍ରଦତ୍ତ ପ୍ରଜାତିଟି ହେଉଛି :

Options :

86435113059. Ba^{2+}

86435113060. Na^{+}

86435113061. PO_4^{3-}

86435113062. SO_4^{2-}

Question Number : 34 Question Id : 8643514354 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The set of elements that differ in mutual relationship from those of the other sets is :

Options :

86435113063. Be - Al

86435113064. B - Si

86435113065. Li - Na

86435113066. Li - Mg

Question Number : 34 Question Id : 8643514354 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମୌଳିକ ମାନଙ୍କର ଏକ ସମାହାର ଯାହା ଅନ୍ୟାନ୍ୟ ସମାହାରମାନଙ୍କ ଠାରୁ ଭିନ୍ନ ଅଟେ :

Options :

86435113063. Be - Al

86435113064. B - Si

86435113065. Li - Na

86435113066. Li - Mg

Question Number : 35 Question Id : 8643514355 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II :

List - I	List - II
(a) Haematite	(i) $Al_2O_3 \cdot xH_2O$
(b) Bauxite	(ii) Fe_2O_3
(c) Magnetite	(iii) $CuCO_3 \cdot Cu(OH)_2$
(d) Malachite	(iv) Fe_3O_4

Choose the correct answer from the options given below :

Options :

86435113067. (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

86435113068. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

86435113069. (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

86435113070. (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

Question Number : 35 Question Id : 8643514355 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ତାଲିକା - I ସହିତ ତାଲିକା - II କୁ ମିଳାଅ :

ତାଲିକା - I	ତାଲିକା - II
(a) ହେମାଟାଇଟ୍	(i) $Al_2O_3 \cdot xH_2O$
(b) ବକ୍ସାଇଟ୍	(ii) Fe_2O_3
(c) ମାଗ୍ନେଟାଇଟ୍	(iii) $CuCO_3 \cdot Cu(OH)_2$
(d) ମାଲାକାଇଟ୍	(iv) Fe_3O_4

ନିମ୍ନଲିଖିତ ବିକଳ୍ପ ମଧ୍ୟରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛ :

Options :

86435113067. (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

86435113068. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

86435113069. (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

86435113070. (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

Question Number : 36 Question Id : 8643514356 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The functional groups that are responsible for the ion-exchange property of cation and anion exchange resins, respectively, are :

Options :

86435113071. $-\text{SO}_3\text{H}$ and $-\text{NH}_2$

86435113072. $-\text{NH}_2$ and $-\text{COOH}$

86435113073. $-\text{NH}_2$ and $-\text{SO}_3\text{H}$

86435113074. $-\text{SO}_3\text{H}$ and $-\text{COOH}$

Question Number : 36 Question Id : 8643514356 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

କେଟାୟନ ଏବଂ ଏନାୟନ ଅଦଳବଦଳ ରେଜିନରେ ଆୟନ ଅଦଳବଦଳ ଗୁଣ ପାଇଁ ଦାୟିତ୍ଵ ବହନ କରୁଥିବା କ୍ରିୟାତ୍ମକମୂଳକ ଗୁଡ଼ିକ ହେଉଛି :

Options :

86435113071. $-\text{SO}_3\text{H}$ ଏବଂ $-\text{NH}_2$

86435113072. $-\text{NH}_2$ ଏବଂ $-\text{COOH}$

86435113073. $-\text{NH}_2$ ଏବଂ $-\text{SO}_3\text{H}$

86435113074. $-\text{SO}_3\text{H}$ ଏବଂ $-\text{COOH}$

Question Number : 37 Question Id : 8643514357 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

One of the by-products formed during the recovery of NH_3 from Solvay process is :

Options :

86435113075. NH_4Cl

86435113076. Ca(OH)_2

86435113077. CaCl_2

86435113078. NaHCO_3

Question Number : 37 Question Id : 8643514357 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ସଲଭେ ପ୍ରଣାଳୀରୁ NH_3 ର ପୁନଃପ୍ରାପ୍ତି ସମୟରେ ଗଠିତ ଉପଜାତ ଦ୍ରବ୍ୟମାନଙ୍କ ମଧ୍ୟରୁ ଗୋଟିଏ ଉପଜାତ ଦ୍ରବ୍ୟ ହେଉଛି :

Options :

86435113075. NH_4Cl

86435113076. Ca(OH)_2

86435113077. CaCl_2

86435113078. NaHCO_3

Question Number : 38 Question Id : 8643514358 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The set that represents the pair of neutral oxides of nitrogen is :

Options :

86435113079. NO and N_2O

86435113080. N_2O and NO_2

86435113081. NO and NO_2

86435113082. N_2O and N_2O_3

Question Number : 38 Question Id : 8643514358 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନାଇଟ୍ରୋଜେନ୍‌ର ନ୍ୟୁଟ୍ରାଲ୍ ଅକ୍ସାଇଡ୍ ଯୋଡ଼ାଟିକୁ ପ୍ରତିନିଧିତ୍ୱ କରୁଥିବା ସମାହାରଟି ହେଉଛି :

Options :

86435113079. NO ଏବଂ N_2O

86435113080. N_2O ଏବଂ NO_2

86435113081. NO ଏବଂ NO_2

86435113082. N_2O ଏବଂ N_2O_3

Question Number : 39 Question Id : 8643514359 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The common positive oxidation states for an element with atomic number 24, are :

Options :

86435113083. +1 to +6

86435113084. +2 to +6

86435113085. +1 and +3 to +6

86435113086. +1 and +3

Question Number : 39 Question Id : 8643514359 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ପାରମାଣବିକ ସଂଖ୍ୟା 24 ଥିବା ମୌଳିକଟିର ସାଧାରଣ ଜାରଣ ଅବସ୍ଥା ହେଉଛି :

Options :

86435113083. +1 କୁ +6

86435113084. +2 କୁ +6

86435113085. +1 ଏବଂ +3 କୁ +6

86435113086. +1 ଏବଂ +3

Question Number : 40 Question Id : 8643514360 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II :

List - I	List - II
(a) $[\text{Co}(\text{NH}_3)_6] [\text{Cr}(\text{CN})_6]$	(i) Linkage isomerism
(b) $[\text{Co}(\text{NH}_3)_3 (\text{NO}_2)_3]$	(ii) Solvate isomerism
(c) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$	(iii) Co-ordination isomerism
(d) $\text{cis-}[\text{CrCl}_2(\text{ox})_2]^{3-}$	(iv) Optical isomerism

Choose the correct answer from the options given below :

Options :

86435113087. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

86435113088. (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

86435113089. (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

86435113090. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

Question Number : 40 Question Id : 8643514360 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ତାଲିକା - I ସହିତ ତାଲିକା - II କୁ ମିଳାଅ :

ତାଲିକା - I	ତାଲିକା - II
(a) $[\text{Co}(\text{NH}_3)_6] [\text{Cr}(\text{CN})_6]$	(i) ଲିଙ୍କେଜ୍ ସମାବୟବତା
(b) $[\text{Co}(\text{NH}_3)_3 (\text{NO}_2)_3]$	(ii) ଜଳୀୟ ସମାବୟବତା
(c) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$	(iii) ଉପସଂଯୋଜ୍ୟ ସମାବୟବତା
(d) $\text{cis-}[\text{CrCl}_2(\text{ox})_2]^{3-}$	(iv) ପ୍ରକାଶ ସମାବୟବତା

ନିମ୍ନ ବିକଳ୍ପ ମଧ୍ୟରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛି :

Options :

86435113087. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

86435113088. (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

86435113089. (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

86435113090. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

Question Number : 41 Question Id : 8643514361 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following statement(s) is (are) incorrect reason for eutrophication ?

- (A) excess usage of fertilisers
- (B) excess usage of detergents
- (C) dense plant population in water bodies
- (D) lack of nutrients in water bodies that prevent plant growth

Choose the most appropriate answer from the options given below :

Options :

86435113091. (A) only

86435113092. (B) and (D) only

86435113093. (C) only

86435113094. (D) only

Question Number : 41 Question Id : 8643514361 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନଲିଖିତ ମଧ୍ୟରୁ କେଉଁ ଉକ୍ତି (ଗୁଡ଼ିକ) ଯୁଗ୍ମୋପକେସନ ବିଷୟରେ ଭୁଲ ଅଟେ ?

- (A) ଅତ୍ୟଧିକ ସାର ବ୍ୟବହାର
- (B) ଅତ୍ୟଧିକ ପରିମାର୍ଜନ ବ୍ୟବହାର
- (C) ଜଳାଶୟରେ ଘନ ଉଦ୍ଭିଦ ଅବସ୍ଥାନ
- (D) ଜଳାଶୟରେ ପୃଷ୍ଠିର ଅଭାବ ଯାହା ଉଦ୍ଭିଦ ବୃଦ୍ଧିରେ ବାଧା ସୃଷ୍ଟି କରେ

ନିମ୍ନଲିଖିତ ବିକଳ୍ପ ମଧ୍ୟରୁ ସର୍ବାଧିକ ଉପଯୁକ୍ତ ଉତ୍ତରଟି ବାଛି :

Options :

86435113091. (A) କେବଳ

86435113092. (B) ଏବଂ (D) କେବଳ

86435113093. (C) କେବଳ

86435113094. (D) କେବଳ

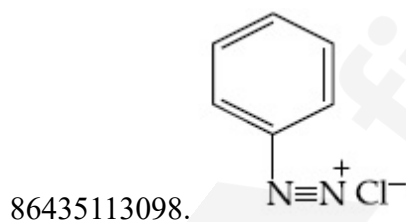
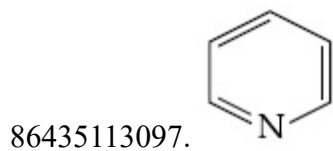
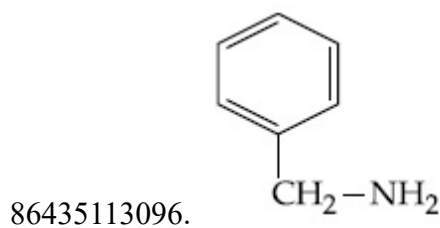
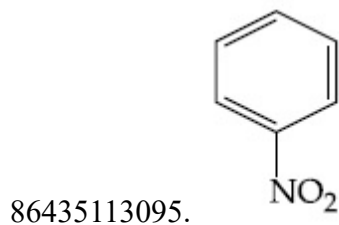
Question Number : 42 Question Id : 8643514362 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Nitrogen can be estimated by Kjeldahl's method for which of the following compound ?

Options :



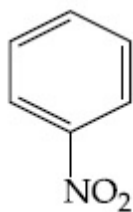
Question Number : 42 Question Id : 8643514362 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

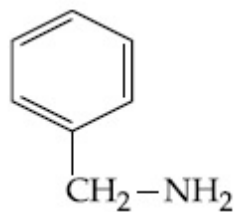
Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନଲିଖିତ କେଉଁ ଯୌଗିକ ପାଇଁ କେଲଡାହାଲ ପ୍ରଣାଳୀରେ ନାଇଟ୍ରୋଜେନ୍ ଆକଳନ/ଅକଳନ କରାଯାଇପାରିବ ?

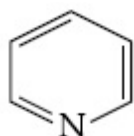
Options :



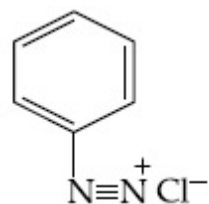
86435113095.



86435113096.



86435113097.



86435113098.

Question Number : 43 Question Id : 8643514363 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The correct pair(s) of the ambident nucleophiles is (are) :

(A) AgCN/KCN

(B) RCOOAg/RCOOK

(C) AgNO₂/KNO₂

(D) AgI/KI

Options :

86435113099. (A) only

86435113100. (B) only

86435113101. (A) and (C) only

86435113102. (B) and (C) only

Question Number : 43 Question Id : 8643514363 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଉତ୍ତର ଦତ୍ତା ନ୍ୟୁକ୍ଲିଓଫାଇଲର ସଠିକ୍ ଯୋଡ଼ା (ଗୁଡ଼ିକ) ହେଉଛି :

- (A) AgCN/KCN
- (B) RCOOAg/RCOOK
- (C) $\text{AgNO}_2/\text{KNO}_2$
- (D) AgI/KI

Options :

86435113099. (A) କେବଳ

86435113100. (B) କେବଳ

86435113101. (A) ଏବଂ (C) କେବଳ

86435113102. (B) ଏବଂ (C) କେବଳ

Question Number : 44 Question Id : 8643514364 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : 2-methylbutane on oxidation with KMnO_4 gives 2-methylbutan-2-ol.

Statement II : n-alkanes can be easily oxidised to corresponding alcohols with KMnO_4 .

Choose the correct option :

Options :

86435113103. Both statement I and statement II are correct

86435113104. Both statement I and statement II are incorrect

86435113105. Statement I is correct but statement II is incorrect

86435113106. Statement I is incorrect but statement II is correct

Question Number : 44 Question Id : 8643514364 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନରେ ଦୁଇଟି ଉକ୍ତି ଦିଆଯାଇଛି :

ଉକ୍ତି I : 2-ମିଥାଇଲ୍ ବ୍ୟୁଟେନ୍ KMnO_4 ସହିତ ଜାରଣ ହେଲେ 2-ମିଥାଇଲ୍‌ବ୍ୟୁଟେନ୍-2-ଆଲ୍ ମିଳେ ।

ଉକ୍ତି II : n-ଆଲକେନ୍, KMnO_4 ସହିତ ସହଜରେ ଜାରଣ ହୋଇ ଖାପ ଖାଉଥିବା ଆଲକୋହଲରେ ପରିଣତ ହୁଏ ।

ସଠିକ୍ ବିକଳ୍ପଟି ବାଛି :

Options :

86435113103. ଉଭୟ ଉକ୍ତି I ଏବଂ ଉକ୍ତି II ସଠିକ୍ ଅଟେ ।

86435113104. ଉଭୟ ଉକ୍ତି I ଏବଂ ଉକ୍ତି II ଭୁଲ୍ ଅଟେ ।

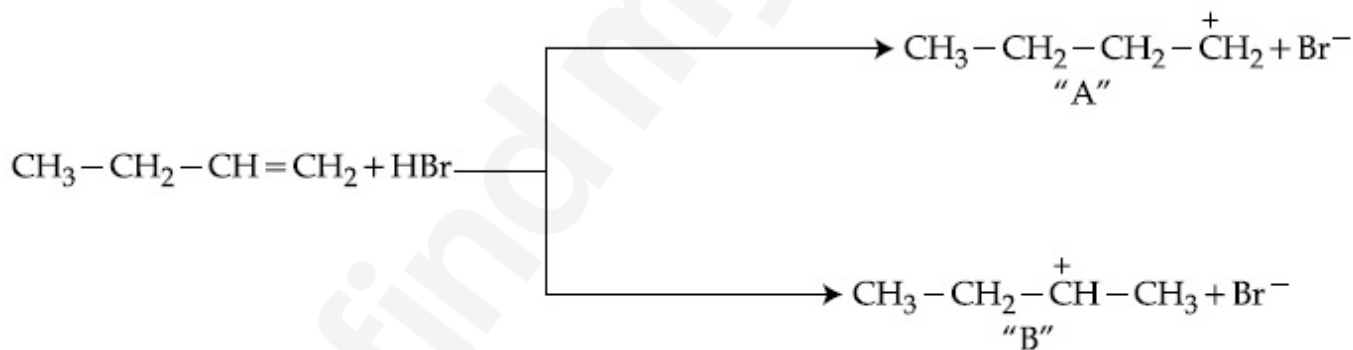
86435113105. ଉକ୍ତି I ସଠିକ୍ କିନ୍ତୁ ଉକ୍ତି II ଭୁଲ୍ ଅଟେ ।

86435113106. ଉକ୍ତି I ଭୁଲ୍ କିନ୍ତୁ ଉକ୍ତି II ସଠିକ୍ ଅଟେ ।

Question Number : 45 Question Id : 8643514365 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Choose the correct statement regarding the formation of carbocations A and B given.



Options :

86435113107. Carbocation A is more stable and formed relatively at slow rate

86435113108. Carbocation B is more stable and formed relatively at slow rate

86435113109. Carbocation A is more stable and formed relatively at faster rate

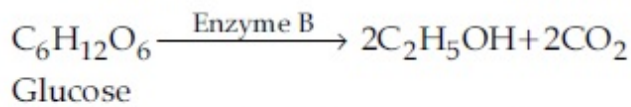
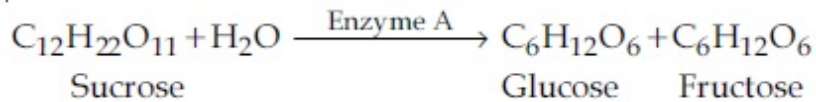
86435113110. Carbocation B is more stable and formed relatively at faster rate

Question Number : 45 Question Id : 8643514365 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Question Number : 46 Question Id : 8643514366 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



ଉପରୋକ୍ତ ପ୍ରତିକ୍ରିୟାରେ ଏନ୍‌ଜାଇମ୍ A ଏବଂ B ଯଥାକ୍ରମେ ହେଉଛନ୍ତି :

Options :

86435113111. ଇନ୍‌ଭରଟେଜ୍ ଏବଂ ଜାଇଫେଜ୍

86435113112. ଜାଇଫେଜ୍ ଏବଂ ଇନ୍‌ଭରଟେଜ୍

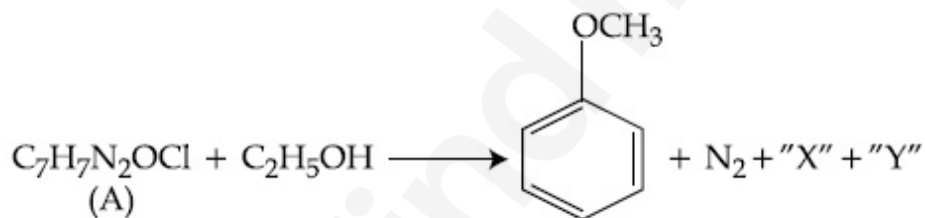
86435113113. ଇନ୍‌ଭରଟେଜ୍ ଏବଂ ଆମାଇଲେଜ୍

86435113114. ଆମାଇଲେଜ୍ ଏବଂ ଇନ୍‌ଭରଟେଜ୍

Question Number : 47 Question Id : 8643514367 Question Type : MCQ Option Shuffling : Yes Is

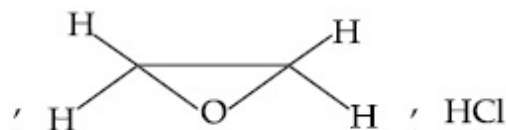
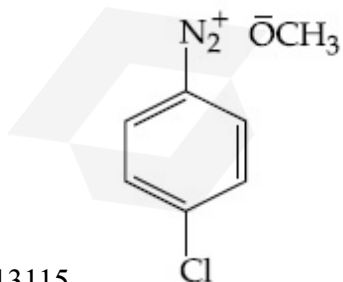
Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

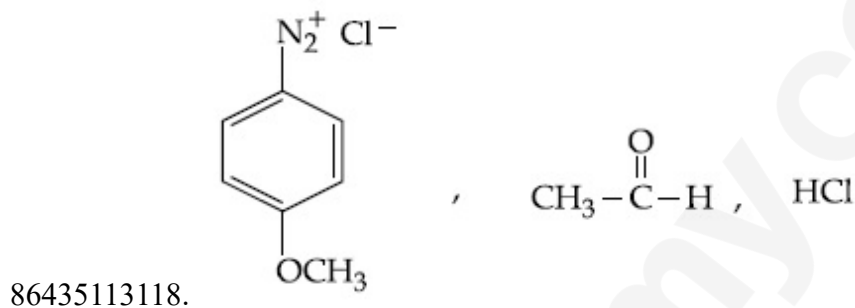
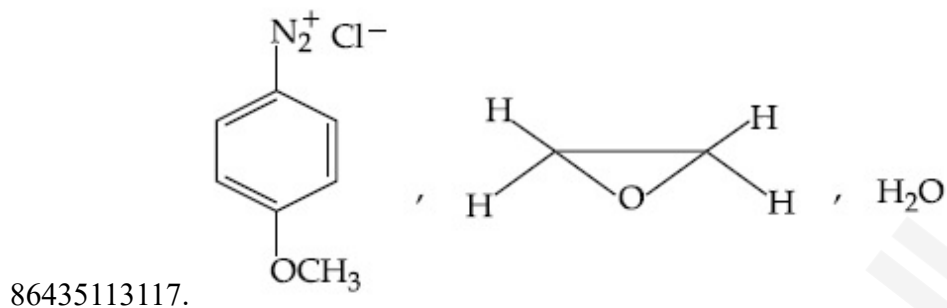
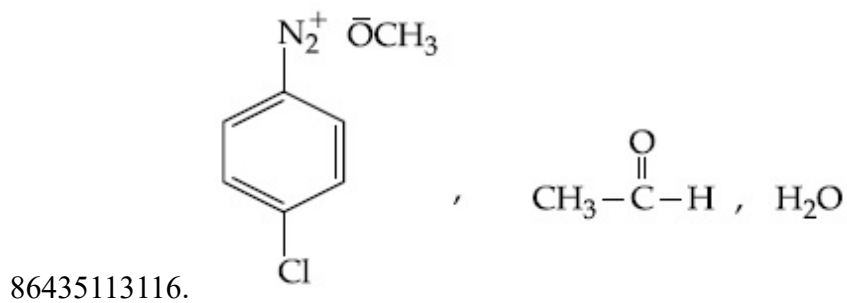


In the above reaction, the structural formula of (A), "X" and "Y" respectively are :

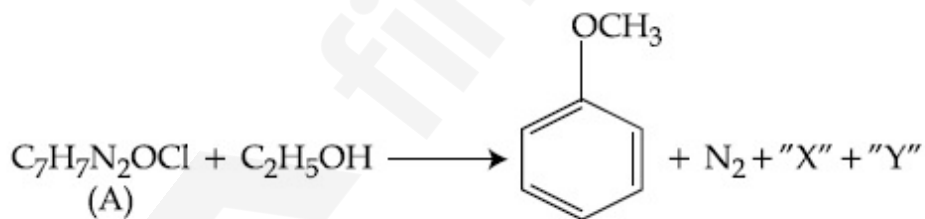
Options :



86435113115.

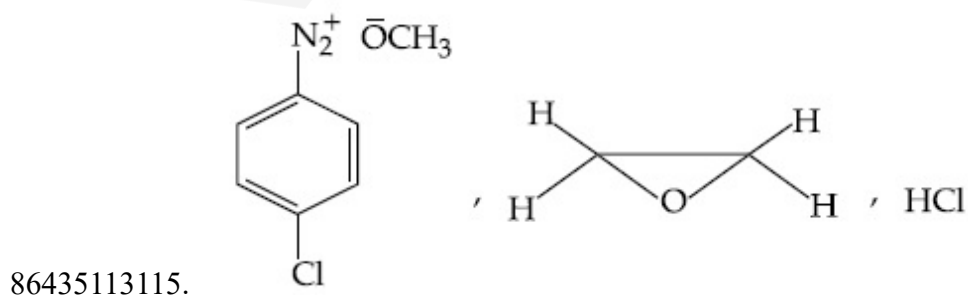


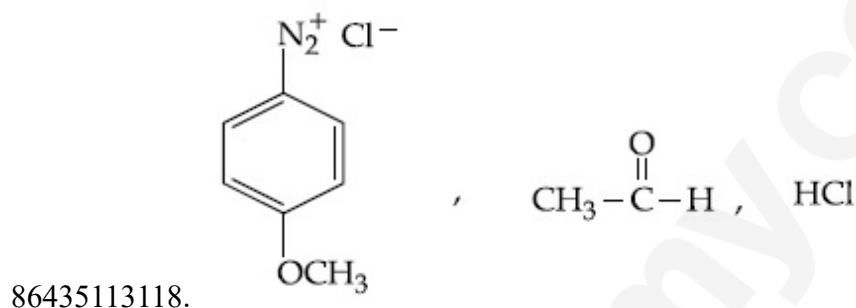
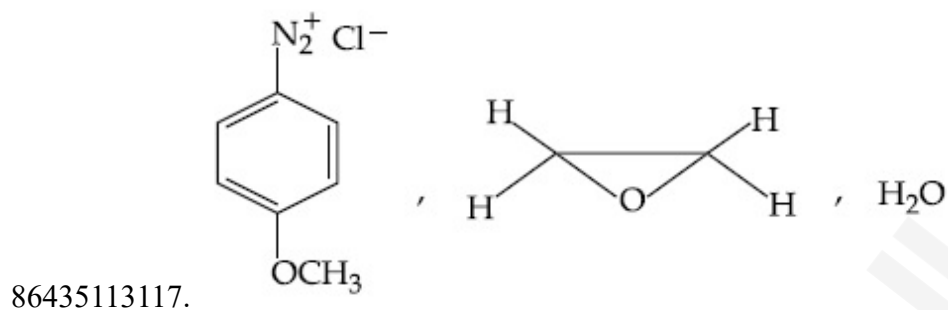
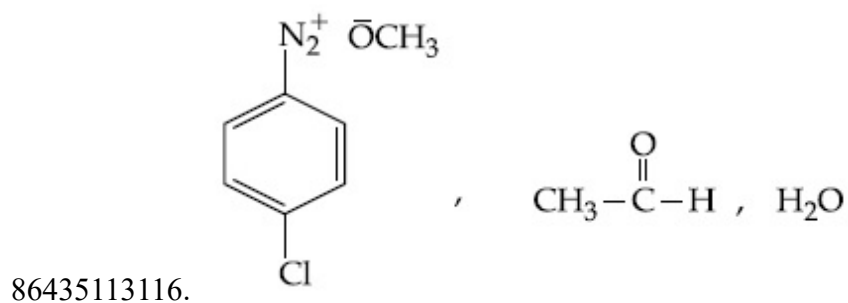
Question Number : 47 Question Id : 8643514367 Question Type : MCQ Option Shuffling : Yes Is
 Question Mandatory : No
 Correct Marks : 4 Wrong Marks : 1



ଉପରୋକ୍ତ ପ୍ରତିକ୍ରିୟାରେ (A), "X" ଏବଂ "Y" ର ସଂରଚନା ସ୍ୱତନ୍ତ୍ର ଯଥାକ୍ରମେ ହେଉଛି :

Options :





Question Number : 48 Question Id : 8643514368 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Primary, secondary and tertiary amines can be separated using :

Options :

86435113119. Chloroform and KOH

86435113120. Benzene sulphonic acid

86435113121. para-Toluene sulphonyl chloride

86435113122. Acetyl amide

Question Number : 48 Question Id : 8643514368 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ପ୍ରାଥମିକ, ଦ୍ୱିତୀୟକ ଏବଂ ତୃତୀୟକ ଆମିନ୍, ନିମ୍ନଲିଖିତ କ୍ରମେ ବ୍ୟବହାର କରି ପୃଥକ୍ କରାଯାଇପାରିବ :

Options :

86435113119. କ୍ଲୋରୋଫର୍ମ ଏବଂ KOH

86435113120. ବେଞ୍ଜିନ୍ ସଲଫୋନିକ୍ ଅମ୍ଳ

86435113121. ପାରାଟଲ୍ୟୁୟନ୍ ସଲଫୋନିକ୍ କ୍ଲୋରାଇଡ୍

86435113122. ଏସିଟିକ୍ ଆମ୍ଳ

Question Number : 49 Question Id : 8643514369 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II.

List - I

Chemical Compound

- (a) Sucralose
 (b) Glyceryl ester of stearic acid
 (c) Sodium benzoate
 (d) Bithionol

List - II

Used as

- (i) Synthetic detergent
 (ii) Artificial sweetener
 (iii) Antiseptic
 (iv) Food preservative

Choose the correct match :

Options :

86435113123. (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

86435113124. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

86435113125. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

86435113126. (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)

Question Number : 49 Question Id : 8643514369 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ତାଲିକା - I ସହିତ ତାଲିକା - II କୁ ମିଳାଅ :

ତାଲିକା - I

ରାସାୟନିକ ଯୌଗିକ

- (a) ସୁକ୍ରାଲୋଜ୍
 (b) ସ୍ଥିରାକ୍ ଥମ୍ବର ଗ୍ଲୁସେରିଲ୍ ଇଷ୍ଟର
 (c) ସୋଡ଼ିଅମ୍ ବେଞ୍ଜୋଏଟ୍
 (d) ବିଥ୍‌ଓନଲ୍

ତାଲିକା - II

ବ୍ୟବହୃତ ହୁଏ

- (i) ସାଂଶ୍ଳେଷିକ ପରିମାର୍ଜକ
 (ii) କୃତ୍ରିମ ମଧୁରକ
 (iii) ଜୀବାଣୁ ନାଶକ
 (iv) ଖାଦ୍ୟ ସଂରକ୍ଷକାରୀ

ସଠିକ୍ ମେଳକଟି ବାଛ :

Options :

86435113123. (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

86435113124. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

86435113125. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

86435113126. (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)

Question Number : 50 Question Id : 8643514370 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Fructose is an example of :

Options :

86435113127. Aldohexose

86435113128. Ketohexose

86435113129. Pyranose

86435113130. Heptose

Question Number : 50 Question Id : 8643514370 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଫୁକ୍ଟୋଜ୍ ଏକ ଉଦାହରଣ ହେଉଛି :

Options :

86435113127. ଆଲଡୋହେକ୍ସୋଇଲ୍

86435113128. କିଟୋହେକ୍ସୋଇଲ୍

86435113129. ପାଇରାନୋଇଲ୍

86435113130. ହେପ୍ଟୋଇଲ୍

Chemistry Section B

Section Id :	864351292
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 :	864351292
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 8643514371 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The number of chlorine atoms in 20 mL of chlorine gas at STP is _____ 10^{21} . (Round off to the Nearest Integer).

[Assume chlorine is an ideal gas at STP

$R = 0.083 \text{ L bar mol}^{-1} \text{ K}^{-1}$, $N_A = 6.023 \times 10^{23}$]

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 : 8643514371 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

STP ସ୍ଥିତିରେ 20 mL କ୍ଲୋରିନ୍ ଗ୍ୟାସରେ ଥିବା କ୍ଲୋରିନ୍ ପରମାଣୁ ସଂଖ୍ୟା ହେଉଛି _____ 10^{21} ।

(ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

[STP ସ୍ଥିତିରେ କ୍ଲୋରିନ୍ ଏକ ଆଦର୍ଶ ଗ୍ୟାସ ଭାବେ ଗ୍ରହଣ କର]

($R = 0.083 \text{ L bar mol}^{-1} \text{ K}^{-1}$, $N_A = 6.023 \times 10^{23}$)

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 :** 8643514372 **Question Type :** SA

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

KBr is doped with 10^{-5} mole percent of SrBr_2 . The number of cationic vacancies in 1 g of KBr crystal is _____ 10^{14} . (Round off to the Nearest Integer).

[Atomic Mass : K : 39.1 u, Br : 79.9 u

$N_A = 6.023 \times 10^{23}$]

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 :** 8643514372 **Question Type :** SA

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

10^{-5} mole ଶତକଡ଼ା SrBr_2 ଅପଦ୍ରବ୍ୟ KBr ରେ ଅବଲୋପନ କରାଯାଇଛି । 1 g KBr ସ୍ଫଟିକରେ ଥିବା କେଟାୟନିକ୍ ଫାଙ୍କା ସଂଖ୍ୟା ହେଉଛି _____ 10^{14} । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

(ପାରମାଣବିକ ବସ୍ତୁତ୍ଵ : K : 39.1 u, Br : 79.9 u

$N_A = 6.023 \times 10^{23}$)

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 : 8643514373 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

In the ground state of atomic Fe($Z=26$), the spin-only magnetic moment is _____ $\times 10^{-1}$ BM. (Round off to the Nearest Integer).

[Given : $\sqrt{3} = 1.73$, $\sqrt{2} = 1.41$]

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 : 8643514373 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Fe($Z=26$) ର ନିମ୍ନତମ ଅବସ୍ଥାରେ ଚୁମ୍ବକୀୟ ଆତ୍ମତ୍ୱ ହେଉଛି _____ $\times 10^{-1}$ BM ।
(ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

[ଦତ୍ତ : $\sqrt{3} = 1.73$, $\sqrt{2} = 1.41$]

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 : 8643514374 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A 1 molal $K_4Fe(CN)_6$ solution has a degree of dissociation of 0.4. Its boiling point is equal to that of another solution which contains 18.1 weight percent of a non electrolytic solute A. The molar mass of A is _____ u. (Round off to the Nearest Integer).

[Density of water = 1.0 g cm^{-3}]

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 : 8643514374 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

1 molal $K_4Fe(CN)_6$ ଦ୍ରବଣର ଅଣୁ ପୃଥକୀକରଣର ମାତ୍ରା ହେଉଛି 0.4 । ଏହାର ସ୍ଫୁଟନାଙ୍କ ଅନ୍ୟ ଏକ ଦ୍ରବଣର ସ୍ଫୁଟନାଙ୍କ ସହିତ ସମାନ ଯେଉଁଥିରେ 18.1 ଓଜନ % ବିଦ୍ୟୁତ୍ ଅବିଶ୍ଳେଷ୍ୟ ଦ୍ରାବ୍ୟ A ରହିଛି । A ର ମୋଲାର ବସ୍ତୁତ୍ଵ ହେଉଛି _____ u । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

[ଜଳର ସାନ୍ଦ୍ରତା = 1.0 g cm^{-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 : 8643514375 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Consider the reaction $N_2O_4(g) \rightleftharpoons 2NO_2(g)$. The temperature at which $K_C = 20.4$ and

$K_P = 600.1$, is _____ K. (Round off to the Nearest Integer).

[Assume all gases are ideal and $R = 0.0831 \text{ L bar K}^{-1} \text{ mol}^{-1}$]

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 : 8643514375 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ପ୍ରକିରାଟିକୁ ବିଚାର କର $N_2O_4(g) \rightleftharpoons 2NO_2(g)$

$K_C = 20.4$ ଏବଂ $K_P = 600.1$ ଦେଖିବା ତାପମାତ୍ରା ହେଉଛି _____ K ।

(ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

(ସମସ୍ତ ଗ୍ୟାସକୁ ଆଦର୍ଶ ଗ୍ୟାସ ମନେକର ଏବଂ $R = 0.0831 \text{ L bar K}^{-1} \text{ mol}^{-1}$)

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 : 8643514376 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A KCl solution of conductivity 0.14 S m^{-1} shows a resistance of 4.19Ω in a conductivity cell. If the same cell is filled with an HCl solution, the resistance drops to 1.03Ω . The conductivity of the HCl solution is _____ $\times 10^{-2} \text{ S m}^{-1}$. (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 : 56 Question Id : 8643514376 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଏକ ପରିବାହିତା ସେଲରେ 0.14 S m^{-1} ପରିବାହିତା ଥିବା KCl ଦ୍ରବଣର ବୈଦ୍ୟୁତିକ ପ୍ରତିରୋଧ 4.19Ω । ଯଦି HCl ଦ୍ରବଣ ଉକ୍ତ ସେଲରେ ପରିପୂର୍ଣ୍ଣ କରାଯାଏ ତାହେଲେ ବୈଦ୍ୟୁତିକ ପ୍ରତିରୋଧ ହ୍ରାସ ଘଟି 1.03Ω ହୋଇଥାଏ । HCl ଦ୍ରବଣର ପରିବାହିତା ହେଉଛି _____ $\times 10^{-2} \text{ S m}^{-1}$ ।

(ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

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 : 8643514377 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The reaction $2A + B_2 \rightarrow 2AB$ is an elementary reaction.

For a certain quantity of reactants, if the volume of the reaction vessel is reduced by a factor of 3, the rate of the reaction increases by a factor of _____. (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 : 8643514377 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ପ୍ରତିକ୍ରିୟା $2A + B_2 \rightarrow 2AB$ ଏକ ମୌଳିକ ପ୍ରତିକ୍ରିୟା । ଏକ ନିର୍ଦ୍ଦିଷ୍ଟ ପରିମାଣ ପ୍ରତିକାରକ ନିମନ୍ତେ ଯଦି ପ୍ରତିକ୍ରିୟା ପାତ୍ରର ଆୟତନ ହ୍ରାସର କାରକ 3 ହୁଏ । ପ୍ରତିକ୍ରିୟା ବୃଦ୍ଧି ହାରର କାରକ ହେଉଛି _____ ।

(ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

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 : 8643514378 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

On complete reaction of $FeCl_3$ with oxalic acid in aqueous solution containing KOH, resulted in the formation of product A. The secondary valency of Fe in the product A 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 : 58 Question Id : 8643514378 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

KOH ଜଳୀୟ ଦ୍ରବଣରେ ଅକ୍ଜାଲିନିକ୍ ଅମ୍ଳ ସହିତ $FeCl_3$ ପ୍ରତିକ୍ରିୟା ଦ୍ୱାରା ଉତ୍ପାଦ A ଗଠନ ହୁଏ । ଉତ୍ପାଦ A ରେ Fe ର ଦ୍ୱିତୀୟକ ଯୋଜ୍ୟତା ହେଉଛି _____ ।

(ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

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 : 8643514379 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The total number of C-C sigma bond/s in mesityl oxide ($C_6H_{10}O$) 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 : 59 Question Id : 8643514379 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଏସିଟୋନ୍ ସେଡିଝମ୍ ହାଇଡ୍ରୋକ୍ସାଇଡ୍ ସହିତ ପ୍ରତିକ୍ରିୟା କରି ମେସିଟିଲ ଅକ୍ସାଇଡ୍ ($C_6H_{10}O$) ଉତ୍ପନ୍ନ କରେ । ମେସିଟିଲ ଅକ୍ସାଇଡ୍ରେ ଛିତ ସମସ୍ତ C-C ସିଗ୍ମା ବନ୍ଧ ସଂଖ୍ୟା ହେଉଛି _____।

(ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

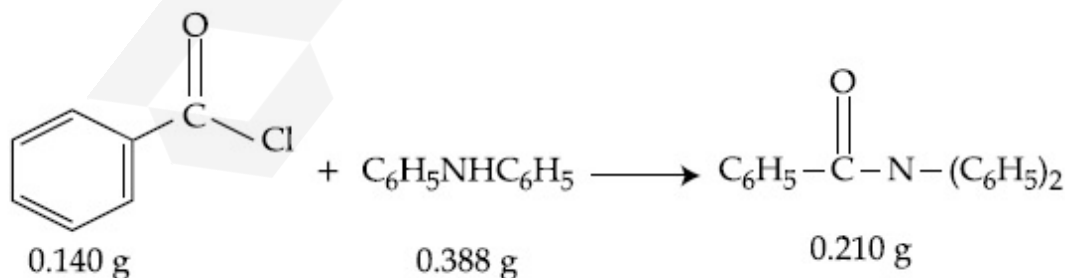
Text Areas : PlainText

Possible Answers :

100

Question Number : 60 Question Id : 8643514380 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

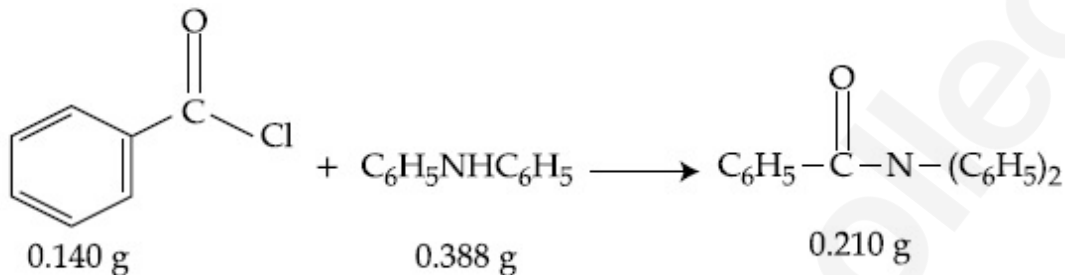


Consider the above reaction. The percentage yield of amide product is _____. (Round off to the Nearest Integer).

(Given : Atomic mass : C : 12.0 u, H : 1.0 u, N : 14.0 u, O : 16.0 u, Cl : 35.5 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 :** 8643514380 **Question Type :** SA**Correct Marks :** 4 **Wrong Marks :** 0

ଉପରୋକ୍ତ ପ୍ରତିକ୍ରିୟାଟିକୁ ବିଚାର କର । ଆମାଲତ୍ ଉତ୍ପାଦର ଶତକଡ଼ା ଉତ୍ପାଦନ ହେଉଛି _____ ।
 (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

(ଦତ୍ତ ଆଣବିକ ବସ୍ତୁତ୍ତ୍ୱ : C : 12.0 u, H : 1.0 u, N : 14.0 u, O : 16.0 u, Cl : 35.5 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

Section Id :	864351293
Section Number :	5
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	864351293
Question Shuffling Allowed :	Yes

Question Number : 61 Question Id : 8643514381 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The number of solutions of the equation $\sin^{-1}\left[x^2 + \frac{1}{3}\right] + \cos^{-1}\left[x^2 - \frac{2}{3}\right] = x^2$, for $x \in [-1, 1]$, and $[x]$ denotes the greatest integer less than or equal to x , is :

Options :

86435113141. 0

86435113142. 2

86435113143. 4

86435113144. Infinite

Question Number : 61 Question Id : 8643514381 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$x \in [-1, 1]$ ପାଇଁ, ଏବଂ $[x]$ ର ଅର୍ଥ ଏହା ଏକ ସର୍ବାଧିକ ପୂର୍ଣ୍ଣସଂଖ୍ୟା x ର ମୂଲ୍ୟ x ଠାରୁ ସାନ ବା x ସହ ସମାନ ପାଇଁ

ସମୀକରଣ $\sin^{-1}\left[x^2 + \frac{1}{3}\right] + \cos^{-1}\left[x^2 - \frac{2}{3}\right] = x^2$ ର ସମାଧାନ ସଂଖ୍ୟା :

Options :

86435113141. 0

86435113142. 2

86435113143. 4

86435113144. ଅସୀମ

Question Number : 62 Question Id : 8643514382 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the Boolean expression $(p \wedge q) \oplus (p \circledast q)$ is a tautology, then \oplus and \circledast are respectively given by :

Options :

86435113145. \wedge, \vee

86435113146. \vee, \rightarrow 86435113147. \rightarrow, \rightarrow 86435113148. \wedge, \rightarrow

Question Number : 62 Question Id : 8643514382 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି ବୁଲିଅନ୍ ଉକ୍ତି $(p \wedge q) \oplus (p \otimes q)$ ଏକ ପୁନରୁକ୍ତି, ତେବେ \oplus ଏବଂ \otimes ଯଥାକ୍ରମେ :

Options :

86435113145. \wedge, \vee 86435113146. \vee, \rightarrow 86435113147. \rightarrow, \rightarrow 86435113148. \wedge, \rightarrow

Question Number : 63 Question Id : 8643514383 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let O be the origin. Let $\vec{OP} = x\hat{i} + y\hat{j} - \hat{k}$ and $\vec{OQ} = -\hat{i} + 2\hat{j} + 3x\hat{k}$, $x, y \in \mathbb{R}$, $x > 0$, be

such that $|\vec{PQ}| = \sqrt{20}$ and the vector \vec{OP} is perpendicular to \vec{OQ} . If $\vec{OR} = 3\hat{i} + z\hat{j} - 7\hat{k}$,

$z \in \mathbb{R}$, is coplanar with \vec{OP} and \vec{OQ} , then the value of $x^2 + y^2 + z^2$ is equal to :

Options :

86435113149. 1

86435113150. 2

86435113151. 7

86435113152. 9

Question Number : 63 Question Id : 8643514383 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର O ମୂଳବିନ୍ଦୁ ଅଟେ । $\vec{OP} = x\hat{i} + y\hat{j} - \hat{k}$ ଏବଂ $\vec{OQ} = -\hat{i} + 2\hat{j} + 3x\hat{k}$, $x, y \in \mathbf{R}$, $x > 0$,

ଯେପରିକି $|\vec{PQ}| = \sqrt{20}$ ଏବଂ \vec{OP} ଦିଶାଙ୍କ \vec{OQ} ଦିଶାଙ୍କ ପ୍ରତି ଲମ୍ବ । ଯଦି $\vec{OR} = 3\hat{i} + z\hat{j} - 7\hat{k}$, $z \in \mathbf{R}$, \vec{OP}

ଏବଂ \vec{OQ} ସହ ଏକ ସମତଳରେ ଅବସ୍ଥିତ ହୁଅନ୍ତି, ତେବେ $x^2 + y^2 + z^2$ ର ମୂଲ୍ୟ ସମାନ :

Options :

86435113149. 1

86435113150. 2

86435113151. 7

86435113152. 9

Question Number : 64 Question Id : 8643514384 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If x, y, z are in arithmetic progression with common difference d , $x \neq 3d$, and the determinant

of the matrix $\begin{bmatrix} 3 & 4\sqrt{2} & x \\ 4 & 5\sqrt{2} & y \\ 5 & k & z \end{bmatrix}$ is zero, then the value of k^2 is :

Options :

86435113153. 6

86435113154. 12

86435113155. 36

86435113156. 72

Question Number : 64 Question Id : 8643514384 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି x, y, z ଗାଣିତିକ ପ୍ରଗତି ରେ ରୁହନ୍ତି ଓ ଯାହାର ସାଧାରଣ ଅନ୍ତର d , $x \neq 3d$, ଏବଂ ମାଟ୍ରିକ୍ସ $\begin{bmatrix} 3 & 4\sqrt{2} & x \\ 4 & 5\sqrt{2} & y \\ 5 & k & z \end{bmatrix}$ ର

ଡିଟରମିନାଣ୍ଟର ମୂଲ୍ୟ 0 ଅଟେ, ତେବେ k^2 ର ମୂଲ୍ୟ ଅଟେ :

Options :

86435113153. 6

86435113154. 12

86435113155. 36

86435113156. 72

Question Number : 65 Question Id : 8643514385 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The value of the limit $\lim_{\theta \rightarrow 0} \frac{\tan(\pi \cos^2 \theta)}{\sin(2\pi \sin^2 \theta)}$ is equal to :

Options :

86435113157. $\frac{1}{4}$ 86435113158. $-\frac{1}{2}$ 86435113159. $-\frac{1}{4}$

86435113160. 0

Question Number : 65 Question Id : 8643514385 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\lim_{\theta \rightarrow 0} \frac{\tan(\pi \cos^2 \theta)}{\sin(2\pi \sin^2 \theta)}$ ର ସୀମାମୂଲ୍ୟ ସମାନ :

Options :

86435113157. $\frac{1}{4}$

86435113158. $-\frac{1}{2}$

86435113159. $-\frac{1}{4}$

86435113160. 0

Question Number : 66 Question Id : 8643514386 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the integral $\int_0^{10} \frac{[\sin 2\pi x]}{e^x - [x]} dx = \alpha e^{-1} + \beta e^{-\frac{1}{2}} + \gamma$, where α, β, γ are integers and $[x]$ denotes

the greatest integer less than or equal to x , then the value of $\alpha + \beta + \gamma$ is equal to :

Options :

86435113161. 0

86435113162. 10

86435113163. 20

86435113164. 25

Question Number : 66 Question Id : 8643514386 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି ସମୀକରଣ $\int_0^{10} \frac{[\sin 2\pi x]}{e^{x-[x]}} dx = \alpha e^{-1} + \beta e^{-\frac{1}{2}} + \gamma$ ହୁଏ, ଯେଉଁଠାରେ α, β, γ ପୂର୍ଣ୍ଣସଂଖ୍ୟା ଏବଂ $[x]$ ର ଅର୍ଥ,

$[x]$ ର ମୂଲ୍ୟ ଏକ ସର୍ବାଧିକ ପୂର୍ଣ୍ଣସଂଖ୍ୟା, x ର ମୂଲ୍ୟ x ଠାରୁ ସାନ ବା x ସହ ସମାନ ପାଇଁ । ତେବେ $\alpha + \beta + \gamma$ ର ମୂଲ୍ୟ ସମାନ :

Options :

86435113161. 0

86435113162. 10

86435113163. 20

86435113164. 25

Question Number : 67 Question Id : 8643514387 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the curve $y=y(x)$ is the solution of the differential equation

$2(x^2 + x^{5/4}) dy - y(x + x^{1/4}) dx = 2x^{9/4} dx, x > 0$ which passes through the point

$\left(1, 1 - \frac{4}{3} \log_e 2\right)$, then the value of $y(16)$ is equal to :

Options :

86435113165. $4\left(\frac{31}{3} - \frac{8}{3} \log_e 3\right)$

86435113166. $\left(\frac{31}{3} - \frac{8}{3} \log_e 3\right)$

86435113167. $\left(\frac{31}{3} + \frac{8}{3} \log_e 3\right)$

86435113168. $4\left(\frac{31}{3} + \frac{8}{3} \log_e 3\right)$

Question Number : 67 Question Id : 8643514387 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି ବକ୍ତୃତା $y = y(x)$ ଚି $2(x^2 + x^{5/4}) dy - y(x + x^{1/4}) dx = 2x^{9/4} dx, x > 0$ ଅବକଳ ସମୀକରଣର

ସମାଧାନ ହୁଏ, ଯାହା ବିନ୍ଦୁ $\left(1, 1 - \frac{4}{3} \log_e 2\right)$ ମଧ୍ୟ ଦେଇ ଗତି କରେ, ତେବେ $y(16)$ ର ମୂଲ୍ୟ ସମାନ :

Options :

86435113165. $4\left(\frac{31}{3} - \frac{8}{3} \log_e 3\right)$

86435113166. $\left(\frac{31}{3} - \frac{8}{3} \log_e 3\right)$

86435113167. $\left(\frac{31}{3} + \frac{8}{3} \log_e 3\right)$

86435113168. $4\left(\frac{31}{3} + \frac{8}{3} \log_e 3\right)$

Question Number : 68 Question Id : 8643514388 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $y = y(x)$ be the solution of the differential equation

$\cos x(3\sin x + \cos x + 3) dy = (1 + y \sin x(3\sin x + \cos x + 3))dx, 0 \leq x \leq \frac{\pi}{2}, y(0) = 0$. Then, $y\left(\frac{\pi}{3}\right)$ is

equal to :

Options :

86435113169. $2 \log_e \left(\frac{3\sqrt{3} - 8}{4}\right)$

86435113170. $2 \log_e \left(\frac{\sqrt{3} + 7}{2}\right)$

$$2 \log_e \left(\frac{2\sqrt{3} + 9}{6} \right)$$

86435113171.

$$2 \log_e \left(\frac{2\sqrt{3} + 10}{11} \right)$$

86435113172.

Question Number : 68 Question Id : 8643514388 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି $\cos x(3\sin x + \cos x + 3) dy = (1 + y \sin x(3\sin x + \cos x + 3)) dx$, $0 \leq x \leq \frac{\pi}{2}$, $y(0) = 0$ ଅବକଳ

ସମାକରଣଟିର ଏକ ସମାଧାନ ହୁଏ, $y = y(x)$ ହୁଏ, ତେବେ $y\left(\frac{\pi}{3}\right)$ ସମାନ :

Options :

$$2 \log_e \left(\frac{3\sqrt{3} - 8}{4} \right)$$

86435113169.

$$2 \log_e \left(\frac{\sqrt{3} + 7}{2} \right)$$

86435113170.

$$2 \log_e \left(\frac{2\sqrt{3} + 9}{6} \right)$$

86435113171.

$$2 \log_e \left(\frac{2\sqrt{3} + 10}{11} \right)$$

86435113172.

Question Number : 69 Question Id : 8643514389 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Consider the function $f: \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = \begin{cases} \left(2 - \sin\left(\frac{1}{x}\right)\right) |x|, & x \neq 0 \\ 0, & x = 0 \end{cases}$. Then f is :

Options :

86435113173. monotonic on $(0, \infty)$ only
86435113174. monotonic on $(-\infty, 0)$ only
86435113175. monotonic on $(-\infty, 0) \cup (0, \infty)$
86435113176. not monotonic on $(-\infty, 0)$ and $(0, \infty)$

Question Number : 69 Question Id : 8643514389 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

ଫଳନ $f: \mathbb{R} \rightarrow \mathbb{R}$, ପରିଭାଷିତ ହୁଏ $f(x) = \begin{cases} \left(2 - \sin\left(\frac{1}{x}\right)\right) |x|, & x \neq 0 \\ 0, & x = 0 \end{cases}$ ବୋଲି ବିଚାର କର । ତେବେ f ଅଟେ :

Options :

86435113173. କେବଳ $(0, \infty)$ ଅନ୍ତରାଳରେ ବିଭିନ୍ନତା ବିହୀନ (ଏକତାନିକ)
86435113174. କେବଳ $(-\infty, 0)$ ଅନ୍ତରାଳରେ ବିଭିନ୍ନତା ବିହୀନ (ଏକତାନିକ)
86435113175. $(-\infty, 0) \cup (0, \infty)$ ଅନ୍ତରାଳରେ ବିଭିନ୍ନତା ବିହୀନ (ଏକତାନିକ)
86435113176. $(-\infty, 0)$ ଏବଂ $(0, \infty)$ ଅନ୍ତରାଳରେ ବିଭିନ୍ନତା ବିହୀନ ନୁହେଁ

Question Number : 70 Question Id : 8643514390 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The value of

$$\lim_{n \rightarrow \infty} \frac{[r] + [2r] + \dots + [nr]}{n^2},$$

where r is a non-zero real number and $[r]$ denotes the greatest integer less than or equal to r , is equal to :

Options :

86435113177. r

86435113178. $\frac{r}{2}$

86435113179. $2r$

86435113180. 0

Question Number : 70 Question Id : 8643514390 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\lim_{n \rightarrow \infty} \frac{[r] + [2r] + \dots + [nr]}{n^2}$ ର ମୂଲ୍ୟ ସମାନ :

(ଯେଉଁଠାରେ r ଏକ ଅଣଶୂନ୍ୟ ବାସ୍ତବ ସଂଖ୍ୟା ଏବଂ $[r]$ ଅର୍ଥ $[r]$ ର ମୂଲ୍ୟ ଏକ ସର୍ବାଧିକ ପୂର୍ଣ୍ଣସଂଖ୍ୟା, ଯାହା r ଠାରୁ ସାନ ବା r ସହ ସମାନ)

Options :

86435113177. r

86435113178. $\frac{r}{2}$

86435113179. $2r$

86435113180. 0

Question Number : 71 Question Id : 8643514391 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let a computer program generate only the digits 0 and 1 to form a string of binary numbers with probability of occurrence of 0 at even places be $\frac{1}{2}$ and probability of occurrence of 0 at

the odd place be $\frac{1}{3}$. Then the probability that '10' is followed by '01' is equal to :

Options :

86435113181. $\frac{1}{9}$

86435113182. $\frac{1}{6}$

86435113183. $\frac{1}{3}$

86435113184. $\frac{1}{18}$

Question Number : 71 Question Id : 8643514391 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର ଏକ କମ୍ପ୍ୟୁଟର ପ୍ରୋଗ୍ରାମ୍ ଦ୍ୱିଜ ସଂଖ୍ୟାମାନଙ୍କର ଷ୍ଟିକ୍‌ରୁ କେବଳ ଅଙ୍କ 0 ଓ ଅଙ୍କ 1 କୁ ସୃଷ୍ଟି କରେ । ଯୁଗ୍ମସ୍ଥାନଙ୍କରେ '0' ଅଙ୍କ ସୃଷ୍ଟି ହେବାର ସମ୍ଭାବ୍ୟତା $\frac{1}{2}$ ଏବଂ ଅଯୁଗ୍ମ ସ୍ଥାନମାନଙ୍କରେ '0' ଅଙ୍କ ସୃଷ୍ଟି ହେବାର ସମ୍ଭାବ୍ୟତା $\frac{1}{3}$ । ତେବେ '10' ପରେ '01' ସୃଷ୍ଟି ହେବାର ସମ୍ଭାବ୍ୟତା ସମାନ :

Options :

86435113181. $\frac{1}{9}$

86435113182. $\frac{1}{6}$

86435113183. $\frac{1}{3}$

86435113184. $\frac{1}{18}$

Question Number : 72 Question Id : 8643514392 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the sides AB, BC and CA of a triangle ABC have 3, 5 and 6 interior points respectively, then the total number of triangles that can be constructed using these points as vertices, is equal to :

Options :

86435113185. 360

86435113186. 364

86435113187. 333

86435113188. 240

Question Number : 72 Question Id : 8643514392 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି ତ୍ରିଭୁଜ ABC ର AB, BC ଏବଂ CA ପାର୍ଶ୍ୱର ଆଭ୍ୟନ୍ତରୀଣ ବିନ୍ଦୁସଂଖ୍ୟା ଯଥାକ୍ରମେ 3, 5 ଏବଂ 6 ହୁଏ, ତେବେ ଏହି ବିନ୍ଦୁମାନଙ୍କୁ ଶୀର୍ଷ ବିନ୍ଦୁ ନେଇ ତିଆରି କରାଯାଇପାରୁଥିବା ତ୍ରିଭୁଜମାନଙ୍କର ମୋଟ ସଂଖ୍ୟା ସମାନ :

Options :

86435113185. 360

86435113186. 364

86435113187. 333

86435113188. 240

Question Number : 73 Question Id : 8643514393 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let the tangent to the circle $x^2 + y^2 = 25$ at the point R(3, 4) meet x -axis and y -axis at points P and Q, respectively. If r is the radius of the circle passing through the origin O and having centre at the incentre of the triangle OPQ, then r^2 is equal to :

Options :

86435113189. $\frac{125}{72}$

$$86435113190. \frac{625}{72}$$

$$86435113191. \frac{529}{64}$$

$$86435113192. \frac{585}{66}$$

Question Number : 73 Question Id : 8643514393 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର ବିନ୍ଦୁ $R(3, 4)$ ଠାରେ ବୃତ୍ତ $x^2 + y^2 = 25$ ପ୍ରତି ଅଙ୍କିତ ସ୍ପର୍ଶକ x -ଅକ୍ଷ ଓ y -ଅକ୍ଷକୁ ଯଥାକ୍ରମେ P ଏବଂ Q ବିନ୍ଦୁଠାରେ ସ୍ପର୍ଶ କରେ । ଯଦି r ଏକ ବୃତ୍ତର ବ୍ୟାସାର୍ଦ୍ଧ ହୁଏ ଯାହା ମୂଳବିନ୍ଦୁ 'O' ମଧ୍ୟ ଦେଇ ଗତି କରେ ଏବଂ ଯାହାର କେନ୍ଦ୍ର, ତ୍ରିଭୁଜ OPQ ର ଅନ୍ତଃକେନ୍ଦ୍ର ହୋଇଥାଏ, ତେବେ r^2 ସମାନ :

Options :

$$86435113189. \frac{125}{72}$$

$$86435113190. \frac{625}{72}$$

$$86435113191. \frac{529}{64}$$

$$86435113192. \frac{585}{66}$$

Question Number : 74 Question Id : 8643514394 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let S_1, S_2 and S_3 be three sets defined as

$$S_1 = \{z \in \mathbb{C} : |z-1| \leq \sqrt{2}\}$$

$$S_2 = \{z \in \mathbb{C} : \operatorname{Re}((1-i)z) \geq 1\}$$

$$S_3 = \{z \in \mathbb{C} : \operatorname{Im}(z) \leq 1\}$$

Then the set $S_1 \cap S_2 \cap S_3$

Options :

86435113193. has exactly two elements

86435113194. has exactly three elements

86435113195. is a singleton

86435113196. has infinitely many elements

Question Number : 74 Question Id : 8643514394 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର S_1, S_2 ଏବଂ S_3 ତିନିଗୋଟି ସେଟ୍ ଯାହାକୁ

$$S_1 = \{z \in \mathbb{C} : |z-1| \leq \sqrt{2}\}$$

$$S_2 = \{z \in \mathbb{C} : \operatorname{Re}((1-i)z) \geq 1\}$$

$$S_3 = \{z \in \mathbb{C} : \operatorname{Im}(z) \leq 1\},$$
 ଏହିପରି ବର୍ଣ୍ଣନା କରାଯାଇଛି ।

ତେବେ ସେଟ୍ $S_1 \cap S_2 \cap S_3$:

Options :

86435113193. ଠିକ୍ ଦୁଇଟି ଉପାଦାନ ଅଛନ୍ତି

86435113194. ଠିକ୍ ତିନିଗୋଟି ଉପାଦାନ ଅଛନ୍ତି

86435113195. ଏକପଦ ଉପାଦାନ ବିଶିଷ୍ଟ

86435113196. ବହୁ ଉପାଦାନ ବିଶିଷ୍ଟ

Question Number : 75 Question Id : 8643514395 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be defined as $f(x) = e^{-x}\sin x$. If $F: [0, 1] \rightarrow \mathbb{R}$ is a differentiable function such

that $F(x) = \int_0^x f(t) dt$, then the value of $\int_0^1 (F'(x) + f(x))e^x dx$ lies in the interval

Options :

86435113197. $\left[\frac{330}{360}, \frac{331}{360} \right]$

86435113198. $\left[\frac{327}{360}, \frac{329}{360} \right]$

86435113199. $\left[\frac{331}{360}, \frac{334}{360} \right]$

86435113200. $\left[\frac{335}{360}, \frac{336}{360} \right]$

Question Number : 75 Question Id : 8643514395 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର $f: \mathbb{R} \rightarrow \mathbb{R}$ ଫଳନଟିକୁ $f(x) = e^{-x}\sin x$ ରୂପେ ପ୍ରକାଶ କରାଯାଏ । ଯଦି $F: [0, 1] \rightarrow \mathbb{R}$ ଏକ ଅବକଳନୀୟ

ଫଳନ ଯେପରିକି $F(x) = \int_0^x f(t) dt$, ତେବେ $\int_0^1 (F'(x) + f(x))e^x dx$ ର ମୂଲ୍ୟ ରହୁଥିବା ଅନ୍ତରାଳଟି :

Options :

86435113197. $\left[\frac{330}{360}, \frac{331}{360} \right]$

86435113198. $\left[\frac{327}{360}, \frac{329}{360} \right]$

86435113199. $\left[\frac{331}{360}, \frac{334}{360} \right]$

$$86435113200. \left[\frac{335}{360}, \frac{336}{360} \right]$$

Question Number : 76 Question Id : 8643514396 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The value of $\sum_{r=0}^6 ({}^6C_r \cdot {}^6C_{6-r})$ is equal to :

Options :

86435113201. 924

86435113202. 1024

86435113203. 1124

86435113204. 1324

Question Number : 76 Question Id : 8643514396 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\sum_{r=0}^6 ({}^6C_r \cdot {}^6C_{6-r})$ ର ମୂଲ୍ୟ ସମାନ :

Options :

86435113201. 924

86435113202. 1024

86435113203. 1124

86435113204. 1324

Question Number : 77 Question Id : 8643514397 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the equation of plane passing through the mirror image of a point $(2, 3, 1)$ with respect to

line $\frac{x+1}{2} = \frac{y-3}{1} = \frac{z+2}{-1}$ and containing the line $\frac{x-2}{3} = \frac{1-y}{2} = \frac{z+1}{1}$ is

$\alpha x + \beta y + \gamma z = 24$, then $\alpha + \beta + \gamma$ is equal to :

Options :

86435113205. 21

86435113206. 20

86435113207. 19

86435113208. 18

Question Number : 77 Question Id : 8643514397 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି $\frac{x+1}{2} = \frac{y-3}{1} = \frac{z+2}{-1}$ ରେଖାଭିତ୍ତିକ $(2, 3, 1)$ ବିନ୍ଦୁର ପ୍ରତିବିମ୍ବ ବିନ୍ଦୁ ମଧ୍ୟ ଦେଇ ଯାଉଥିବା ସମତଳ ଯାହା

ଉପରେ ରେଖା $\frac{x-2}{3} = \frac{1-y}{2} = \frac{z+1}{1}$ ଅବସ୍ଥିତ ତାହାର ସମୀକରଣ $\alpha x + \beta y + \gamma z = 24$ ହୁଏ, ତେବେ $\alpha + \beta + \gamma$

ସମାନ :

Options :

86435113205. 21

86435113206. 20

86435113207. 19

86435113208. 18

Question Number : 78 Question Id : 8643514398 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two tangents are drawn from a point P to the circle $x^2 + y^2 - 2x - 4y + 4 = 0$, such that the angle between these tangents is $\tan^{-1}\left(\frac{12}{5}\right)$, where $\tan^{-1}\left(\frac{12}{5}\right) \in (0, \pi)$. If the centre of the circle is denoted by C and these tangents touch the circle at points A and B, then the ratio of the areas of ΔPAB and ΔCAB is :

Options :

86435113209. 9 : 4

86435113210. 3 : 1

86435113211. 2 : 1

86435113212. 11 : 4

Question Number : 78 Question Id : 8643514398 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

P ବିନ୍ଦୁରୁ ବୃତ୍ତ $x^2 + y^2 - 2x - 4y + 4 = 0$ ପ୍ରତି ଦୁଇଟି ସ୍ପର୍ଶକ ଚିତ୍ରିତ କରାଯାଇଛି । ଯେପରିକି ସ୍ପର୍ଶକ ଦୁଇଟି ମଧ୍ୟବର୍ତ୍ତୀ କୋଣ $\tan^{-1}\left(\frac{12}{5}\right)$ ଅଟେ, ଯେଉଁଠାରେ $\tan^{-1}\left(\frac{12}{5}\right) \in (0, \pi)$ । ଯଦି ବୃତ୍ତର କେନ୍ଦ୍ରକୁ C ବୋଲି ଲେଖାଯାଏ ଏବଂ ଏହି ସ୍ପର୍ଶକମାନେ ବୃତ୍ତକୁ A ଏବଂ B ବିନ୍ଦୁରେ ସ୍ପର୍ଶ କରନ୍ତି, ତେବେ ତ୍ରିଭୁଜ ΔPAB , ବଂ ତ୍ରିଭୁଜ ΔCAB ର କ୍ଷେତ୍ରଫଳ ମାନଙ୍କର ସମ୍ଭାବ୍ୟ ଅନୁପାତ ଅଟେ :

Options :

86435113209. 9 : 4

86435113210. 3 : 1

86435113211. 2 : 1

86435113212. 11 : 4

Question Number : 79 Question Id : 8643514399 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The number of solutions of the equation $x + 2 \tan x = \frac{\pi}{2}$ in the interval $[0, 2\pi]$ is :

Options :

86435113213. 2

86435113214. 3

86435113215. 4

86435113216. 5

Question Number : 79 Question Id : 8643514399 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଅନ୍ତରାଳ $[0, 2\pi]$ ମଧ୍ୟରେ ସମୀକରଣ $x + 2 \tan x = \frac{\pi}{2}$ ର ସମାଧାନ ସଂଖ୍ୟା ଅଟେ :

Options :

86435113213. 2

86435113214. 3

86435113215. 4

86435113216. 5

Question Number : 80 Question Id : 8643514400 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let L be a tangent line to the parabola $y^2 = 4x - 20$ at $(6, 2)$. If L is also a tangent to the ellipse

$\frac{x^2}{2} + \frac{y^2}{b} = 1$, then the value of b is equal to :

Options :

86435113217. 11

86435113218. 14

86435113219. 16

86435113220. 20

Question Number : 80 Question Id : 8643514400 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର ପରିବୃତ୍ତ (ପାରାବୋଲା) $y^2 = 4x - 20$ ର ବିନ୍ଦୁ $(6, 2)$ ଠାରେ L ଏକ ସ୍ପର୍ଶକ ରେଖା । ଯଦି ଏହି ରେଖା L , ଜଳିଷ୍ଠ

(ଦୀର୍ଘବୃତ୍ତ) $\frac{x^2}{2} + \frac{y^2}{b} = 1$ ପ୍ରତି ମଧ୍ୟ ଏକ ସ୍ପର୍ଶକ ହୁଏ, ତେବେ b ର ମୂଲ୍ୟ ସମାନ :

Options :

86435113217. 11

86435113218. 14

86435113219. 16

86435113220. 20

Mathematics Section B

Section Id :	864351294
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 :	864351294
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 8643514401 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $I_n = \int_1^e x^{19} (\log|x|)^n dx$, where $n \in \mathbb{N}$. If $(20)I_{10} = \alpha I_9 + \beta I_8$, for natural numbers α and β ,

then $\alpha - \beta$ equals to _____.

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 :** 8643514401 **Question Type :** SA

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

ମନେକର $I_n = \int_1^e x^{19} (\log|x|)^n dx$, ଯେଉଁଠାରେ $n \in \mathbb{N}$ । ଯଦି $(20)I_{10} = \alpha I_9 + \beta I_8$, α ଏବଂ β ଗଣନ ସଂଖ୍ୟା

(ସ୍ଵାଭାବିକ ସଂଖ୍ୟା) ପାଇଁ, ତେବେ $\alpha - \beta$ ସମାନ _____ ।

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 :** 8643514402 **Question Type :** SA

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

Let $\tan\alpha, \tan\beta$ and $\tan\gamma$; $\alpha, \beta, \gamma \neq \frac{(2n-1)\pi}{2}$, $n \in \mathbb{N}$ be the slopes of three line segments OA,

OB and OC, respectively, where O is origin. If circumcentre of ΔABC coincides with origin

and its orthocentre lies on y -axis, then the value of $\left(\frac{\cos 3\alpha + \cos 3\beta + \cos 3\gamma}{\cos \alpha \cos \beta \cos \gamma} \right)^2$ 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 : 8643514402 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

ମନେକର ତିନିଗୋଟି ରେଖାଖଣ୍ଡ OA, OB ଏବଂ OC ର ସ୍ଲୋପମାନେ ଯଥାକ୍ରମେ $\tan\alpha$, $\tan\beta$ ଏବଂ $\tan\gamma$;

$\alpha, \beta, \gamma \neq \frac{(2n-1)\pi}{2}, n \in \mathbf{N}$, ଯେଉଁଠାରେ 'O' ମୂଳବିନ୍ଦୁ ଅଟେ । ଯଦି ତ୍ରିଭୁଜ ΔABC ର ପରିକେନ୍ଦ୍ର ମୂଳବିନ୍ଦୁ 'O' ସହ

ମିଳିଯାଏ ଏବଂ ତ୍ରିଭୁଜର ଲମ୍ବ କେନ୍ଦ୍ର (ଲମ୍ବମାନଙ୍କର ମିଳିତ ବିନ୍ଦୁ) y -ଅକ୍ଷ ଉପରେ ଅବସ୍ଥିତ ହୁଏ, ତେବେ

$\left(\frac{\cos 3\alpha + \cos 3\beta + \cos 3\gamma}{\cos \alpha \cos \beta \cos \gamma} \right)^2$ ର ମୂଲ୍ୟ ସମାନ _____ ।

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 : 8643514403 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

If 1, $\log_{10}(4^x - 2)$ and $\log_{10}\left(4^x + \frac{18}{5}\right)$ are in arithmetic progression for a real number x , then

the value of the determinant $\begin{vmatrix} 2\left(x - \frac{1}{2}\right) & x - 1 & x^2 \\ 1 & 0 & x \\ x & 1 & 0 \end{vmatrix}$ 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 : 83 Question Id : 8643514403 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

ଯଦି $1, \log_{10}(4^x - 2)$ ଏବଂ $\log_{10}\left(4^x + \frac{18}{5}\right)$, x ର ଏକ ବାସ୍ତବ ମୂଲ୍ୟ ପାଇଁ ଗାଣିତିକ ପ୍ରଗତି ରେ ରୁହନ୍ତି, ତେବେ

$$\begin{vmatrix} 2\left(x - \frac{1}{2}\right) & x - 1 & x^2 \\ 1 & 0 & x \\ x & 1 & 0 \end{vmatrix} \text{ ତିରମିନାଶର ମୂଲ୍ୟ ସମାନ } \underline{\hspace{2cm}} \text{ ।}$$

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 : 8643514404 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Consider a set of $3n$ numbers having variance 4. In this set, the mean of first $2n$ numbers is 6 and the mean of the remaining n numbers is 3. A new set is constructed by adding 1 into each of first $2n$ numbers, and subtracting 1 from each of the remaining n numbers. If the variance of the new set is k , then $9k$ 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 : 84 Question Id : 8643514404 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

4 ପ୍ରସରଣ ଥିବା $3n$ ଉପାଦାନ ବିଶିଷ୍ଟ ଏକ ସେଟ୍‌କୁ ବିଚାର କର । ଏହି ସେଟ୍‌ରେ ପ୍ରଥମ $2n$ ସଂଖ୍ୟକ ସଂଖ୍ୟାମାନଙ୍କର ମଧ୍ୟକ 6 ଏବଂ ଅବଶିଷ୍ଟ n ସଂଖ୍ୟକ ସଂଖ୍ୟା ମାନଙ୍କର ମଧ୍ୟକ 3 । ପ୍ରଥମ $2n$ ସଂଖ୍ୟକ ସଂଖ୍ୟା ମାନଙ୍କରେ ପ୍ରତ୍ୟେକରେ 1 ଯୋଗକରି ଓ ଅବଶିଷ୍ଟ n ସଂଖ୍ୟକ ପ୍ରତ୍ୟେକ ସଂଖ୍ୟାମାନଙ୍କରୁ 1 ବିୟୋଗ କରି ଏକ ନୂଆ ସେଟ୍ ତିଆରି କରାଗଲା । ଯଦି ନୂଆ ସେଟ୍‌ର ପ୍ରସରଣ k ଅଟେ, ତେବେ $9k$ ସମାନ _____ ।

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 : 8643514405 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $f: [-1, 1] \rightarrow \mathbb{R}$ be defined as $f(x) = ax^2 + bx + c$ for all $x \in [-1, 1]$, where $a, b, c \in \mathbb{R}$ such that $f(-1) = 2, f'(-1) = 1$ and for $x \in (-1, 1)$ the maximum value of $f''(x)$ is $\frac{1}{2}$. If $f(x) \leq \alpha, x \in [-1, 1]$, then the least value of α 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 : 85 Question Id : 8643514405 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ମନେକର $f: [-1, 1] \rightarrow \mathbb{R}$ ଫଳନଟିକୁ $f(x) = ax^2 + bx + c$ ଭାବେ ପରିଭାଷିତ କରାଗଲା । (ସମସ୍ତ $x \in [-1, 1]$, ଯେଉଁଠାରେ $a, b, c \in \mathbb{R}$) ଯେପରିକି $f(-1) = 2, f'(-1) = 1$ ଏବଂ $x \in (-1, 1)$ ପାଇଁ $f''(x)$ ର ସର୍ବାଧିକ ମୂଲ୍ୟ $\frac{1}{2}$ ଅଟେ । ଯଦି $f(x) \leq \alpha, x \in [-1, 1]$, ତେବେ α ର ସର୍ବନିମ୍ନ ମାନ ସମାନ _____ ।

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 : 8643514406 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let the coefficients of third, fourth and fifth terms in the expansion of $\left(x + \frac{a}{x^2}\right)^n, x \neq 0$, be in the ratio 12 : 8 : 3. Then the term independent of x in the expansion, 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 : 86 **Question Id :** 8643514406 **Question Type :** SA**Correct Marks :** 4 **Wrong Marks :** 0

$\left(x + \frac{a}{x^2}\right)^n$, $x \neq 0$ ର ପ୍ରସାରଣରେ ଚୂଳାଘ, ଚତୁର୍ଥ ଓ ପଞ୍ଚମ ପଦ ମାନଙ୍କର ସହଗର ଅନୁପାତ 12 : 8 : 3 । ତେବେ ଏହି

ପ୍ରସାରଣରେ x ନଥିବା ପଦଟି ସମାନ _____ ।

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 :** 8643514407 **Question Type :** SA**Correct Marks :** 4 **Wrong Marks :** 0

Let $f : [-3, 1] \rightarrow \mathbb{R}$ be given as

$$f(x) = \begin{cases} \min \{(x + 6), x^2\}, & -3 \leq x \leq 0 \\ \max \{\sqrt{x}, x^2\}, & 0 \leq x \leq 1. \end{cases}$$

If the area bounded by $y = f(x)$ and x -axis is A , then the value of $6A$ 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 : 87 **Question Id :** 8643514407 **Question Type :** SA**Correct Marks :** 4 **Wrong Marks :** 0

ମନେକର $f: [-3, 1] \rightarrow \mathbb{R}$ ଫଳନଟିକୁ $f(x) = \begin{cases} \min \{(x+6), x^2\}, & -3 \leq x \leq 0 \\ \max \{\sqrt{x}, x^2\}, & 0 \leq x \leq 1. \end{cases}$ ଏହି ରୂପେ ଦିଆଯାଇଛି ।

ଯଦି x -ଅକ୍ଷ ଓ $y=f(x)$ ଦ୍ୱାରା ଆବଦ୍ଧ କ୍ଷେତ୍ରର କ୍ଷେତ୍ରଫଳ A ହୁଏ, ତେବେ $6A$ ର ମୂଲ୍ୟ ସମାନ _____ ।

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 :** 8643514408 **Question Type :** SA

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

Let P be an arbitrary point having sum of the squares of the distances from the planes $x+y+z=0$, $lx-nz=0$ and $x-2y+z=0$, equal to 9. If the locus of the point P is $x^2+y^2+z^2=9$, then the value of $l-n$ 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 :** 8643514408 **Question Type :** SA

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

ମନେକର P ଏକ ମନଜଳା ବିନ୍ଦୁ । ସମତଳ $x+y+z=0$, $lx-nz=0$ ଏବଂ $x-2y+z=0$ ଠାରୁ P ବିନ୍ଦୁର ଦୂରତ୍ୱର ବର୍ଗମାନଙ୍କର ସମଷ୍ଟି 9 । ଯଦି P ବିନ୍ଦୁର ସଂଚାର ପଥ $x^2+y^2+z^2=9$ ହୁଏ, ତେବେ $l-n$ ର ମୂଲ୍ୟ ସମାନ _____ ।

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 :** 8643514409 **Question Type :** SA

Correct Marks : 4 Wrong Marks : 0

Let \vec{x} be a vector in the plane containing vectors $\vec{a} = 2\hat{i} - \hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} - \hat{k}$. If the vector \vec{x} is perpendicular to $(3\hat{i} + 2\hat{j} - \hat{k})$ and its projection on \vec{a} is $\frac{17\sqrt{6}}{2}$, then the value of

$|\vec{x}|^2$ 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 : 89 Question Id : 8643514409 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ମନେକର ଦିଶାଙ୍କ $\vec{a} = 2\hat{i} - \hat{j} + \hat{k}$ ଏବଂ $\vec{b} = \hat{i} + 2\hat{j} - \hat{k}$ ଅବସ୍ଥିତ ଥିବା ସମତଳ ଉପରେ \vec{x} ଗୋଟିଏ ଦିଶାଙ୍କ । ଯଦି \vec{x}

ଦିଶାଙ୍କ $(3\hat{i} + 2\hat{j} - \hat{k})$ ଦିଶାଙ୍କ ପ୍ରତି ଲମ୍ବ ଏବଂ \vec{a} ଦିଶାଙ୍କ ଉପରେ ଏହାର ଅଭିଲେଖ (ପ୍ରୋଜେକ୍ସନ୍) $\frac{17\sqrt{6}}{2}$ ଅଟେ,

ତେବେ $|\vec{x}|^2$ ର ମୂଲ୍ୟ ସମାନ _____ ।

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 : 8643514410 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and $B = \begin{bmatrix} \alpha \\ \beta \end{bmatrix} \neq \begin{bmatrix} 0 \\ 0 \end{bmatrix}$ such that $AB = B$ and $a + d = 2021$, then the value of $ad - bc$ 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 : 8643514410 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ମନେକର $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ ଏବଂ $B = \begin{bmatrix} \alpha \\ \beta \end{bmatrix} \neq \begin{bmatrix} 0 \\ 0 \end{bmatrix}$ ଯେପରିକି $AB=B$ ଏବଂ $a+d=2021$, ତେବେ $ad-bc$ ର ମୂଲ୍ୟ

ସମାନ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100