

Question Paper Name : B TECH EO 26th Feb 2021 Shift 1
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Duration : 180
Number of Questions : 90
Total Marks : 300
Display Marks: Yes

B TECH EO

Group Number : 1
Group Id : 708191223
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 : 708191916
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 :	7081911196
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 70819120644 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In a typical combustion engine the workdone by a gas molecule is given by

$W = \alpha^2 \beta e^{-\frac{\beta x^2}{kT}}$, where x is the displacement, k is the Boltzmann constant and T is the temperature. If α and β are constants, dimensions of α will be :

Options :

70819167081. [M L T⁻²]

70819167082. [M⁰ L T⁰]

70819167083. [M L T⁻¹]

70819167084. [M² L T⁻²]

Question Number : 1 Question Id : 70819120644 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$W = \alpha^2 \beta e^{-\frac{\beta x^2}{kT}}$ ଦ୍ୱାରା ପ୍ରକାଶ କରାଯାଏ, ଯେଉଁଠାରେ x ବିସ୍ଥାପନ, k ବୋଲ୍ଟଜମାନ ସ୍ଥିରାଙ୍କ ଏବଂ T ତାପମାତ୍ରା ଅଟେ ।

ଯଦି α ଓ β ଦୁଇଟି ଧ୍ରୁବୀକ ଅଟନ୍ତି ତେବେ α ର ବିମିତି ଗୁଣିତ ହେବ :

Options :

70819167081. [M L T⁻²]

70819167082. [M⁰ L T⁰]

70819167083. [M L T⁻¹]

70819167084. [M² L T⁻²]

Question Number : 2 Question Id : 70819120645 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : Body 'P' having mass M moving with speed 'u' has head-on collision elastically with another body 'Q' having mass 'm' initially at rest. If $m \ll M$, body 'Q' will have a maximum speed equal to '2u' after collision.

Reason R : During elastic collision, the momentum and kinetic energy are both conserved.

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

Options :

70819167085. Both A and R are correct and R is the correct explanation of A.

70819167086. Both A and R are correct but R is NOT the correct explanation of A.

70819167087. A is correct but R is not correct.

70819167088. A is not correct but R is correct.

Question Number : 2 Question Id : 70819120645 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନରେ ଦୁଇଟି ଉକ୍ତି ଦିଆଯାଇଛି । ଗୋଟିଏ ଘୋଷଣା A ପ୍ରକାରରେ ଓ ଅନ୍ୟଟି କାରଣ R ପ୍ରକାରରେ ନିରୂପଣ କରାଯାଇଛି ।

ଘୋଷଣା A : 'u' ବେଗରେ ଗତି କରୁଥିବା M ବସ୍ତୁ ଥିବା ଏକ ବସ୍ତୁ 'P' ପ୍ରାରମ୍ଭରେ ସ୍ଥିର ଅବସ୍ଥାରେ ଥିବା 'm' ବସ୍ତୁ ଦ୍ଵିଗୁଣ ଅନ୍ୟ ଏକ ବସ୍ତୁ 'Q' ସହ ସ୍ଥିତିସ୍ଥାପକତା ଭାବେ ମୁହାଁମୁହିଁ ଧକ୍କା ହେଲା । ଯଦି $m \ll M$, ଧକ୍କା ପରେ ବସ୍ତୁ 'Q' ର ସର୍ବାଧିକ ବେଗ '2u' ସହ ସମାନ ହେବ ।

କାରଣ R : ସ୍ଥିତିସ୍ଥାପକ ଧକ୍କା ସମୟରେ, ଉଭୟ ସଂବେଗ ଓ ଗତିକ ଶକ୍ତି ସଂରକ୍ଷିତ ରହିଥାନ୍ତି ।

ଉପରୋକ୍ତ ଉକ୍ତି ଅନୁଯାୟୀ, ନିମ୍ନରେ ଦତ୍ତ ବିକଳ୍ପ ଗୁଡ଼ିକ ମଧ୍ୟରୁ ସର୍ବୋତ୍ତମ ଉତ୍ତରଟି ଚୟନ କରନ୍ତୁ :

Options :

70819167085. ଉଭୟ A ଓ R ଠିକ୍ ଏବଂ R ଟି A ର ଠିକ୍ ବ୍ୟାଖ୍ୟା ଅଟେ ।

70819167086. ଉଭୟ A ଏବଂ R ଠିକ୍ କିନ୍ତୁ R ଟି A ର ଠିକ୍ ବ୍ୟାଖ୍ୟା ନୁହେଁ ।

70819167087. A ଠିକ୍ ଅଟେ କିନ୍ତୁ R ଠିକ୍ ନୁହେଁ ।

70819167088. A ଠିକ୍ ନୁହେଁ କିନ୍ତୁ R ଠିକ୍ ଅଟେ ।

Question Number : 3 Question Id : 70819120646 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A planet revolving in elliptical orbit has :

- A. a constant velocity of revolution.
- B. has the least velocity when it is nearest to the sun.
- C. its areal velocity is directly proportional to its velocity.
- D. areal velocity is inversely proportional to its velocity.
- E. to follow a trajectory such that the areal velocity is constant.

Choose the correct answer from the options given below :

Options :

70819167089. A only

70819167090. C only

70819167091. D only

70819167092. E only

Question Number : 3 Question Id : 70819120646 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଉପଯୁକ୍ତ ବାକ୍ୟଖଣ୍ଡ ଯୋଡ଼ : ଅଣ୍ଟାକୃତୀୟ (ଇଲିପ୍ଟିକାଲ) କକ୍ଷପଥରେ ଘୁରୁଥିବା ଗୋଟିଏ ଗ୍ରହର :

- A. ଏକ ସ୍ଥିର ପରିକ୍ରମଣ ପରିବେଶ ରହିଥାଏ ।
- B. ସୂର୍ଯ୍ୟର ନ୍ୟୁନତମ ଦୂରତାରେ ଥିବାବେଳେ ଏହାର ସବୁଠାରୁ କମ୍ ପରିବେଶ ରହିଥାଏ ।
- C. କ୍ଷେତ୍ରୀୟ ପରିବେଶ ଏହାର ପରିବେଶ ସହ ସମାନୁପାତୀ ଅଟେ ।
- D. କ୍ଷେତ୍ରୀୟ ପରିବେଶ ଏହାର ପରିବେଶ ସହ ପ୍ରତିଲୋମାନୁପାତୀ ଅଟେ ।
- E. ଏମିତି ପ୍ରକ୍ଷେପ-ପଥରେ ଯାଏ, ଯେମିତି ଏହାର କ୍ଷେତ୍ରୀୟ ବେଗ ଅପରିବର୍ତ୍ତିତ ରହିଥାଏ ।

ତଳେ ଦିଆଯାଇଥିବା ବିକଳ୍ପ ଗୁଡ଼ିକ ମଧ୍ୟରୁ ଠିକ୍ ଉତ୍ତର ଚୟନ କର :

Options :

70819167089. କେବଳ A

70819167090. କେବଳ C

70819167091. କେବଳ D

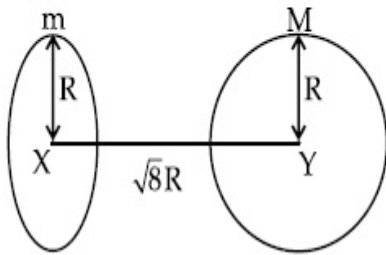
70819167092. କେବଳ E

Question Number : 4 Question Id : 70819120647 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Find the gravitational force of attraction between the ring and sphere as shown in the diagram, where the plane of the ring is perpendicular to the line joining the centres. If $\sqrt{8}R$ is the distance between the centres of a ring (of mass 'm') and a sphere (mass 'M') where both have equal radius 'R'.



Options :

70819167093. $\frac{\sqrt{8}}{27} \cdot \frac{GmM}{R^2}$

70819167094. $\frac{\sqrt{8}}{9} \cdot \frac{GmM}{R}$

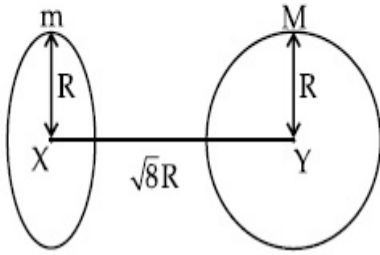
70819167095. $\frac{1}{3\sqrt{8}} \cdot \frac{GMm}{R^2}$

70819167096. $\frac{2\sqrt{2}}{3} \cdot \frac{GMm}{R^2}$

Question Number : 4 Question Id : 70819120647 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଚିତ୍ରରେ ଦର୍ଶାଯାଇଥିବା ଅନୁସାରେ, ସମାନ-ବ୍ୟାସାର୍ଦ୍ଧ (R) ଥାଇ m ବସ୍ତୁତ୍ଵ ବିଶିଷ୍ଟ ଗୋଟିଏ ବଳୟ (ରିଡିୟସ୍ M ବସ୍ତୁତ୍ଵ ଥାଇ ଅନ୍ୟ ଗୋଟିଏ ଗୋଲକ ମଧ୍ୟରେ ମହାକର୍ଷଣ ବଳ ନିର୍ଣ୍ଣୟ କର ଯଦି ସେମାନଙ୍କର କେନ୍ଦ୍ର ଦୁଇଟି ମଧ୍ୟରେ ଦୂରତା $\sqrt{8}R$ ଅଟେ, ଯେତେବେଳେ ବଳୟର ସମତଳକୁ ଦୁଇଟିଯାକର କେନ୍ଦ୍ର ବିନ୍ଦୁକୁ ଯୋଗ କରୁଥିବା ରେଖାକୁ ଲମ୍ଭଭାବେ ଥିବା ସ୍ଥାନରେ ରଖାଯାଏ ।



Options :

70819167093. $\frac{\sqrt{8}}{27} \cdot \frac{GmM}{R^2}$

70819167094. $\frac{\sqrt{8}}{9} \cdot \frac{GmM}{R}$

70819167095. $\frac{1}{3\sqrt{8}} \cdot \frac{GMm}{R^2}$

70819167096. $\frac{2\sqrt{2}}{3} \cdot \frac{GMm}{R^2}$

Question Number : 5 Question Id : 70819120648 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Four identical solid spheres each of mass ' m ' and radius ' a ' are placed with their centres on the four corners of a square of side ' b '. The moment of inertia of the system about one side of square where the axis of rotation is parallel to the plane of the square is :

Options :

70819167097. $\frac{4}{5}ma^2 + 2mb^2$

70819167098.

$$\frac{8}{5}ma^2 + 2mb^2$$

70819167099. $\frac{8}{5}ma^2 + mb^2$

70819167100. $\frac{4}{5}ma^2$

Question Number : 5 Question Id : 70819120648 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

'b' ପାର୍ଶ୍ୱ ଥିବା ଗୋଟିଏ ବର୍ଗାକାର କ୍ଷେତ୍ରର ଚାରି କୋଣରେ 'm' ବସ୍ତୁତ୍ୱ ଓ 'a' ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ ଚାରୋଟି ଏକାକଳିଆ ନିଦା ଗୋଲକ ରଖାଯାଇଛି । ବର୍ଗାକାର କ୍ଷେତ୍ରର ଗୋଟିଏ ପାର୍ଶ୍ୱର ଚାରିପଟେ, ଯେଉଁଠାରେ ଘୂର୍ଣ୍ଣନ ଅକ୍ଷତି ବର୍ଗକ୍ଷେତ୍ରର ସମତଳକୁ ସମାନ୍ତର ଅଟେ, ଆଘୂର୍ଣ୍ଣ ଜଡ଼ତ୍ୱ ହେଉଛି :

Options :

70819167097. $\frac{4}{5}ma^2 + 2mb^2$

70819167098. $\frac{8}{5}ma^2 + 2mb^2$

70819167099. $\frac{8}{5}ma^2 + mb^2$

70819167100. $\frac{4}{5}ma^2$

Question Number : 6 Question Id : 70819120649 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A large number of water drops, each of radius r , combine to have a drop of radius R . If the surface tension is T and mechanical equivalent of heat is J , the rise in heat energy per unit volume will be :

Options :

70819167101. $\frac{2T}{J} \left(\frac{1}{r} - \frac{1}{R} \right)$

70819167102. $\frac{3T}{J} \left(\frac{1}{r} - \frac{1}{R} \right)$

70819167103. $\frac{3T}{rJ}$

70819167104. $\frac{2T}{rJ}$

Question Number : 6 Question Id : 70819120649 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଅସଂଖ୍ୟ r ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ ଜଳବିନ୍ଦୁ ମିଶି R ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ ଗୋଟିଏ ବଡ଼ ଜଳବିନ୍ଦୁ ହେଉଛନ୍ତି । ଯଦି ପୃଷ୍ଠତାନ T ଏବଂ ତାପର ଯାନ୍ତ୍ରିକ ବୃଦ୍ଧ୍ୟାଙ୍କ J ହୁଏ, ପ୍ରତି ଏକକ ଆୟତନରେ ବଦଳୁଥିବା ତାପଶକ୍ତି ହେବ :

Options :

70819167101. $\frac{2T}{J} \left(\frac{1}{r} - \frac{1}{R} \right)$

70819167102. $\frac{3T}{J} \left(\frac{1}{r} - \frac{1}{R} \right)$

70819167103. $\frac{3T}{rJ}$

70819167104.

Question Number : 7 Question Id : 70819120650 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The normal density of a material is ρ and its bulk modulus of elasticity is K . The magnitude of increase in density of material, when a pressure P is applied uniformly on all sides, will be :

Options :

70819167105. $\frac{\rho P}{K}$

70819167106. $\frac{K}{\rho P}$

70819167107. $\frac{\rho K}{P}$

70819167108. $\frac{PK}{\rho}$

Question Number : 7 Question Id : 70819120650 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଗୋଟିଏ ପଦାର୍ଥର ସାଧାରଣ ସାନ୍ଦ୍ରତା ρ ଏବଂ ଏହାର ପ୍ରତ୍ୟକ୍ଷ ଗୁଣାଙ୍କ (ବଲକ୍ ମଡ୍ୟୁଲସ୍) K ଅଟେ । ଯେତେବେଳେ ସମାନ ଭାବରେ ସବୁ ପାର୍ଶ୍ୱରେ ଚାପ (P) ପକାଯାଏ, ଏହି ପଦାର୍ଥର ସାନ୍ଦ୍ରତାରେ ହେଉଥିବା ବୃଦ୍ଧିର ପରିମାଣ ହେବ :

Options :

70819167105. $\frac{\rho P}{K}$

70819167106. $\frac{K}{\rho P}$

70819167107. $\frac{\rho K}{P}$

70819167108. $\frac{PK}{\rho}$

Question Number : 8 Question Id : 70819120651 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Assume that a tunnel is dug along a chord of the earth, at a perpendicular distance ($R/2$) from the earth's centre, where 'R' is the radius of the Earth. The wall of the tunnel is frictionless. If a particle is released in this tunnel, it will execute a simple harmonic motion with a time period :

Options :

70819167109. $\frac{2\pi R}{g}$

70819167110. $2\pi \sqrt{\frac{R}{g}}$

70819167111. $\frac{1}{2\pi} \sqrt{\frac{g}{R}}$

70819167112. $\frac{g}{2\pi R}$

Question Number : 8 Question Id : 70819120651 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଧରିନିଅ, ଲମ୍ବା ଭାବେ ପୃଥିବୀର କେନ୍ଦ୍ରଠାରୁ $(R/2)$ ଦୂରତାରେ, ଯେଉଁଠି 'R' ହେଉଛି ପୃଥିବୀର ବ୍ୟାସାର୍ଦ୍ଧ । ଗୋଟିଏ ଚନ୍ଦେଇ ପୃଥିବୀର ଜ୍ୟା ଦିଗରେ ଖୋଲାଗଲା । ଚନ୍ଦେଇଟିର କାନ୍ଧ ଘର୍ଷଣ ବିହୀନ ଅଟେ । ଯଦି ଏକ କଣିକାକୁ ଚନ୍ଦେଇ ମଧ୍ୟରେ ଛଡ଼ାଯାଏ ଏହା ସରଳ ହାରମୋନିକ୍ ଗତିରେ ଗତି କରିବ ଯାହାର ଆବର୍ତ୍ତକାଳଟି ହେବ :

Options :

70819167109. $\frac{2\pi R}{g}$

70819167110. $2\pi \sqrt{\frac{R}{g}}$

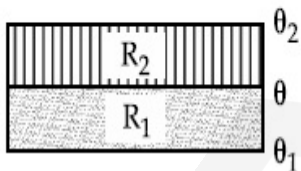
70819167111. $\frac{1}{2\pi} \sqrt{\frac{g}{R}}$

70819167112. $\frac{g}{2\pi R}$

Question Number : 9 Question Id : 70819120652 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The temperature θ at the junction of two insulating sheets, having thermal resistances R_1 and R_2 as well as top and bottom temperatures θ_1 and θ_2 (as shown in figure) is given by :



Options :

70819167113. $\frac{\theta_1 R_2 + \theta_2 R_1}{R_1 + R_2}$

70819167114. $\frac{\theta_1 R_1 + \theta_2 R_2}{R_1 + R_2}$

$$70819167115. \quad \frac{\theta_1 R_2 - \theta_2 R_1}{R_2 - R_1}$$

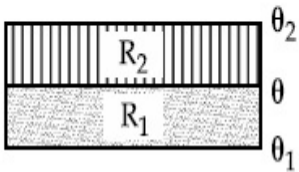
$$70819167116. \quad \frac{\theta_2 R_2 - \theta_1 R_1}{R_2 - R_1}$$

Question Number : 9 Question Id : 70819120652 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଉପର ଏବଂ ତଳ ତାପମାତ୍ରା θ_1 ଏବଂ θ_2 (ଚିତ୍ରରେ ଦର୍ଶାଯାଇଥିବା ଅନୁସାରେ) ସହ ଓ ତାପୀୟ ପ୍ରତିରୋଧ R_1 ଏବଂ R_2 ଥିବା ଦୁଇଟି ରୋଧନ ତାହରର ସଂଯୋଗ ବିନ୍ଦୁ (ଜଙ୍କସନ୍) ର ତାପମାତ୍ରା θ କୁ ଦର୍ଶାଯାଇ ପାରିବ :



Options :

$$70819167113. \quad \frac{\theta_1 R_2 + \theta_2 R_1}{R_1 + R_2}$$

$$70819167114. \quad \frac{\theta_1 R_1 + \theta_2 R_2}{R_1 + R_2}$$

$$70819167115. \quad \frac{\theta_1 R_2 - \theta_2 R_1}{R_2 - R_1}$$

$$70819167116. \quad \frac{\theta_2 R_2 - \theta_1 R_1}{R_2 - R_1}$$

Question Number : 10 Question Id : 70819120653 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A particle is moving with uniform speed along the circumference of a circle of radius R under the action of a central fictitious force F which is inversely proportional to R^3 . Its time period of revolution will be given by :

Options :

70819167117. $T \propto R^{\frac{3}{2}}$

70819167118. $T \propto R^{\frac{4}{3}}$

70819167119. $T \propto R^2$

70819167120. $T \propto R^{\frac{5}{2}}$

Question Number : 10 Question Id : 70819120653 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

R^3 ସହ ପ୍ରତିଲୋମାନୁପାତୀ ଗୋଟିଏ କେନ୍ଦ୍ରୀୟ ଅପ୍ରକୃତ (ଫିକ୍ଟିସସ୍) ବଳର ପ୍ରଭାବରେ କଣିକାଟିଏ R ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ ଗୋଟିଏ ବୃତ୍ତର ପରିଧିରେ ସମବେଗରେ ଗତି କରୁଅଛି । ଏହାର ପରିକ୍ରମଣର ଆମର୍ତ୍ତକାଳ ହେବ :

Options :

70819167117. $T \propto R^{\frac{3}{2}}$

70819167118. $T \propto R^{\frac{4}{3}}$

70819167119. $T \propto R^2$

70819167120. $T \propto R^{\frac{5}{2}}$

Question Number : 11 Question Id : 70819120654 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If two similar springs each of spring constant K_1 are joined in series, the new spring constant and time period would be changed by a factor :

Options :

70819167121. $\frac{1}{2}, \sqrt{2}$

70819167122. $\frac{1}{4}, 2\sqrt{2}$

70819167123. $\frac{1}{2}, 2\sqrt{2}$

70819167124. $\frac{1}{4}, \sqrt{2}$

Question Number : 11 Question Id : 70819120654 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ପ୍ରତ୍ୟେକ ସ୍ପ୍ରିଙ୍ଗ୍ ଧ୍ରୁବାଙ୍କ K_1 ଥିବା ଦୁଇଟି ଏକାଭଳି ସ୍ପ୍ରିଙ୍ଗ୍‌କୁ ଶ୍ରେଣୀରେ ସଂଯୁକ୍ତ କରାଯାଇଛି । ନୂତନ ସ୍ପ୍ରିଙ୍ଗ୍ ଧ୍ରୁବାଙ୍କ ଏବଂ ଆବର୍ତ୍ତକାଳ କେଉଁ ଗୁଣନୀୟକ ସହ ପରିବର୍ତ୍ତନ ହେବ ?

Options :

70819167121. $\frac{1}{2}, \sqrt{2}$

70819167122. $\frac{1}{4}, 2\sqrt{2}$

70819167123. $\frac{1}{2}, 2\sqrt{2}$

70819167124. $\frac{1}{4}, \sqrt{2}$

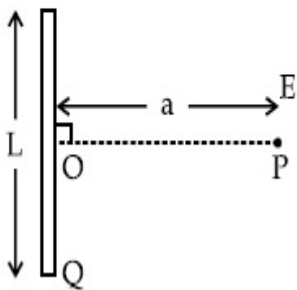
Question Number : 12 Question Id : 70819120655 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Find the electric field at point P (as shown in figure) on the perpendicular bisector of a uniformly charged thin wire of length L carrying a charge Q. The distance of the point P

from the centre of the rod is $a = \frac{\sqrt{3}}{2} L$.



Options :

70819167125. $\frac{Q}{3\pi\epsilon_0 L^2}$

70819167126. $\frac{Q}{4\pi\epsilon_0 L^2}$

70819167127. $\frac{\sqrt{3}Q}{4\pi\epsilon_0 L^2}$

70819167128. $\frac{Q}{2\sqrt{3}\pi\epsilon_0 L^2}$

Question Number : 12 Question Id : 70819120655 Question Type : MCQ Option Shuffling : Yes

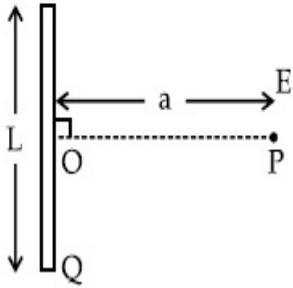
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Q ଚାର୍ଜ ବହନ କରୁଥିବା ଗୋଟିଏ L ଦୈର୍ଘ୍ୟ ବିଶିଷ୍ଟ ସମତାଳରେ ଚାର୍ଜିତ ପତଳା ତାରର ଲମ୍ବକୁ ସମଦ୍ୱିଖଣ୍ଡ କରୁଥିବା ରେଖାର

P ବିନ୍ଦୁରେ (ଚିତ୍ରରେ ଦର୍ଶାଯାଇଥିବା ଅନୁସାରେ) ବିଦ୍ୟୁତ୍ କ୍ଷେତ୍ର ନିର୍ଣ୍ଣୟ କର । ତାରଟିର ମଝିରୁ P ବିନ୍ଦୁର ଦୂରତା $a = \frac{\sqrt{3}}{2}$

L ଅଟେ ।



Options :

70819167125. $\frac{Q}{3\pi\epsilon_0 L^2}$

70819167126. $\frac{Q}{4\pi\epsilon_0 L^2}$

70819167127. $\frac{\sqrt{3}Q}{4\pi\epsilon_0 L^2}$

70819167128. $\frac{Q}{2\sqrt{3}\pi\epsilon_0 L^2}$

Question Number : 13 Question Id : 70819120656 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Consider the combination of 2 capacitors C_1 and C_2 , with $C_2 > C_1$, when connected in parallel,

the equivalent capacitance is $\frac{15}{4}$ times the equivalent capacitance of the same connected in

series. Calculate the ratio of capacitors, $\frac{C_2}{C_1}$.

Options :

70819167129. $\frac{29}{15}$

70819167130. $\frac{15}{11}$

70819167131. $\frac{15}{4}$

70819167132. $\frac{111}{80}$

Question Number : 13 Question Id : 70819120656 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$C_2 > C_1$ ଆଇ ଦୁଇଟି ଧାରିତ୍ର C_1 ଏବଂ C_2 ର ସଂଯୋଗ ବିଚାର କର । ସମାନ୍ତରରେ ସଂଯୁକ୍ତ ସମତୁଲ୍ୟ ଧାରିତା ଶ୍ରେଣୀରେ

ସଂଯୁକ୍ତ ସମତୁଲ୍ୟ ଧାରିତାର $\frac{15}{4}$ ଗୁଣ ଅଟେ । $\frac{C_2}{C_1}$ ର ଅନୁପାତ କଳନା କର ।

Options :

70819167129. $\frac{29}{15}$

70819167130. $\frac{15}{11}$

70819167131. $\frac{15}{4}$

70819167132. $\frac{111}{80}$

Question Number : 14 Question Id : 70819120657 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An alternating current is given by the equation $i = i_1 \sin \omega t + i_2 \cos \omega t$. The rms current will be :

Options :

70819167133. $\frac{1}{\sqrt{2}} (i_1 + i_2)$

70819167134. $\frac{1}{\sqrt{2}} (i_1 + i_2)^2$

70819167135. $\frac{1}{\sqrt{2}} (i_1^2 + i_2^2)^{\frac{1}{2}}$

70819167136. $\frac{1}{2} (i_1^2 + i_2^2)^{\frac{1}{2}}$

Question Number : 14 Question Id : 70819120657 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଗୋଟିଏ ପ୍ରତ୍ୟାବର୍ତ୍ତୀ ବିଦ୍ୟୁତ୍ ସ୍ରୋତ $i = i_1 \sin \omega t + i_2 \cos \omega t$ ଦ୍ୱାରା ଦର୍ଶାଯାଇଅଛି । ବିଦ୍ୟୁତ୍ ସ୍ରୋତର ମାଧ୍ୟବର୍ଗର ବର୍ଗମୂଳ (ଆର.ଏମ୍.ଏସ୍) ହେବ ।

Options :

70819167133. $\frac{1}{\sqrt{2}} (i_1 + i_2)$

70819167134. $\frac{1}{\sqrt{2}} (i_1 + i_2)^2$

70819167135. $\frac{1}{\sqrt{2}} (i_1^2 + i_2^2)^{\frac{1}{2}}$

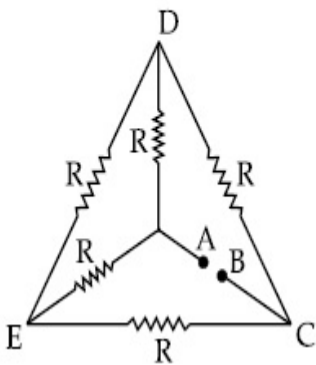
70819167136. $\frac{1}{2} (i_1^2 + i_2^2)^{\frac{1}{2}}$

Question Number : 15 Question Id : 70819120658 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Five equal resistances are connected in a network as shown in figure. The net resistance between the points A and B is :



Options :

70819167137. $2R$

70819167138. $\frac{R}{2}$

70819167139. R

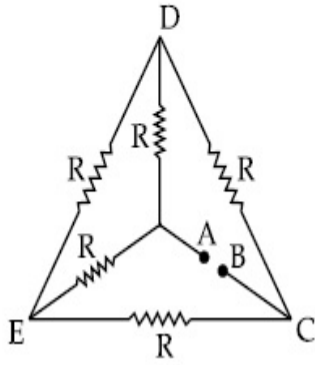
70819167140. $\frac{3R}{2}$

Question Number : 15 Question Id : 70819120658 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ପାଞ୍ଚଟି ସମାନ ବିଦ୍ୟୁତ୍ ପ୍ରତିରୋଧୀକୁ ଚିତ୍ରରେ ଦର୍ଶାଯାଇଥିବା ଅନୁସାରେ ଏକ ଜାଲକ୍ରମ (ନେଟୱାର୍କ) ର ସଂଯୋଗ କରାଯାଇଛି । A ଏବଂ B ବିନ୍ଦୁ ଦୁଇଟି ମଧ୍ୟରେ ପରିଣାମୀ ପ୍ରତିରୋଧ ଅଟେ _____ ।



Options :

70819167137. $2R$

70819167138. $\frac{R}{2}$

70819167139. R

70819167140. $\frac{3R}{2}$

Question Number : 16 Question Id : 70819120659 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A short straight object of height 100 cm lies before the central axis of a spherical mirror whose focal length has absolute value $|f| = 40$ cm. The image of object produced by the mirror is of height 25 cm and has the same orientation of the object. One may conclude from the information :

Options :

70819167141. Image is virtual, opposite side of concave mirror.

70819167142. Image is real, same side of concave mirror.

70819167143. Image is virtual, opposite side of convex mirror.

70819167144. Image is real, same side of convex mirror.

Question Number : 16 Question Id : 70819120659 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

100 cm ଉଚ୍ଚତା ବିଶିଷ୍ଟ ଏକ ଛୋଟ ସଲଖ ବସ୍ତୁକୁ ଫୋକସ୍ ଦୈର୍ଘ୍ୟର ପରମ ମୂଲ୍ୟ $|f| = 40$ cm ଥିବା ଏକ ବର୍ତ୍ତୁଳାକାର ଦର୍ପଣ ସମ୍ମୁଖରେ କେନ୍ଦ୍ରୀୟ ଅକ୍ଷ ଉପରେ ରହିଅଛି । ଦର୍ପଣ ଦ୍ୱାରା ସଂଗଠିତ ପ୍ରତିବିମ୍ବର ଉଚ୍ଚତା 25 cm ଏବଂ ଏହା ବସ୍ତୁ ରହିଥିବା ଦିଗରେ (ଓରିଏଣ୍ଟେସନ) ରହିଅଛି । ଏହି ସୂଚନାରୁ ଜଣେ ସିଦ୍ଧାନ୍ତରେ ଉପନୀତ ହେବ ଯେ :

Options :

70819167141. ପ୍ରତିବିମ୍ବଟି ଆଭାସୀ ଏବଂ ଅବତଳ ଦର୍ପଣର ବିପରୀତ ପାର୍ଶ୍ୱରେ ଅଛି ।

70819167142. ପ୍ରତିବିମ୍ବଟି ବାସ୍ତବ ଏବଂ ଅବତଳ ଦର୍ପଣର ସମାନ ପାର୍ଶ୍ୱରେ ଅଛି ।

70819167143. ପ୍ରତିବିମ୍ବଟି ଆଭାସୀ ଏବଂ ଉତ୍ତଳ ଦର୍ପଣର ବିପରୀତ ପାର୍ଶ୍ୱରେ ଅଛି ।

70819167144. ପ୍ରତିବିମ୍ବଟି ବାସ୍ତବ ଏବଂ ଉତ୍ତଳ ଦର୍ପଣର ସମାନ ପାର୍ଶ୍ୱରେ ଅଛି ।

Question Number : 17 Question Id : 70819120660 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In a Young's double slit experiment two slits are separated by 2 mm and the screen is placed one meter away. When a light of wavelength 500 nm is used, the fringe separation will be :

Options :

70819167145. 1 mm

70819167146. 0.75 mm

70819167147. 0.50 mm

70819167148. 0.25 mm

Question Number : 17 Question Id : 70819120660 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଏକ ଯତ୍ନକ ବିଚ୍ଛିନ୍ନ ପରୀକ୍ଷାରେ ଦୁଇଟି ଛିଦ୍ର (ସ୍ଲିଟ୍) 2 mm ରେ ପୃଥକ୍ ହୋଇ ରହିଛି ଏବଂ ପରଦାଟି ଏକ ମିଟର ଦୂରତାରେ ଅଛି । ଯେତେବେଳେ 500 nm ଚରଣ ଦୈର୍ଘ୍ୟର ଗୋଟିଏ ଆଲୋକ ବ୍ୟବହାର କରାଯାଏ, ଫ୍ରିଜ୍ ବ୍ୟବଧାନ ହେବ :

Options :

70819167145. 1 mm

70819167146. 0.75 mm

70819167147. 0.50 mm

70819167148. 0.25 mm

Question Number : 18 Question Id : 70819120661 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : An electron microscope can achieve better resolving power than an optical microscope.

Reason R : The de Broglie's wavelength of the electrons emitted from an electron gun is much less than wavelength of visible light.

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

Options :

70819167149. Both A and R are true and R is the correct explanation of A.

70819167150. Both A and R are true but R is NOT the correct explanation of A.

70819167151. A is true but R is false.

70819167152. A is false but R is true.

Question Number : 18 Question Id : 70819120661 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନରେ ଦୁଇଟି ଉକ୍ତି ଦିଆଯାଇଛି । ଗୋଟିଏ ଘୋଷଣା A ଓ ଅନ୍ୟଟି କାରଣ R ଆକାରରେ ସ୍ଥିରକୃତ ହୋଇଛି ।

ଘୋଷଣା A : ଗୋଟିଏ ଅପ୍ଟିକାଲ୍ ଅଣୁବିକ୍ଷଣ ଯନ୍ତ୍ର ଠାରୁ ଗୋଟିଏ ଇଲେକ୍ଟ୍ରନ୍ ଅଣୁବିକ୍ଷଣ ଯନ୍ତ୍ରରେ ଭଲ ବିଭେଦନ କ୍ଷମତା ମିଳିଥାଏ ।

କାରଣ R : ଗୋଟିଏ ଇଲେକ୍ଟ୍ରନ୍ ଗନ୍ତୁ ଉତ୍ସର୍ଜିତ ଇଲେକ୍ଟ୍ରନ୍ର ଡିସ୍ପ୍ରେସନ୍ ଚରଣ ଦୈର୍ଘ୍ୟ ଦୃଶ୍ୟମାନ ଆଲୋକର ଚରଣ ଦୈର୍ଘ୍ୟଠାରୁ ବହୁତ କମ୍ ।

ଉପରୋକ୍ତ ଉକ୍ତିଗୁଡ଼ିକ ଅନୁସାରେ, ନିମ୍ନରେ ଦତ୍ତ ବିକଳ୍ପ ଗୁଡ଼ିକରୁ ଠିକ୍ ଉତ୍ତର ଚୟନ କର :

Options :

70819167149. ଉଭୟ A ଏବଂ R ସତ୍ୟ ଅଟନ୍ତି ଏବଂ R ତି A ର ଠିକ୍ ବ୍ୟାଖ୍ୟା ।

70819167150. ଉଭୟ A ଏବଂ R ସତ୍ୟ ଅଟନ୍ତି କିନ୍ତୁ R ତି A ର ଠିକ୍ ବ୍ୟାଖ୍ୟା ନୁହେଁ ।

70819167151. A ସତ୍ୟ ଅଟେ କିନ୍ତୁ R ମିଥ୍ୟା ଅଟେ ।

70819167152. A ମିଥ୍ୟା ଅଟେ କିନ୍ତୁ R ସତ୍ୟ ଅଟେ ।

Question Number : 19 Question Id : 70819120662 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If λ_1 and λ_2 are the wavelengths of the third member of Lyman and first member of the Paschen series respectively, then the value of $\lambda_1 : \lambda_2$ is :

Options :

70819167153. 7 : 108

70819167154. 7 : 135

70819167155. 1 : 3

70819167156. 1 : 9

Question Number : 19 Question Id : 70819120662 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି λ_1 ଏବଂ λ_2 ଯଥାକ୍ରମେ ଲାଇମାନ୍ ଶୃଙ୍ଖଳାର ତୃତୀୟ ମେମ୍ବର ଏବଂ ପାଶ୍ଚେନ୍ ଶୃଙ୍ଖଳାର ପ୍ରଥମ ମେମ୍ବରର ତରଙ୍ଗ ଦୈର୍ଘ୍ୟ ଅଟନ୍ତି, ତେବେ $\lambda_1 : \lambda_2$ ର ମୂଲ୍ୟ ହେବ :

Options :

70819167153. 7 : 108

70819167154. 7 : 135

70819167155. 1 : 3

70819167156. 1 : 9

Question Number : 20 Question Id : 70819120663 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

LED is constructed from Ga-As-P semiconducting material. The energy gap of this LED is 1.9 eV. Calculate the wavelength of light emitted and its colour.

[$h = 6.63 \times 10^{-34}$ Js and $c = 3 \times 10^8$ ms⁻¹]

Options :

70819167157. 654 nm and red colour
70819167158. 654 nm and orange colour
70819167159. 1046 nm and blue colour
70819167160. 1046 nm and red colour

Question Number : 20 Question Id : 70819120663 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଅର୍ଦ୍ଧପରିବାହୀ ପଦାର୍ଥ Ga-As-P ରୁ ଏକ LED ତିଆରି କରାଗଲା । ଏହି LED ର ଶକ୍ତି ସ୍ତର ବିଭେଦ (ଏନର୍ଜୀ ଗ୍ୟାପ୍) 1.9 eV ଅଟେ । ଆଲୋକଟିର ଚରଙ୍ଗ ଦୈର୍ଘ୍ୟ ଏବଂ ବର୍ଣ୍ଣ କଳନା କର ।

($h=6.63 \times 10^{-34}$ Js ଏବଂ $c=3 \times 10^8$ ms⁻¹)

Options :

70819167157. 654 nm ଏବଂ ଲାଲ ରଙ୍ଗ
70819167158. 654 nm ଏବଂ କମଳା ରଙ୍ଗ
70819167159. 1046 nm ଏବଂ ନୀଳ ରଙ୍ଗ
70819167160. 1046 nm ଏବଂ ଲାଲ ରଙ୍ଗ

Physics Section B

Section Id :

708191917

Section Number :

2

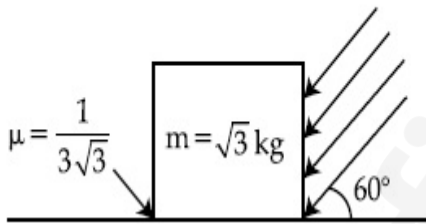
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	7081911197
Question Shuffling Allowed :	Yes

Question Number : 21 Question Id : 70819120664 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

As shown in the figure, a block of mass $\sqrt{3}$ kg is kept on a horizontal rough surface of coefficient of friction $\frac{1}{3\sqrt{3}}$. The critical force to be applied on the vertical surface as shown at an angle 60° with horizontal such that it does not move, will be $3x$. The value of x will be _____.

$$[g = 10 \text{ m/s}^2; \sin 60^\circ = \frac{\sqrt{3}}{2}; \cos 60^\circ = \frac{1}{2}]$$



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

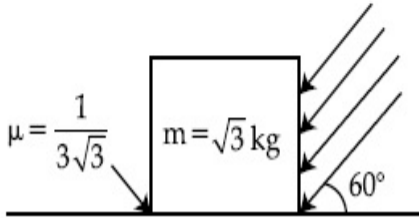
Question Number : 21 Question Id : 70819120664 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଚିତ୍ରରେ ଦର୍ଶାଯାଇଥିବା ଅନୁସାରେ, ଘର୍ଷଣ ଧ୍ରୁବାଙ୍କ $\frac{1}{3\sqrt{3}}$ ଥିବା ଏକ ଭୂସମାନ୍ତର ବସ୍ତୁର ପୃଷ୍ଠରେ $\sqrt{3}$ kg ବସ୍ତୁର ଏକ ବୁଲ୍

ରଖାଯାଇଛି । ଏହା ଗତି କରିପାରୁନଥିବା ସ୍ଥିତିରେ ଏହାର ଭୂଲମ୍ବୀୟ ପାର୍ଶ୍ୱରେ ଦେଖାଯାଇଥିବା ଅନୁସାରେ ପକାଯାଇଥିବା କ୍ରାନ୍ତୀୟ ବଳ $3x$ ହେବ । x ର ମୂଲ୍ୟ ହେବ _____

$$[g = 10 \text{ m/s}^2 ; \sin 60^\circ = \frac{\sqrt{3}}{2} ; \cos 60^\circ = \frac{1}{2}]$$



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 22 Question Id : 70819120665 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A boy pushes a box of mass 2 kg with a force $\vec{F} = (20\hat{i} + 10\hat{j})$ N on a frictionless surface.

If the box was initially at rest, then _____ m is displacement along the x-axis after 10 s.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 22 Question Id : 70819120665 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ବାଳକଟିଏ 2 kg ବସ୍ତୁର ବିଶିଷ୍ଟ ଏକ ବାକ୍ସକୁ $\vec{F} = (20\hat{i} + 10\hat{j})\text{N}$ ବଳରେ ଗୋଟିଏ ଘର୍ଷଣହୀନ ପୃଷ୍ଠରେ ଠେଲୁଛି ।

ଯଦି ବାକ୍ସଟି ପ୍ରାରମ୍ଭରେ ଶୁନ୍ୟ ଅବସ୍ଥାରେ ରହିଥାଏ, ତେବେ 10 s ପରେ x-ଅକ୍ଷ ଦିଗରେ ଏହାର ବିସ୍ଥାପନ ହେବ _____ m.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 23 Question Id : 70819120666 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A person standing on a spring balance inside a stationary lift measures 60 kg. The weight of that person if the lift descends with uniform downward acceleration of 1.8 m/s^2 will be _____ N. [$g = 10 \text{ m/s}^2$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 23 Question Id : 70819120666 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ସ୍ଥିରରେ ଥିବା ଏକ ଲିଫ୍ଟ୍ ମଧ୍ୟରେ ଗୋଟିଏ ସ୍ପ୍ରିଙ୍ଗ୍ ବାଲାନ୍ସ୍, ଉପରେ ଛିଡ଼ା ହୋଇଥିବା ବ୍ୟକ୍ତିର ଓଜନ ମାପି ହୁଏ । ଯଦି ଲିଫ୍ଟ୍ଟି 1.8 m/s^2 ବିଶିଷ୍ଟ ସମତ୍ୱରଣରେ ତଳକୁ ଖସୁଥାଏ, ବ୍ୟକ୍ତି ଜଣକର ଓଜନ ହେବ _____ N ।
 $[g = 10 \text{ m/s}^2]$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 24 **Question Id :** 70819120667 **Question Type :** SA

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

The mass per unit length of a uniform wire is 0.135 g/cm . A transverse wave of the form $y = -0.21 \sin(x + 30t)$ is produced in it, where x is in meter and t is in second. Then, the expected value of tension in the wire is $x \times 10^{-2} \text{ N}$. Value of x is _____. (Round-off to the nearest integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 24 **Question Id :** 70819120667 **Question Type :** SA

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

ଗୋଟିଏ ସମତ୍ୱରଣ ତାରର ପ୍ରତି ଏକକ ଦୈର୍ଘ୍ୟ ପାଇଁ ବସ୍ତୁତ୍ୱ ଅଟେ 0.135 g/cm । $y = -0.21 \sin(x + 30t)$ ପ୍ରକାର ଏକ ଅନୁପ୍ରସ୍ଥ ତରଙ୍ଗ ଏଥିରେ ସୃଷ୍ଟି କରାଗଲା, ଯେଉଁଠି x ଟି ମିଟରରେ ଏବଂ t ସେକେଣ୍ଡରେ ଅଛି । ତେବେ ତାରଟିରେ ଆଶାକରାଯାଉଥିବା ତାନ (ଟେନ୍ସନ୍) ଅଟେ $x \times 10^{-2} \text{ N}$ । x ର ମୂଲ୍ୟ ଅଟେ _____ । (ନିକଟତମ ପୂର୍ଣ୍ଣ ସଂଖ୍ୟାରେ ପ୍ରକାଶ କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 25 **Question Id :** 70819120668 **Question Type :** SA

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

A container is divided into two chambers by a partition. The volume of first chamber is 4.5 litre and second chamber is 5.5 litre. The first chamber contain 3.0 moles of gas at pressure 2.0 atm and second chamber contain 4.0 moles of gas at pressure 3.0 atm. After the partition is removed and the mixture attains equilibrium, then, the common equilibrium pressure existing in the mixture is $x \times 10^{-1}$ atm. Value of x is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 25 **Question Id :** 70819120668 **Question Type :** SA

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

ଗୋଟିଏ ଆଧାରକୁ ପାର୍ଟିସନ୍ ଦ୍ୱାରା ଦୁଇଟି ଚାମରରେ ବିଭକ୍ତ କରାଯାଇଛି । ପ୍ରଥମ ଚାମରର ଆୟତନ 4.5 ଲିଟର ଏବଂ ଦ୍ୱିତୀୟ ଚାମରର ଆୟତନ 5.5 ଲିଟର ଅଟେ । ପ୍ରଥମ ଚାମରଟି 2.0 ବାୟୁମଣ୍ଡଳୀୟ (ଆଟମୋସ୍ଫିଅରିକ୍) ଚାପରେ 3.0 ମୋଲ୍ ଗ୍ୟାସ୍ ଏବଂ ଦ୍ୱିତୀୟ ଚାମରଟି 3.0 ବାୟୁ ମଣ୍ଡଳୀୟ (ଆଟମୋସ୍ଫିଅରିକ୍) ଚାପରେ 4.0 ମୋଲ୍ ଗ୍ୟାସ୍ ଧାରଣ କରିଛି । ପାର୍ଟିସନ୍‌ଟି ହଟାଇଦେଲା ପରେ, ମିଶ୍ରଣଟି ସନ୍ତୁଳନକୁ ଆସିଯାଏ । ତେବେ ମିଶ୍ରଣରେ ହେଉଥିବା ସାଧାରଣ ସନ୍ତୁଳନ ଚାପ ହେଉଛି $x \times 10^{-1}$ ଆଟମୋସ୍ଫିଅର । x ର ମୂଲ୍ୟ ଅଟେ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 26 Question Id : 70819120669 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A radiation is emitted by 1000 W bulb and it generates an electric field and magnetic field at P, placed at a distance of 2 m. The efficiency of the bulb is 1.25%. The value of peak electric field at P is $x \times 10^{-1}$ V/m. Value of x is _____. (Rounded-off to the nearest integer)

[Take $\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2 \text{ N}^{-1} \text{ m}^{-2}$, $c = 3 \times 10^8 \text{ ms}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 26 Question Id : 70819120669 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

1000 W ବଲ୍‌ବ୍ ଦ୍ୱାରା ବିକିରଣଟିଏ ଉତ୍ପାଦନ ହେଉଛି ଏବଂ ଏହା 2 m ଦୂରତାରେ ଥିବା P ଠାରେ ଗୋଟିଏ ଇଲେକ୍ଟ୍ରିକ୍ କ୍ଷେତ୍ର ଏବଂ ଚୁମ୍ବକୀୟ କ୍ଷେତ୍ର ସୃଷ୍ଟି କରୁଛି । ବଲ୍‌ବ୍‌ଟିର ଦକ୍ଷତା 1.25% ଅଟେ । P ଠାରେ ସର୍ବୋଚ୍ଚ ବୈଦ୍ୟୁତିକ କ୍ଷେତ୍ରର ମୂଲ୍ୟ ଅଟେ $x \times 10^{-1}$ V/m । x ର ମୂଲ୍ୟ ଅଟେ _____ ।

[ଧର $\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2 \text{ N}^{-1} \text{ m}^{-2}$, $c = 3 \times 10^8 \text{ ms}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 27 Question Id : 70819120670 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

In an electrical circuit, a battery is connected to pass 20 C of charge through it in a certain given time. The potential difference between two plates of the battery is maintained at 15 V. The workdone by the battery is _____ J.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 27 Question Id : 70819120670 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଗୋଟିଏ ବୈଦ୍ୟୁତିକ ପରିପଥରେ, କୌଣସି ଏକ ନିର୍ଦ୍ଦିଷ୍ଟ ସମୟରେ ଏହା ମଧ୍ୟ ଦେଇ 20 C ଚାର୍ଜକୁ ପ୍ରବାହିତ କରିବାକୁ ଏଥିରେ ଏକ ବ୍ୟାଟେରୀ ସଂଯୋଗ କରାଗଲା । ବ୍ୟାଟେରୀର ଦୁଇ ପ୍ଲେଟ୍ ମଧ୍ୟରେ 15 V ର ବିଭବ ପାର୍ଥକ୍ୟ ଚାଲୁ ରଖାଗଲା । ବ୍ୟାଟେରୀ ଦ୍ୱାରା ସମ୍ପାଦିତ କାର୍ଯ୍ୟ ହେଉଛି _____ J ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

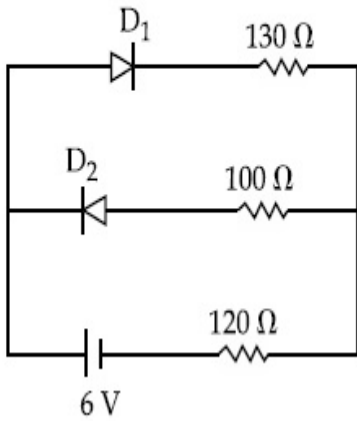
Possible Answers :

5 to 5.001

Question Number : 28 Question Id : 70819120671 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The circuit contains two diodes each with a forward resistance of 50Ω and an infinite reverse resistance. If the battery voltage is 6 V , the current through the 120Ω resistance is _____ mA.



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

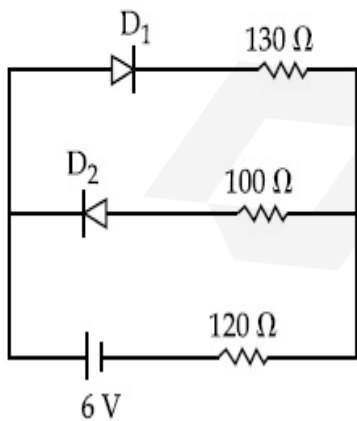
Possible Answers :

5 to 5.001

Question Number : 28 **Question Id :** 70819120671 **Question Type :** SA

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

ବିଦ୍ୟୁତ୍ ପରିପଥଟିରେ ପ୍ରତ୍ୟେକ 50Ω ବିଶିଷ୍ଟ ଅଗ୍ରମୁଖୀ ପ୍ରତିରୋଧ ଓ ଅସୀମ ବିପରୀତ ମୁଖୀ ପ୍ରତିରୋଧ ବାଲା ଦୁଇଟି ଡାଇଓଡ୍ ରହିଛି । ଯଦି ବ୍ୟାଟେରୀର ଭୋଲଟେଜ୍ 6 V ହୁଏ, 120Ω ପ୍ରତିରୋଧ ଦେଇ ଯାଉଥିବା ବିଦ୍ୟୁତ୍ ସ୍ରୋତ _____ mA ଅଟେ ।



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 29 Question Id : 70819120672 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The maximum and minimum amplitude of an amplitude modulated wave is 16 V and 8 V respectively. The modulation index for this amplitude modulated wave is $x \times 10^{-2}$. The value of x is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 29 Question Id : 70819120672 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଗୋଟିଏ ଆୟାମ ମଡୁଲେଟ୍ଡ ତରଙ୍ଗର ସର୍ବାଧିକ ଏବଂ ସର୍ବନିମ୍ନ ଆୟାମ ଯଥାକ୍ରମେ 16 V ଏବଂ 8 V ଅଟେ । ଏହି ଆୟାମ ମଡୁଲେଟ୍ଡ ତରଙ୍ଗ ପାଇଁ ମଡୁଲେଟ୍ଡ ଇଣ୍ଡେକ୍ସ $x \times 10^{-2}$ ଅଟେ । x ର ମୂଲ୍ୟ _____ ଅଟେ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 30 Question Id : 70819120673 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

In a series LCR resonant circuit, the quality factor is measured as 100. If the inductance is increased by two fold and resistance is decreased by two fold, then the quality factor after this change will be _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 30 Question Id : 70819120673 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଗୋଟିଏ ଶ୍ରେଣୀରେ ସଂଯୁକ୍ତ LCR ଅନୁନାଦ ପରିପଥରେ, ଫଳବତ୍ତା ସୂଚକ (କ୍ୱାଲିଟି ଫାକ୍ଟର) 100 ବୋଲି ମପାଯାଇଛି । ଯଦି ପ୍ରଶୋଦକତାକୁ ଦୁଇଗୁଣ ବୃଦ୍ଧି କରାଯାଏ ଏବଂ ପ୍ରତିରୋଧକୁ ଦୁଇଗୁଣ କମାଯାଏ, ତେବେ ଏହି ପରିବର୍ତ୍ତନ ପରେ ଫଳବତ୍ତା ସୂଚକଟି ହେବ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Chemistry Section A

Section Id : 708191918

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 : 7081911198
Question Shuffling Allowed : Yes

Question Number : 31 Question Id : 70819120674 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The orbital having two radial as well as two angular nodes is :

Options :

70819167171. 3p

70819167172. 4d

70819167173. 4f

70819167174. 5d

Question Number : 31 Question Id : 70819120674 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଦୁଇଟି ରେଡିଆଲ ସହିତ ଦୁଇଟି ଏଙ୍ଗୁଲାର ନୋଡ୍ସ ଥିବା ଅରବିଟାଲ୍ଟି ହେଉଛି :

Options :

70819167171. 3p

70819167172. 4d

70819167173. 4f

70819167174. 5d

Question Number : 32 Question Id : 70819120675 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : Dipole-dipole interactions are the only non-covalent interactions, resulting in hydrogen bond formation.

Reason R : Fluorine is the most electronegative element and hydrogen bonds in HF are symmetrical.

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

Options :

70819167175. Both A and R are true and R is the correct explanation of A

70819167176. Both A and R are true but R is NOT the correct explanation of A

70819167177. A is true but R is false

70819167178. A is false but R is true

Question Number : 32 Question Id : 70819120675 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନରେ ଦୁଇଟି ଉକ୍ତି ଦିଆଯାଇଛି । ଗୋଟିଏ ଦୃଢ଼ୋକ୍ତି **A** ଏବଂ ଅନ୍ୟଟି କାରଣ **R** ଭାବେ ଚିହ୍ନଟ କରାଯାଇଛି ।

ଦୃଢ଼ୋକ୍ତି A : ଡାଇପୋଲ - ଡାଇପୋଲ ମଧ୍ୟରେ ପାରସ୍ପରିକ ପ୍ରତିକ୍ରିୟାଟି ଏକମାତ୍ର ଅସହଯୋଗୀ ପାରସ୍ପରିକ ପ୍ରତିକ୍ରିୟା ଯାହା ଫଳରେ ହାଇଡ୍ରୋଜେନ୍ ବନ୍ଧ ଗଠନ ହୁଏ ।

କାରଣ R : ଫ୍ଲୋରିନ୍ ସର୍ବାଧିକ ଇଲେକ୍ଟ୍ରୋନେଗେଟିଭ୍ ମୌଳିକ ଏବଂ HF ରେ ହାଇଡ୍ରୋଜେନ୍ ବନ୍ଧଟି ସିମେଟ୍ରିକାଲ୍ ।
ଉପରୋକ୍ତ ଆବୃତ୍ତି ଅନୁସାରେ ନିମ୍ନଲିଖିତ ବିକଳ୍ପରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛି :

Options :

70819167175. **A** ଏବଂ **R** ଉଭୟ ସତ୍ୟ ଏବଂ **A**ର ସଠିକ୍ ବ୍ୟାଖ୍ୟା **R**

70819167176. **A** ଏବଂ **R** ଉଭୟ ସତ୍ୟ କିନ୍ତୁ **A** ର ସଠିକ୍ ବ୍ୟାଖ୍ୟା **R** ନୁହେଁ

70819167177. **A** ସତ୍ୟ କିନ୍ତୁ **R** ଅସତ୍ୟ

70819167178. **A** ଅସତ୍ୟ **R** ସତ୍ୟ

Question Number : 33 Question Id : 70819120676 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
Electronic configuration of elements	$\Delta_f H$ in kJ mol^{-1}
(a) $1s^2 2s^2$	(i) 801
(b) $1s^2 2s^2 2p^4$	(ii) 899
(c) $1s^2 2s^2 2p^3$	(iii) 1314
(d) $1s^2 2s^2 2p^1$	(iv) 1402

Choose the most appropriate answer from the options given below :

Options :

70819167179. (a) \rightarrow (i), (b) \rightarrow (iv), (c) \rightarrow (iii), (d) \rightarrow (ii)

70819167180. (a) \rightarrow (iv), (b) \rightarrow (i), (c) \rightarrow (ii), (d) \rightarrow (iii)

70819167181. (a) \rightarrow (ii), (b) \rightarrow (iii), (c) \rightarrow (iv), (d) \rightarrow (i)

70819167182. (a) → (i), (b) → (iii), (c) → (iv), (d) → (ii)

Question Number : 33 Question Id : 70819120676 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ତାଲିକା - I କୁ - II ସହ ମିଳାଅ :

ତାଲିକା - I (ମୌଳିକର ଇଲେକ୍ଟ୍ରନ୍ ବିନ୍ୟାସ)	ତାଲିକା - II ($\Delta_f H$ in kJ mol ⁻¹)
(a) $1s^2 2s^2$	(i) 801
(b) $1s^2 2s^2 2p^4$	(ii) 899
(c) $1s^2 2s^2 2p^3$	(iii) 1314
(d) $1s^2 2s^2 2p^1$	(iv) 1402

ନିମ୍ନଲିଖିତ ବିକଳ୍ପ ମଧ୍ୟରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛ :

Options :

70819167179. (a) → (i), (b) → (iv), (c) → (iii), (d) → (ii)

70819167180. (a) → (iv), (b) → (i), (c) → (ii), (d) → (iii)

70819167181. (a) → (ii), (b) → (iii), (c) → (iv), (d) → (i)

70819167182. (a) → (i), (b) → (iii), (c) → (iv), (d) → (ii)

Question Number : 34 Question Id : 70819120677 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List-I with List-II.

List-I (Ore)	List-II (Element Present)
(a) Kernite	(i) Tin
(b) Cassiterite	(ii) Boron
(c) Calamine	(iii) Fluorine
(d) Cryolite	(iv) Zinc

Choose the most appropriate answer from the options given below :

Options :

70819167183. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819167184. (a) → (iii), (b) → (i), (c) → (ii), (d) → (iv)

70819167185. (a) → (ii), (b) → (iv), (c) → (i), (d) → (iii)

70819167186. (a) → (i), (b) → (iii), (c) → (iv), (d) → (ii)

Question Number : 34 Question Id : 70819120677 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ତାଲିକା I କୁ II ସହ ମିଳାଅ :

ତାଲିକା - I (ଧାତୁପିଣ୍ଡ)	ତାଲିକା - II (ଉପସ୍ଥିତ ମୌଳିକ)
(a) କାରନାଇଟ୍	(i) ଟିନ୍
(b) କାସିଟେରାଇଟ୍	(ii) ବୋରନ୍
(c) କାଲମାଇନ	(iii) ଫ୍ଲୁରିନ୍
(d) କ୍ରାଇଲାଇଟ୍	(iv) ଜିଙ୍କ୍

ନିମ୍ନ ପ୍ରଦତ୍ତ ବିକଳ୍ପରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛି :

Options :

70819167183. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819167184. (a) → (iii), (b) → (i), (c) → (ii), (d) → (iv)

70819167185. (a) → (ii), (b) → (iv), (c) → (i), (d) → (iii)

70819167186. (a) → (i), (b) → (iii), (c) → (iv), (d) → (ii)

Question Number : 35 Question Id : 70819120678 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Statements about heavy water are given below.

- A. Heavy water is used in exchange reactions for the study of reaction mechanisms.
- B. Heavy water is prepared by exhaustive electrolysis of water.
- C. Heavy water has higher boiling point than ordinary water.
- D. Viscosity of H_2O is greater than D_2O .

Choose the most appropriate answer from the options given below :

Options :

70819167187. A and B only

70819167188. A and C only

70819167189. A and D only

70819167190. A, B and C only

Question Number : 35 Question Id : 70819120678 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନରେ ଭାରିଜଳ ବିଷୟରେ କିଛି ଉକ୍ତି ଦିଆଯାଇଛି ।

- A. ବିନିମୟ ପ୍ରତିକ୍ରିୟାର କାର୍ଯ୍ୟପ୍ରଣାଳୀ ଅଧ୍ୟୟନ କରିବା ନିମନ୍ତେ ଭାରିଜଳ ପ୍ରତିକ୍ରିୟାରେ ବ୍ୟବହୃତ ହୁଏ ।
- B. ଜଳର ସମ୍ପୂର୍ଣ୍ଣ ବୈଦ୍ୟୁତିକ ବିଶ୍ଳେଷଣରେ ଭାରିଜଳ ପ୍ରସ୍ତୁତ ହୁଏ ।
- C. ଭାରିଜଳର ସ୍ଫୁଟନାଙ୍କ ସାଧାରଣ ଜଳ ଅପେକ୍ଷା ଅଧିକ ।
- D. H_2O ର ଭିସ୍କୋସିଟି D_2O ଅପେକ୍ଷା ଅଧିକ ।

ନିମ୍ନ ବିକଳ୍ପ ମଧ୍ୟରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛି :

Options :

70819167187. A ଏବଂ B କେବଳ

70819167188. A ଏବଂ C କେବଳ

70819167189. A ଏବଂ D କେବଳ

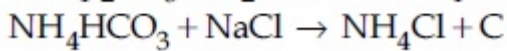
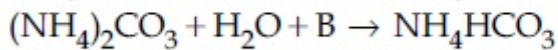
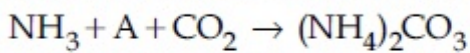
70819167190. A, B ଏବଂ C କେବଳ

Question Number : 36 Question Id : 70819120679 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Find A, B and C in the following reactions :



Options :

70819167191. A – H₂O ; B – O₂ ; C – Na₂CO₃

70819167192. A – H₂O ; B – O₂ ; C – NaHCO₃

70819167193. A – H₂O ; B – CO₂ ; C – NaHCO₃

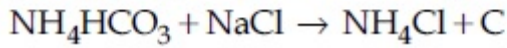
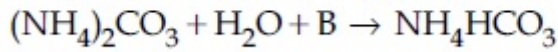
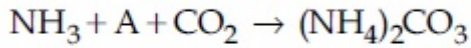
70819167194. A – O₂ ; B – CO₂ ; C – Na₂CO₃

Question Number : 36 Question Id : 70819120679 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନଲିଖିତ ପ୍ରତିକ୍ରିୟାରେ A, B ଏବଂ C କୁ ନିର୍ଣ୍ଣୟ କର :



Options :

70819167191. A – H₂O ; B – O₂ ; C – Na₂CO₃

70819167192. A – H₂O ; B – O₂ ; C – NaHCO₃

70819167193. A – H₂O ; B – CO₂ ; C – NaHCO₃

70819167194. A – O₂ ; B – CO₂ ; C – Na₂CO₃

Question Number : 37 Question Id : 70819120680 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Compound A used as a strong oxidizing agent is amphoteric in nature. It is the part of lead storage batteries. Compound A is :

Options :

70819167195. PbO

70819167196. PbO₂

70819167197. Pb₃O₄

70819167198. PbSO₄

Question Number : 37 Question Id : 70819120680 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଏକ ଶକ୍ତିଶାଳୀ ବିଜାରକ ଭାବେ ବ୍ୟବହୃତ ହେଉଥିବା A ଗୁଣରେ ଉଭୟର୍ଥୀ ଅଟେ । ଏହା ଲିଡ୍ ସଞ୍ଚୟ ବ୍ୟାଟେରୀର ଏକ ଅଂଶ । ଯୌଗିକ A ହେଉଛି :

Options :

70819167195. PbO

70819167196. PbO_2

70819167197. Pb_3O_4

70819167198. PbSO_4

Question Number : 38 Question Id : 70819120681 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which one of the following lanthanoids does not form MO_2 ?
[M is lanthanoid metal]

Options :

70819167199. Nd

70819167200. Dy

70819167201. Pr

70819167202. Yb

Question Number : 38 Question Id : 70819120681 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନଲିଖିତ ଲାହାନୀୟତ୍ୱ ମଧ୍ୟରୁ କେଉଁଟି MO_2 ଗଠନ କରେ ନାହିଁ ?

Options :

70819167199. Nd

70819167200. Dy

70819167201. Pr

70819167202. Yb

Question Number : 39 Question Id : 70819120682 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The presence of ozone in troposphere :

Options :

70819167203. protects us from the UV radiation

70819167204. protects us from the X-ray radiation

70819167205. generates photochemical smog

70819167206. protects us from greenhouse effect

Question Number : 39 Question Id : 70819120682 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଗ୍ରୋପୋସ୍ଫିଅରରେ ଓଜନ ଗ୍ୟାସର ଉପସ୍ଥିତି :

Options :

70819167203. ଆମକୁ ଅତିବାଇଗଣୀ ଆଲୋକ ବିକିରଣରୁ ରକ୍ଷାକରେ ।

70819167204. ଆମକୁ ରଞ୍ଜନ ରଶ୍ମି ବିକିରଣରୁ ରକ୍ଷା କରେ ।

70819167205. ଫୋଟୋ କେମିକାଲ୍ ସ୍ପଲ୍ ସୃଷ୍ଟି କରେ ।

70819167206. ସବୁଜ ଘର ପ୍ରଭାବରୁ ରକ୍ଷା କରେ ।

Question Number : 40 Question Id : 70819120683 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : A mixture of chloroform and aniline can be separated by simple distillation.

Statement II : When separating aniline from a mixture of aniline and water by steam distillation aniline boils below its boiling point.

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

Options :

70819167207. Both Statement I and Statement II are true

70819167208. Both Statement I and Statement II are false

70819167209. Statement I is true but Statement II is false

70819167210. Statement I is false but Statement II is true

Question Number : 40 Question Id : 70819120683 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନରେ ଦୁଇଟି ବିବୃତି ଦିଆଯାଇଛି :

ବିବୃତି I: କ୍ଲୋରୋଫର୍ମ ଓ ଆନିଲିନ୍ର ଏକ ମିଶ୍ରଣକୁ ସରଳ ପାତନ ପ୍ରଣାଳୀ ଦ୍ୱାରା ଅଲଗା କରାଯାଇ ପାରିବ ।

ବିବୃତି II: ଯେତେବେଳେ ଆନିଲିନ୍ ଓ ଜଳର ଏକ ମିଶ୍ରଣରୁ ବାଷ୍ପ ପାତନ ପ୍ରଣାଳୀ ଦ୍ୱାରା ଆନିଲିନ୍କୁ ଅଲଗା କରାଯାଏ, ଆନିଲିନ୍ ଏହାର ସ୍ଫୁଟନାଙ୍କ ଠାରୁ କମ୍ ତାପମାତ୍ରାରେ ଫୁଟେ ।

Options :

70819167207. ଉଭୟ ବିବୃତି I ଏବଂ ବିବୃତି II ଠିକ୍

70819167208. ଉଭୟ ବିବୃତି I ଏବଂ ବିବୃତି II ଭୁଲ୍

70819167209. ବିବୃତି I ଠିକ୍ ଠିକ୍ କିନ୍ତୁ ବିବୃତି II ଠିକ୍ ଭୁଲ୍

70819167210. ବିବୃତି I ଠିକ୍ ଭୁଲ୍ କିନ୍ତୁ ବିବୃତି II ଠିକ୍ ଠିକ୍

Question Number : 41 Question Id : 70819120684 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following is 'a' FALSE statement ?

Options :

70819167211. Carius tube is used in the estimation of sulphur in an organic compound.

70819167212. Carius method is used for the estimation of nitrogen in an organic compound.

70819167213. Kjeldahl's method is used for the estimation of nitrogen in an organic compound.

70819167214. Phosphoric acid produced on oxidation of phosphorus present in an organic compound is precipitated as $Mg_2P_2O_7$ by adding magnesia mixture.

Question Number : 41 Question Id : 70819120684 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନ ପ୍ରଦତ୍ତ କେଉଁ ବିବୃତିଟି ମିଛ ?

Options :

70819167211. ଏକ ଜୈବ ଯୌଗିକରେ ସଲଫରର ମାତ୍ରା ଆକଳନ ପାଇଁ କ୍ୟାରିଅସ୍ ଟ୍ୟୁବ୍ ବ୍ୟବହାର ହୁଏ ।

70819167212. ଏକ ଜୈବ ଯୌଗିକରେ ନାଇଟ୍ରୋଜେନ୍‌ର ମାତ୍ରା ଆକଳନ ପାଇଁ କ୍ୟାରିଅସ୍ ପବ୍‌ଟି ବ୍ୟବହାର ହୁଏ ।

70819167213. ଏକ ଜୈବ ଯୌଗିକରେ ନାଇଟ୍ରୋଜେନ୍‌ର ମାତ୍ରା ଆକଳନ ପାଇଁ ଜେଲ୍ ଦାହାଲ୍ ପବ୍‌ଟି ବ୍ୟବହାର ହୁଏ ।

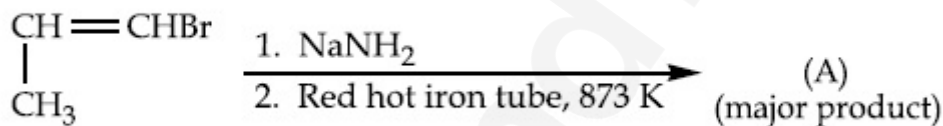
70819167214. ଜୈବ ଯୌଗିକରେ ଥିବା ଫସଫରସ୍ ଜାରିତ ହୋଇ ଉତ୍ତୁଳ ହେଉଥିବା ଫସଫରିକ୍ ଅମ୍ଳ ମ୍ୟାଗ୍ନେସିଆ ମିଶ୍ରଣ ସହ ମିଶି $Mg_2P_2O_7$ ଭାବେ ଅବକ୍ଷେପିତ ହୁଏ ।

Question Number : 42 Question Id : 70819120685 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

For the given reaction :

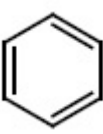


What is 'A' ?

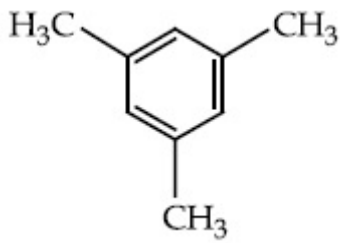
Options :

70819167215. $\begin{array}{c} \text{CH}=\text{CH}-\text{NH}_2 \\ | \\ \text{CH}_3 \end{array}$

70819167216. $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$

70819167217. 

70819167218.

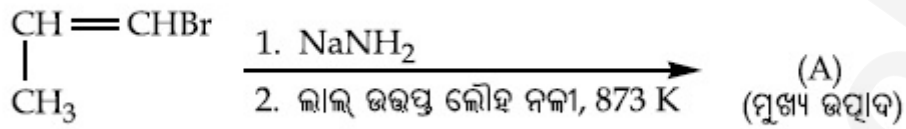


Question Number : 42 Question Id : 70819120685 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

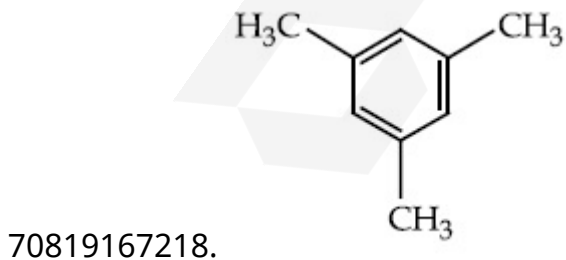
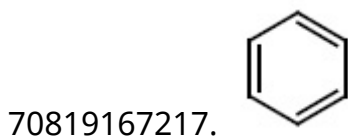
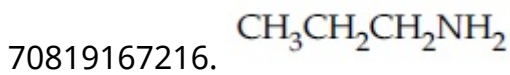
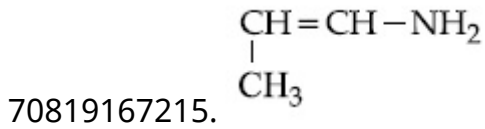
Correct Marks : 4 Wrong Marks : 1

ଦତ୍ତ ରାସାୟନିକ ପ୍ରତିକ୍ରିୟା ପାଇଁ



'A' ଚି କଣ ?

Options :

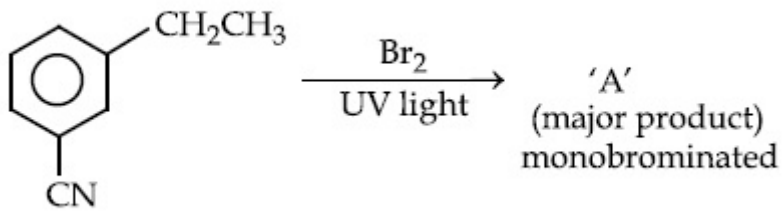


Question Number : 43 Question Id : 70819120686 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

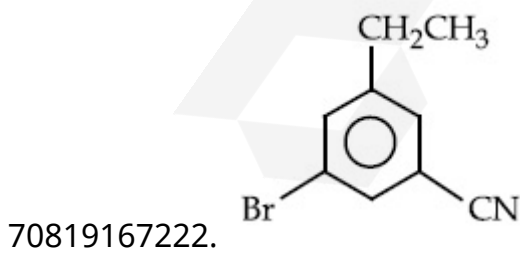
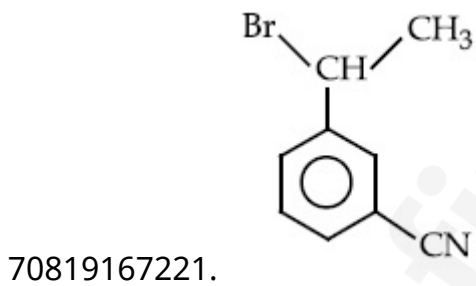
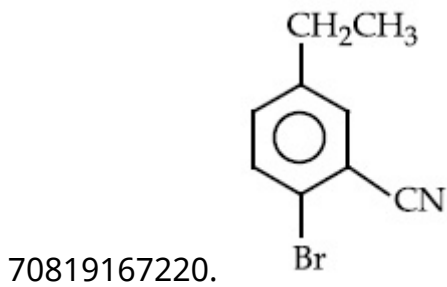
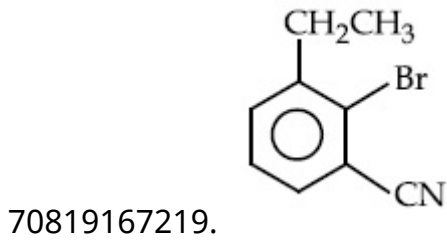
Correct Marks : 4 Wrong Marks : 1

For the given reaction :



What is 'A'?

Options :

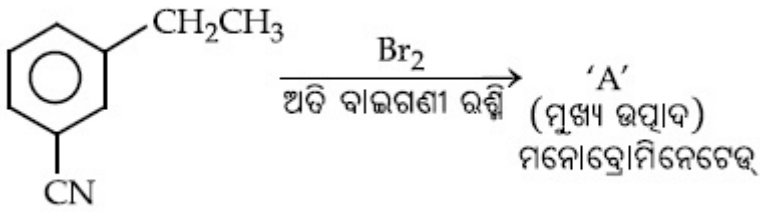


Question Number : 43 Question Id : 70819120686 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

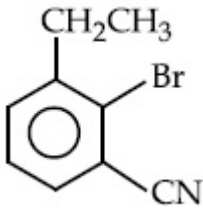
Correct Marks : 4 Wrong Marks : 1

ଦତ୍ତ ରାସାୟନିକ ପ୍ରତିକ୍ରିୟା ପାଇଁ

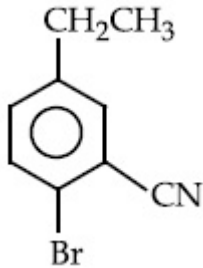


'A' ଚି କଣ ?

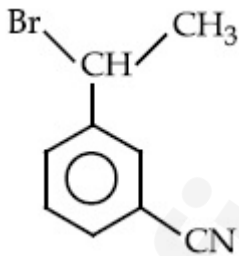
Options :



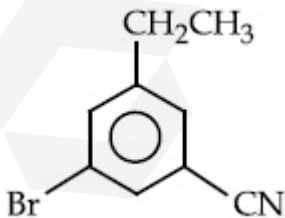
70819167219.



70819167220.



70819167221.

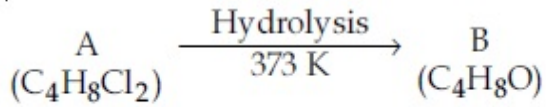


70819167222.

Question Number : 44 Question Id : 70819120687 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



B reacts with Hydroxyl amine but does not give Tollen's test. Identify A and B.

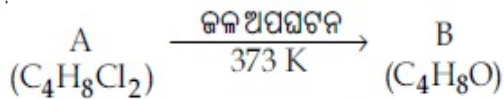
Options :

70819167223. 1,1-Dichlorobutane and Butanal
70819167224. 2,2-Dichlorobutane and Butanal
70819167225. 1,1-Dichlorobutane and 2-Butanone
70819167226. 2,2-Dichlorobutane and Butan-2-one

Question Number : 44 Question Id : 70819120687 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



B ହାଇଡ୍ରୋକ୍ସିଲ ଆମିନ୍ ସହ ପ୍ରତିକ୍ରିୟା କରେ କିନ୍ତୁ ଟଲେନସ୍ ପରୀକ୍ଷା ଦିଏ ନାହିଁ । A ଏବଂ B କୁ ଚିହ୍ନଟ କର :

Options :

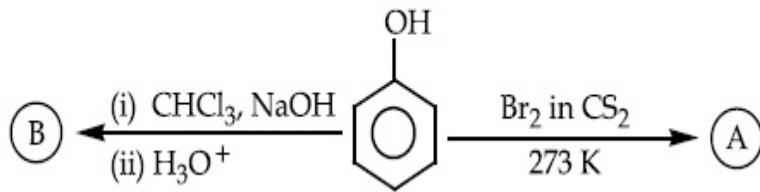
70819167223. 1,1-ଡାଇକ୍ଲୋରୋବ୍ୟୁଟେନ୍ ଓ ବ୍ୟୁଟାନାଲ୍
70819167224. 2,2-ଡାଇକ୍ଲୋରୋବ୍ୟୁଟେନ୍ ଓ ବ୍ୟୁଟାନାଲ୍
70819167225. 1,1-ଡାଇକ୍ଲୋରୋବ୍ୟୁଟେନ୍ ଓ 2-ବ୍ୟୁଟାନୋନ୍
70819167226. 2,2-ଡାଇକ୍ଲୋରୋବ୍ୟୁଟେନ୍ ଓ ବ୍ୟୁଟାନ-2-ଓନ୍

Question Number : 45 Question Id : 70819120688 Question Type : MCQ Option Shuffling : Yes

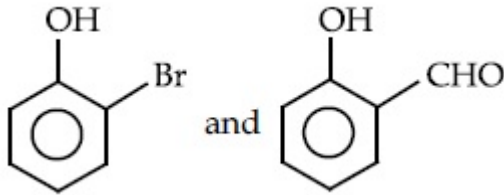
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

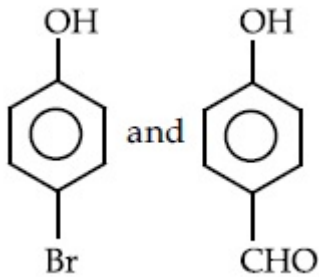
Identify the major products A and B respectively in the following reactions of phenol :



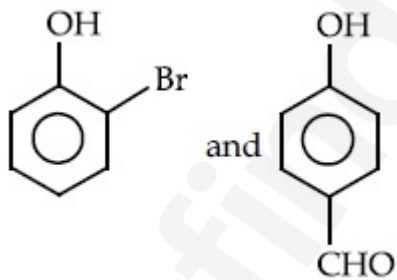
Options :



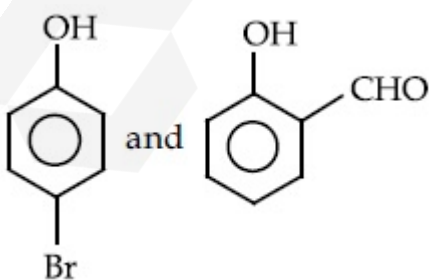
70819167227.



70819167228.



70819167229.

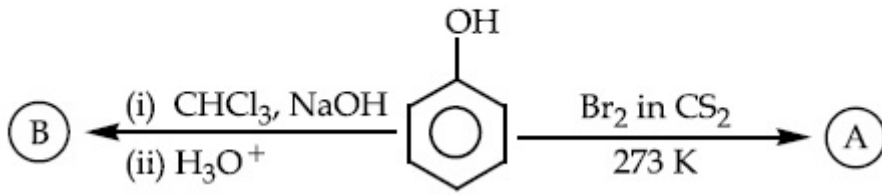


70819167230.

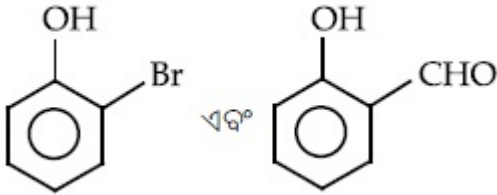
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

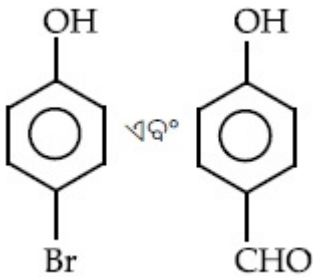
ଫେନଲର ନିମ୍ନଲିଖିତ ପ୍ରତିକ୍ରିୟାର ମୁଖ୍ୟ ଉତ୍ପାଦ A ଓ B କୁ ଚିହ୍ନାଅ :



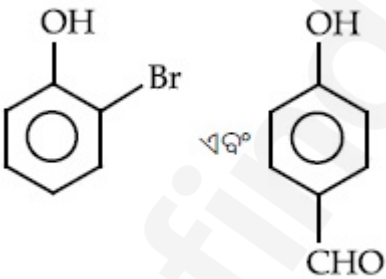
Options :



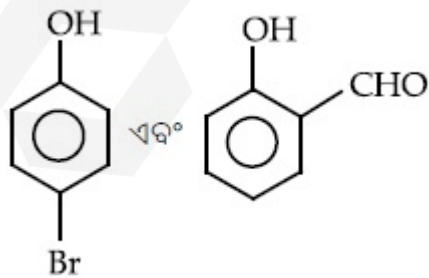
70819167227.



70819167228.



70819167229.



70819167230.

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : *o*-Nitrophenol is steam volatile due to intramolecular hydrogen bonding.

Statement II : *o*-Nitrophenol has high melting due to hydrogen bonding.

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

Options :

70819167231. Both Statement I and Statement II are true

70819167232. Both Statement I and Statement II are false

70819167233. Statement I is true but Statement II is false

70819167234. Statement I is false but Statement II is true

Question Number : 46 Question Id : 70819120689 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନରେ ଦୁଇଟି ବିବୃତି ଦିଆଯାଇଛି :

ବିବୃତି I : ଇଥ୍ରେ ମଲିକୁଲାର ହାଇଡ୍ରୋଜେନ୍ ବନ୍ଧ ଯୋଗୁଁ *o*-ନାଇଟ୍ରୋଫେନଲ୍ ବାଷ୍ପ ଉଦ୍‌ବାୟୀ

ବିବୃତି II : ହାଇଡ୍ରୋଜେନ୍ ବନ୍ଧ ଯୋଗୁଁ *o*-ନାଇଟ୍ରୋଫେନଲ୍‌ର ଉଚ୍ଚ ଗଳନାଙ୍କ ଅଛି ।

ଉପରୋକ୍ତ ବିବୃତି ଅନୁସାରେ ନିମ୍ନ ପ୍ରଦତ୍ତ ବିକଳ୍ପ ମଧ୍ୟରୁ ସର୍ବାଧିକ ଉପଯୁକ୍ତ ଉତ୍ତରଟିକୁ ବାଛି :

Options :

70819167231. ଉଭୟ ବିବୃତି I ଓ II ଠିକ୍

70819167232. ଉଭୟ ବିବୃତି I ଓ II ଭୁଲ୍

70819167233. ବିବୃତି I ଠିକ୍ କିନ୍ତୁ ବିବୃତି II ଭୁଲ୍

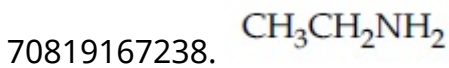
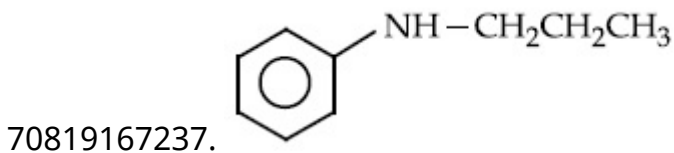
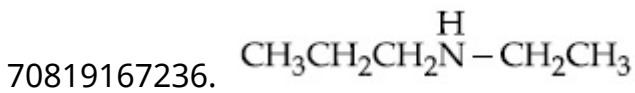
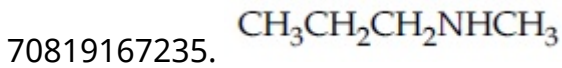
70819167234. ବିବୃତି I ଭୁଲ୍ କିନ୍ତୁ ବିବୃତି II ଠିକ୍

Question Number : 47 Question Id : 70819120690 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An amine on reaction with benzenesulphonyl chloride produces a compound insoluble in alkaline solution. This amine can be prepared by ammonolysis of ethyl chloride. The correct structure of amine is :

Options :

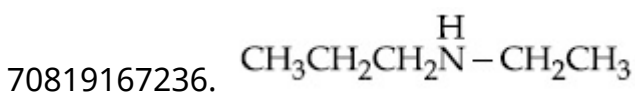
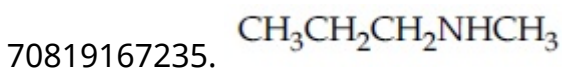


Question Number : 47 Question Id : 70819120690 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

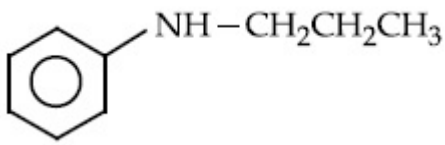
Correct Marks : 4 Wrong Marks : 1

ଏକ ଆମିନ୍, ବେଝିନ୍ ସଲ୍‌ଫୋନିଲ୍ କ୍ଲୋରାଇଡ୍ ସହ ପ୍ରତିକ୍ରିୟା ଘଟାଇ କ୍ଷାରୀୟ ଦ୍ରବଣରେ ଅଦ୍ରବଣୀୟ ଏକ ଯୌଗିକ ସୃଷ୍ଟି କରେ । ଏହି ଆମିନ୍‌କୁ ଇଥାଇଲ୍ କ୍ଲୋରାଇଡ୍‌ର ଆମିନୋଲିସିସ୍ ଦ୍ୱାରା ତିଆରି କରାଯାଇ ପାରିବ । ଏହି ଆମିନ୍‌ର ସଠିକ୍ ସଂରଚନାଟି ହେଉଛି :

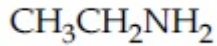
Options :



70819167237.



70819167238.



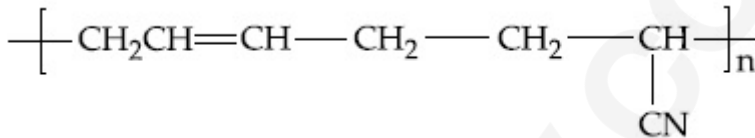
Question Number : 48 Question Id : 70819120691 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

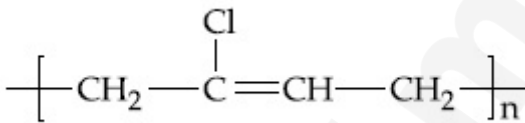
The structure of Neoprene is :

Options :

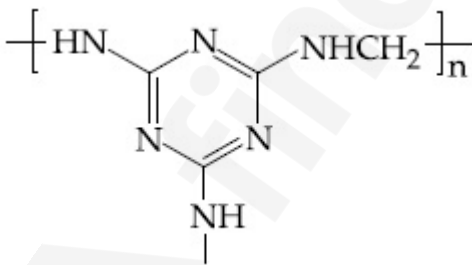
70819167239.



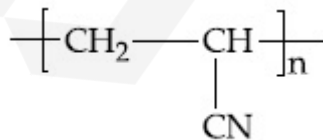
70819167240.



70819167241.



70819167242.

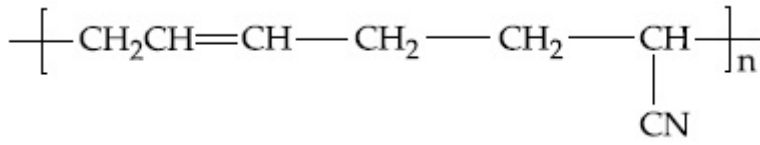


Question Number : 48 Question Id : 70819120691 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

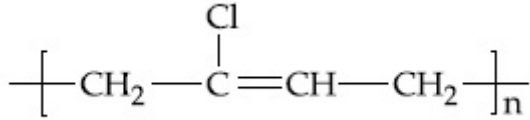
Correct Marks : 4 Wrong Marks : 1

ନିଖୁପ୍ରିନ୍ର ସଂରଚନାଟି ହେଉଛି :

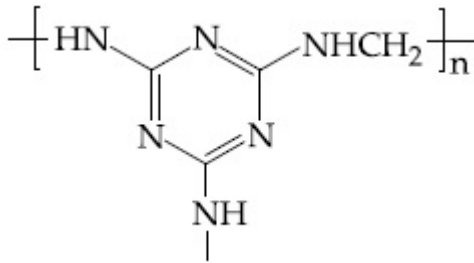
Options :



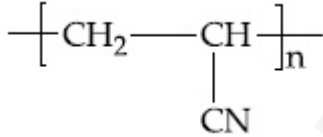
70819167239.



70819167240.



70819167241.



70819167242.

Question Number : 49 Question Id : 70819120692 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following vitamin is helpful in delaying the blood clotting ?

Options :

70819167243. Vitamin B

70819167244. Vitamin C

70819167245. Vitamin E

Question Number : 49 Question Id : 70819120692 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନଲିଖିତ କେଉଁ ଭିଟାମିନ୍‌ଟି ରକ୍ତକୁ ବିଳମ୍ବରେ ଜମାଟ ବାନ୍ଧିବାରେ ସାହାଯ୍ୟ କରିଥାଏ ?

Options :

70819167243. ଭିଟାମିନ୍ B

70819167244. ଭିଟାମିନ୍ C

70819167245. ଭିଟାମିନ୍ E

70819167246. ଭିଟାମିନ୍ K

Question Number : 50 Question Id : 70819120693 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

On treating a compound with warm dil. H_2SO_4 , gas X is evolved which turns $K_2Cr_2O_7$ paper acidified with dil. H_2SO_4 to a green compound Y. X and Y respectively are :

Options :

70819167247. $X=SO_3, Y=Cr_2(SO_4)_3$

70819167248. $X=SO_2, Y=Cr_2O_3$

70819167249. $X=SO_3, Y=Cr_2O_3$

70819167250. $X=SO_2, Y=Cr_2(SO_4)_3$

Question Number : 50 Question Id : 70819120693 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଉତ୍ତମ ଲଘୁ ସଲ୍‌ଫୁରିକ୍ ଅମ୍ଳ ସହ ଏକ ଯୌଗିକ ପଦାର୍ଥକୁ ପ୍ରତିକ୍ରିୟା କରାଇଲେ X ଗ୍ୟାସ୍ ନିର୍ଗତ ହୁଏ ଯାହା ଲଘୁ ସଲ୍‌ଫୁରିକ୍ ଅମ୍ଳ ଦ୍ୱାରା ଅମ୍ଳୀକରଣ ହୋଇଥିବା ପଦାର୍ଥ ଅମ୍ଳ ଭାଇକ୍ରୋମେଟ୍ କାଗଜକୁ ସବୁଜ ରଙ୍ଗର ଯୌଗିକ Y କୁ ରୂପାନ୍ତରିତ ହୋଇଥାଏ । X ଓ Y ଯଥାକ୍ରମେ ହେଉଛନ୍ତି :

Options :

70819167247. $X = SO_3, Y = Cr_2(SO_4)_3$

70819167248. $X = SO_2, Y = Cr_2O_3$

70819167249. $X = SO_3, Y = Cr_2O_3$

70819167250. $X = SO_2, Y = Cr_2(SO_4)_3$

Chemistry Section B

Section Id :	708191919
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 :	7081911199

Question Shuffling Allowed :

Yes

Question Number : 51 Question Id : 70819120694 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The number of significant figures in 50000.020×10^{-3} is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 51 Question Id : 70819120694 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

50000.020×10^{-3} ରେ ନିହିତ ସାର୍ଥକ ମୂଲ୍ୟମାନଙ୍କର ସଂଖ୍ୟା _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 52 Question Id : 70819120695 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A certain gas obeys $P(V_m - b) = RT$. The value of $\left(\frac{\partial Z}{\partial P}\right)_T$ is $\frac{xb}{RT}$. The value of x is _____.

(Integer answer) (Z : compressibility factor)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 52 Question Id : 70819120695 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଏକ ନିର୍ଦ୍ଦିଷ୍ଟ ଗ୍ୟାସ୍ $P(V_m - b) = RT$ କୁ ମାନେ । $\left(\frac{\partial Z}{\partial P}\right)_T$ ର ମୂଲ୍ୟ $\frac{xb}{RT}$ । x ର ମୂଲ୍ୟ _____ ।

(ପୂର୍ଣ୍ଣସଂଖ୍ୟା ଉତ୍ତର) (Z : ସଂଚାପିତତା ଗୁଣକ)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 53 Question Id : 70819120696 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

For a chemical reaction $A + B \rightleftharpoons C + D$

($\Delta_r H^\ominus = 80 \text{ kJ mol}^{-1}$) the entropy change $\Delta_r S^\ominus$ depends on the temperature T(in K) as $\Delta_r S^\ominus = 2T \text{ (J K}^{-1}\text{mol}^{-1}\text{)}$.

Minimum temperature at which it will become spontaneous is _____ K. (Integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 53 Question Id : 70819120696 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$A + B \rightleftharpoons C + D$ ରାସାୟନିକ ପ୍ରତିକ୍ରିୟା ପାଇଁ ($\Delta_r H^\ominus = 80 \text{ kJ mol}^{-1}$) ଏନ୍‌ଡ୍ରୋପି ପରିବର୍ତ୍ତନ $\Delta_r S^\ominus$ ତାପମାତ୍ରା T (କେଲଭିନ୍‌ରେ) ଉପରେ ନିର୍ଭର କରେ ଯେହେତୁ $\Delta_r S^\ominus = 2T$. ($\text{J K}^{-1}\text{mol}^{-1}$) ସର୍ବନିମ୍ନ ତାପମାତ୍ରା ଯେଉଁଠି ଏହା ସ୍ୱତଃ ହେବ, ହେଉଛି _____ K । (ପୂର୍ଣ୍ଣ ସଂଖ୍ୟା)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 54 Question Id : 70819120697 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

224 mL of $\text{SO}_2(\text{g})$ at 298 K and 1 atm is passed through 100 mL of 0.1 M NaOH solution. The non-volatile solute produced is dissolved in 36 g of water. The lowering of vapour pressure of solution (assuming the solution is dilute) ($P_{(\text{H}_2\text{O})}^\ominus = 24 \text{ mm of Hg}$) is $x \times 10^{-2} \text{ mm of Hg}$, the value of x is _____. (Integer answer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 54 Question Id : 70819120697 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

298 K ଓ 1 atm ରେ 224 mL ସଲଫର ଡାଇ ଅକ୍ସାଇଡ୍ ଗ୍ୟାସ୍ 100 mL ର 0.1 M NaOH ଦ୍ରବଣରେ ପ୍ରବାହିତ କରାଯାଇଛି । ଗଠିତ ଅନୁନୟନୀ ଦ୍ରାବ୍ୟକୁ 36 g ଜଳରେ ଦ୍ରବିଭୂତ କରାଯାଇଛି । (ଦ୍ରବଣକୁ ଲଘୁ ବୋଲି ବିଚାର କରି) $(P_{(H_2O)}^\circ = 24 \text{ mm of Hg})$ ଦ୍ରବଣର କମିଯାଇଥିବା ବାଷ୍ପ ଚାପ ହେଉଛି $x \times 10^{-2} \text{ mm of Hg}$ । x ର ମୂଲ୍ୟ ହେଉଛି _____ । (ପୂର୍ଣ୍ଣ ସଂଖ୍ୟାରେ ଉତ୍ତର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 55 Question Id : 70819120698 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A homogeneous ideal gaseous reaction $AB_{2(g)} \rightleftharpoons A_{(g)} + 2B_{(g)}$ is carried out in a 25 litre flask at 27°C . The initial amount of AB_2 was 1 mole and the equilibrium pressure was 1.9 atm. The value of K_p is $x \times 10^{-2}$. The value of x is _____. (Integer answer)
[$R = 0.08206 \text{ dm}^3\text{atm K}^{-1} \text{ mol}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 55 Question Id : 70819120698 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

27°C ରେ 25 ଲିଟର ପ୍ଲାସ୍ଟିକ୍ ବ୍ୟାକ୍ସରେ ଏକ ସମାନ୍ତ ଆବର୍ଣ୍ଣ ବାଷ୍ପିୟ ପ୍ରତିକ୍ରିୟା $AB_{2(g)} \rightleftharpoons A_{(g)} + 2B_{(g)}$ କୁ କରାଗଲା । AB_2 ର ପ୍ରାରମ୍ଭିକ ପରିମାଣ ଥିଲା ଏକ ମୋଲ୍ ଏବଂ ସାମ୍ୟାବସ୍ଥା ଚାପ ଥିଲା 1.9 atm । K_p ର ମୂଲ୍ୟ ହେଉଛି $x \times 10^{-2}$ । x ର ମୂଲ୍ୟ ହେଉଛି _____ । (ପୂର୍ଣ୍ଣ ସଂଖ୍ୟା ଉତ୍ତର)

($R = 0.08206 \text{ dm}^3\text{atm K}^{-1} \text{ mol}^{-1}$)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 56 **Question Id :** 70819120699 **Question Type :** SA

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

Consider the following reaction



The quantity of electricity required in Faraday to reduce five moles of MnO_4^- is _____.
(Integer answer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 56 **Question Id :** 70819120699 **Question Type :** SA

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

ନିମ୍ନଲିଖିତ ପ୍ରତିକ୍ରିୟାଟିକୁ ବିଚାର କର :



5 mole MnO_4^- କୁ ବିଜାରଣ କରିବା ପାଇଁ ଆବଶ୍ୟକୀୟ ବିଦ୍ୟୁତ୍ ପରିମାଣ ଫାରାଡ଼ରେ ହେଉଛି _____ ।
(ପୂର୍ଣ୍ଣ ସଂଖ୍ୟା ଉତ୍ତର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 57 **Question Id :** 70819120700 **Question Type :** SA

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

An exothermic reaction $X \rightarrow Y$ has an activation energy 30 kJ mol^{-1} . If energy change ΔE during the reaction is -20 kJ , then the activation energy for the reverse reaction in kJ is _____. (Integer answer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 57 **Question Id :** 70819120700 **Question Type :** SA

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

ଏକ ତାପକ୍ଷେପୀ ପ୍ରତିକ୍ରିୟା $X \rightarrow Y$ ର ସକ୍ରିୟତା ଶକ୍ତି 30 kJ mole^{-1} । ଯଦି ପ୍ରତିକ୍ରିୟାରେ ଶକ୍ତି ପରିବର୍ତ୍ତନ $\Delta E = -20 \text{ kJ}$ ହୁଏ, ତାହେଲେ ଓଲଟା ପ୍ରତିକ୍ରିୟା ପାଇଁ ଆବଶ୍ୟକ ସକ୍ରିୟତା ଶକ୍ତି kJ ରେ ହେଉଛି _____ । (ପୂର୍ଣ୍ଣ ସଂଖ୍ୟାରେ ଉତ୍ତର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 58 **Question Id :** 70819120701 **Question Type :** SA

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

3.12 g of oxygen is adsorbed on 1.2 g of platinum metal. The volume of oxygen adsorbed per gram of the adsorbent at 1 atm and 300 K in L is _____.

[$R = 0.0821 \text{ L atm K}^{-1} \text{ mol}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 58 **Question Id :** 70819120701 **Question Type :** SA

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

1.2 ଗ୍ରାମ ପ୍ଲାଟିନମ୍ ଧାତୁରେ 3.12 ଗ୍ରାମ ଅକ୍ସିଜେନ୍ ଅଧିଶୋଷିତ ହୁଏ । 1 atm ଏବଂ 300 K ତାପମାତ୍ରାରେ ପ୍ରତି ଏକ ଗ୍ରାମ ଅଧିଶୋଷକରେ ଅଧିଶୋଷଣ ହେଉଥିବା ଅକ୍ସିଜେନ୍ର ଆୟତନ ଲିଟରରେ ହେଉଛି _____ ।

($R = 0.0821 \text{ L atm K}^{-1} \text{ mol}^{-1}$)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 59 Question Id : 70819120702 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Dichromate ion is treated with base, the oxidation number of Cr in the product formed is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 59 Question Id : 70819120702 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଡାଇକ୍ରୋମେଟ୍ ଆୟନକୁ କ୍ଷାର ସହିତ ଯୋଗ କଲେ ଗଠିତ ଉତ୍ପାଦରେ କ୍ରୋମିୟମର ଜାରଣ ସଂଖ୍ୟା ହେଉଛି _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 60 Question Id : 70819120703 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Number of bridging CO ligands in $[\text{Mn}_2(\text{CO})_{10}]$ is _____ .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 60 Question Id : 70819120703 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

[Mn₂(CO)₁₀] ରେ ସେତୁ ହୋଇଥିବା CO ଲିଗାଣ୍ଡସ୍‌ର ସଂଖ୍ୟା ହେଉଛି _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Mathematics Section A

Section Id :	708191920
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 :	7081911200

Question Number : 61 Question Id : 70819120704 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If \vec{a} and \vec{b} are perpendicular, then $\vec{a} \times (\vec{a} \times (\vec{a} \times (\vec{a} \times \vec{b})))$ is equal to :

Options :

70819167261. $\vec{0}$

70819167262. $\frac{1}{2} |\vec{a}|^4 \vec{b}$

70819167263. $|\vec{a}|^4 \vec{b}$

70819167264. $\vec{a} \times \vec{b}$

Question Number : 61 Question Id : 70819120704 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି \vec{a} ଓ \vec{b} ଲମ୍ବ ଅଟନ୍ତି, ତେବେ $\vec{a} \times (\vec{a} \times (\vec{a} \times (\vec{a} \times \vec{b})))$ ସମାନ :

Options :

70819167261. $\vec{0}$

70819167262. $\frac{1}{2} |\vec{a}|^4 \vec{b}$

70819167263. $|\vec{a}|^4 \vec{b}$

70819167264. $\vec{a} \times \vec{b}$

Question Number : 62 Question Id : 70819120705 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If $(1, 5, 35)$, $(7, 5, 5)$, $(1, \lambda, 7)$ and $(2\lambda, 1, 2)$ are coplanar, then the sum of all possible values of λ is:

Options :

70819167265. $\frac{39}{5}$

70819167266. $-\frac{39}{5}$

70819167267. $-\frac{44}{5}$

70819167268. $\frac{44}{5}$

Question Number : 62 Question Id : 70819120705 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି ବିନ୍ଦୁ $(1, 5, 35)$, $(7, 5, 5)$, $(1, \lambda, 7)$ ଓ $(2\lambda, 1, 2)$ ଗୁଡ଼ିକ ସମତଳୀୟ (ଏକ ସମତଳ ଉପରେ ଅବସ୍ଥିତ), ତେବେ λ ର ସମସ୍ତ ସମ୍ଭବ ମୂଲ୍ୟମାନଙ୍କର ସମଷ୍ଟି ଅଟେ :

Options :

70819167265. $\frac{39}{5}$

70819167266.

$$-\frac{39}{5}$$

70819167267. $-\frac{44}{5}$

70819167268. $\frac{44}{5}$

Question Number : 63 Question Id : 70819120706 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The intersection of three lines $x - y = 0$, $x + 2y = 3$ and $2x + y = 6$ is a :

Options :

70819167269. Right angled triangle

70819167270. Isosceles triangle

70819167271. Equilateral triangle

70819167272. None of the above

Question Number : 63 Question Id : 70819120706 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ତିନିଗୋଟି ରେଖା $x - y = 0$, $x + 2y = 3$ ଏବଂ $2x + y = 6$ ମାନକର ପ୍ରତିଛେଦ ଅଟେ ଏକ :

Options :

70819167269. ସମକୋଣୀ ତ୍ରିଭୁଜ

70819167270. ସମସ୍ତ ବାହୁ ତ୍ରିଭୁଜ

70819167271. ସମବାହୁ ତ୍ରିଭୁଜ

70819167272. ଉପରୋକ୍ତମାନଙ୍କ ମଧ୍ୟରୁ କେଉଁଟି ନୁହେଁ

Question Number : 64 Question Id : 70819120707 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The value of $\begin{vmatrix} (a+1)(a+2) & a+2 & 1 \\ (a+2)(a+3) & a+3 & 1 \\ (a+3)(a+4) & a+4 & 1 \end{vmatrix}$ is :

Options :

70819167273. $(a+1)(a+2)(a+3)$

70819167274. $(a+2)(a+3)(a+4)$

70819167275. -2

70819167276. 0

Question Number : 64 Question Id : 70819120707 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\begin{vmatrix} (a+1)(a+2) & a+2 & 1 \\ (a+2)(a+3) & a+3 & 1 \\ (a+3)(a+4) & a+4 & 1 \end{vmatrix}$ ର ମୂଲ୍ୟ ଅଟେ :

Options :

70819167273. $(a+1)(a+2)(a+3)$

70819167274. $(a + 2)(a + 3)(a + 4)$

70819167275. -2

70819167276. 0

Question Number : 65 Question Id : 70819120708 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The rate of growth of bacteria in a culture is proportional to the number of bacteria present and the bacteria count is 1000 at initial time $t=0$. The number of bacteria is increased by

20% in 2 hours. If the population of bacteria is 2000 after $\frac{k}{\log_e\left(\frac{6}{5}\right)}$ hours, then $\left(\frac{k}{\log_e 2}\right)^2$ is

equal to :

Options :

70819167277. 2

70819167278. 4

70819167279. 8

70819167280. 16

Question Number : 65 Question Id : 70819120708 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଏକ ବିଶ୍ଳେଷଣରେ ବାଜାରୀମାନଙ୍କର ବୃଦ୍ଧିର ହାର, ଉପସ୍ଥିତ ଥିବା ବାଜାରୀ ସଂଖ୍ୟା ସହ ସମାନୁପାତୀ ଓ ପ୍ରତି ସମାନ ବେଳେ ବାଜାରୀ ସଂଖ୍ୟା 1000 ଥିବେ । ଦୁଇ ଘଣ୍ଟାରେ ବାଜାରୀ ସଂଖ୍ୟାର 20% (ଶତକଡ଼ା 20) ବୃଦ୍ଧି ଘଟେ । ଯଦି

$\frac{k}{\log_e\left(\frac{6}{5}\right)}$ ଘଣ୍ଟାରେ ବାଜାରୀ ସଂଖ୍ୟା 2000 ହୁଏ, ତେବେ $\left(\frac{k}{\log_e 2}\right)^2$ ସମାନ :

Options :

70819167277. 2

70819167278. 4

70819167279. 8

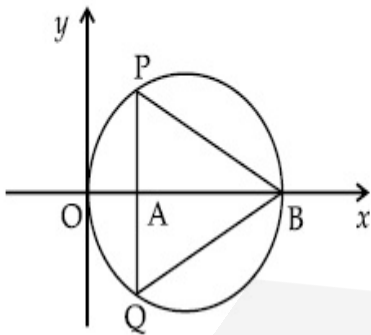
70819167280. 16

Question Number : 66 Question Id : 70819120709 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In the circle given below, let $OA = 1$ unit, $OB = 13$ unit and $PQ \perp OB$. Then, the area of the triangle PQB (in square units) is :



Options :

70819167281. $24\sqrt{2}$

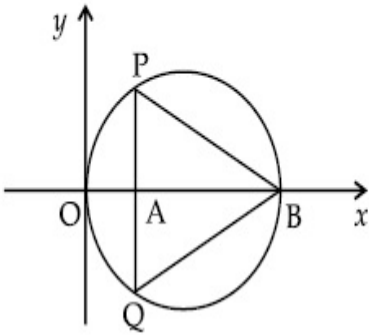
70819167282. $24\sqrt{3}$

70819167283. $26\sqrt{2}$

Question Number : 66 Question Id : 70819120709 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନରେ ଦିଆ ବୃତ୍ତରେ, ମନେକର $OA = 1$ ଏକକ, $OB = 13$ ଏକକ, ଏବଂ $PQ \perp OB$ ପ୍ରତି ଲମ୍ବ । ତେବେ ତ୍ରିଭୁଜ PQB ର କ୍ଷେତ୍ରଫଳ (ବର୍ଗଏକକ) ଅଟେ :



Options :

70819167281. $24\sqrt{2}$

70819167282. $24\sqrt{3}$

70819167283. $26\sqrt{2}$

70819167284. $26\sqrt{3}$

Question Number : 67 Question Id : 70819120710 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The value of $\lim_{h \rightarrow 0} 2 \left\{ \frac{\sqrt{3} \sin\left(\frac{\pi}{6} + h\right) - \cos\left(\frac{\pi}{6} + h\right)}{\sqrt{3}h(\sqrt{3}\cos h - \sin h)} \right\}$ is :

Options :

70819167285.

$\frac{2}{3}$

70819167286. $\frac{4}{3}$

70819167287. $\frac{2}{\sqrt{3}}$

70819167288. $\frac{3}{4}$

Question Number : 67 Question Id : 70819120710 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\lim_{h \rightarrow 0} 2 \left\{ \frac{\sqrt{3} \sin\left(\frac{\pi}{6} + h\right) - \cos\left(\frac{\pi}{6} + h\right)}{\sqrt{3}h(\sqrt{3}\cos h - \sin h)} \right\}$ ର ମୂଲ୍ୟ ଅଟେ :

Options :

70819167285. $\frac{2}{3}$

70819167286. $\frac{4}{3}$

70819167287. $\frac{2}{\sqrt{3}}$

70819167288. $\frac{3}{4}$

Question Number : 68 Question Id : 70819120711 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The maximum slope of the curve $y = \frac{1}{2}x^4 - 5x^3 + 18x^2 - 19x$ occurs at the point :

Options :

70819167289. (0, 0)

70819167290. (2, 2)

70819167291. $\left(3, \frac{21}{2}\right)$

70819167292. (2, 9)

Question Number : 68 Question Id : 70819120711 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ବକ୍ରରେଖା $y = \frac{1}{2}x^4 - 5x^3 + 18x^2 - 19x$ ର ସର୍ବାଧିକ ସ୍ଲୋପ୍ ମିଳୁଥିବା ବିନ୍ଦୁଟି :

Options :

70819167289. (0, 0)

70819167290. (2, 2)

70819167291. $\left(3, \frac{21}{2}\right)$

70819167292. (2, 9)

Question Number : 69 Question Id : 70819120712 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The value of $\int_{-\pi/2}^{\pi/2} \frac{\cos^2 x}{1 + 3^x} dx$ is :

Options :

70819167293. $\frac{\pi}{2}$

70819167294. 2π

70819167295. $\frac{\pi}{4}$

70819167296. 4π

Question Number : 69 Question Id : 70819120712 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\int_{-\pi/2}^{\pi/2} \frac{\cos^2 x}{1 + 3^x} dx$ ର ମୂଲ୍ୟ ଅଟେ :

Options :

70819167293. $\frac{\pi}{2}$

70819167294. 2π

70819167295. $\frac{\pi}{4}$

70819167296. 4π

Question Number : 70 Question Id : 70819120713 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The number of seven digit integers with sum of the digits equal to 10 and formed by using the digits 1, 2 and 3 only is :

Options :

70819167297. 42

70819167298. 35

70819167299. 77

70819167300. 82

Question Number : 70 Question Id : 70819120713 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

କେବଳ 1, 2 ଓ 3 ଅଙ୍କ ଗୁଡ଼ିକୁ ବ୍ୟବହାର କରି ସାତ ଅଙ୍କ ବିଶିଷ୍ଟ ପୂର୍ଣ୍ଣସଂଖ୍ୟା ତିଆରି କରାଯିବ ଯେଉଁଠି ଅଙ୍କମାନଙ୍କର ସମଷ୍ଟି 10 ହେଉଥିବ, ତେବେ ସେମାନଙ୍କର ସଂଖ୍ୟା ଅଟେ :

Options :

70819167297. 42

70819167298. 35

70819167299. 77

70819167300. 82

Question Number : 71 Question Id : 70819120714 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The maximum value of the term independent of 't' in the expansion of $\left(tx^{\frac{1}{5}} + \frac{(1-x)^{\frac{1}{10}}}{t} \right)^{10}$

where $x \in (0, 1)$ is :

Options :

70819167301. $\frac{10!}{\sqrt{3}(5!)^2}$

70819167302. $\frac{2 \cdot 10!}{3\sqrt{3}(5!)^2}$

70819167303. $\frac{2 \cdot 10!}{3(5!)^2}$

70819167304. $\frac{10!}{3(5!)^2}$

Question Number : 71 Question Id : 70819120714 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\left(tx^{\frac{1}{5}} + \frac{(1-x)^{\frac{1}{10}}}{t} \right)^{10}$ ବିସଫଳ ପ୍ରସାରଣରେ 't' ଯଦି ମୁକ୍ତ ଥିବା ଯଦି (ଯେପରିକି $x \in (0, 1)$) ସର୍ବାଧିକ ମୂଲ୍ୟ

ଅଟେ :

Options :

70819167301. $\frac{10!}{\sqrt{3}(5!)^2}$

70819167302. $\frac{2 \cdot 10!}{3\sqrt{3}(5!)^2}$

70819167303.

$$\frac{2 \cdot 10!}{3(5!)^2}$$

70819167304. $\frac{10!}{3(5!)^2}$

Question Number : 72 Question Id : 70819120715 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $R = \{(P, Q) \mid P \text{ and } Q \text{ are at the same distance from the origin}\}$ be a relation, then the equivalence class of $(1, -1)$ is the set :

Options :

70819167305. $S = \{(x, y) \mid x^2 + y^2 = 4\}$

70819167306. $S = \{(x, y) \mid x^2 + y^2 = 2\}$

70819167307. $S = \{(x, y) \mid x^2 + y^2 = 1\}$

70819167308. $S = \{(x, y) \mid x^2 + y^2 = \sqrt{2}\}$

Question Number : 72 Question Id : 70819120715 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର $R = \{(P, Q) \mid P \text{ ଓ } Q \text{ ମୂଳବିନ୍ଦୁଠାରୁ ସମାନ ଦୂରରେ ଅବସ୍ଥିତ}\}$ ଏକ ସମ୍ପର୍କ (ସମ୍ପର୍କ), ତେବେ $(1, -1)$ ର ସମତୁଲ୍ୟ ଶ୍ରେଣୀର ସେଟ୍ଟି ଅଟେ :

Options :

70819167305. $S = \{(x, y) \mid x^2 + y^2 = 4\}$

70819167306. $S = \{(x, y) \mid x^2 + y^2 = 2\}$

70819167307. $S = \{(x, y) \mid x^2 + y^2 = 1\}$

70819167308. $S = \{(x, y) \mid x^2 + y^2 = \sqrt{2}\}$

**Question Number : 73 Question Id : 70819120716 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No**

Correct Marks : 4 Wrong Marks : 1

Let A be a symmetric matrix of order 2 with integer entries. If the sum of the diagonal elements of A^2 is 1, then the possible number of such matrices is :

Options :

70819167309. 1

70819167310. 4

70819167311. 6

70819167312. 12

**Question Number : 73 Question Id : 70819120716 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No**

Correct Marks : 4 Wrong Marks : 1

ମନେକର A ପୂର୍ଣ୍ଣସଂଖ୍ୟାମାନଙ୍କର 2×2 ବିଶିଷ୍ଟ ଏକ ସମମିତ ମାଟ୍ରିକ୍ସ ଅଟେ । ଯଦି A^2 ର କର୍ଣ୍ଣ (ଡାଇଗୋନାଲ) ରେ ଥିବା ଉପାଦାନମାନଙ୍କର ସମଷ୍ଟି 1 ଅଟେ, ତେବେ ଏପରି ମାଟ୍ରିକ୍ସ ଗୁଡ଼ିକର ସମ୍ଭବ ସଂଖ୍ୟା ଅଟେ :

Options :

70819167309. 1

70819167310. 4

70819167311. 6

70819167312. 12

Question Number : 74 Question Id : 70819120717 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let f be any function defined on \mathbf{R} and let it satisfy the condition :

$$|f(x) - f(y)| \leq |x - y|^2, \forall (x, y) \in \mathbf{R}$$

If $f(0) = 1$, then :

Options :

70819167313. $f(x) > 0, \forall x \in \mathbf{R}$

70819167314. $f(x) < 0, \forall x \in \mathbf{R}$

70819167315. $f(x) = 0, \forall x \in \mathbf{R}$

70819167316. $f(x)$ can take any value in \mathbf{R}

Question Number : 74 Question Id : 70819120717 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର ବାସ୍ତବ ସଂଖ୍ୟା ସେଟ୍ \mathbf{R} ଉପରେ f ଏକ ଫଳନ ଏବଂ ଏହା $|f(x) - f(y)| \leq |x - y|^2, \forall (x, y) \in \mathbf{R}$ ସର୍ତ୍ତକୁ

ମାନେ । ଯଦି $f(0) = 1$, ତେବେ :

Options :

70819167313. $f(x) > 0, \forall x \in \mathbf{R}$

70819167314. $f(x) < 0, \forall x \in \mathbf{R}$

70819167315. $f(x) = 0, \forall x \in \mathbb{R}$

70819167316. $f(x)$ ର ମୂଲ୍ୟ ଯେକୌଣସି ବାସ୍ତବ ସଂଖ୍ୟା

Question Number : 75 Question Id : 70819120718 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A fair coin is tossed a fixed number of times. If the probability of getting 7 heads is equal to probability of getting 9 heads, then the probability of getting 2 heads is :

Options :

70819167317. $\frac{15}{2^8}$

70819167318. $\frac{15}{2^{12}}$

70819167319. $\frac{15}{2^{13}}$

70819167320. $\frac{15}{2^{14}}$

Question Number : 75 Question Id : 70819120718 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଏକ ନିରପେକ୍ଷ ମୁଦ୍ରାକୁ ନିର୍ଦ୍ଦିଷ୍ଟ ଥର ପାଇଁ ଫୋପଡ଼ା ଗଲା । ଯଦି 7 ଟି H (ମୁଣ୍ଡ) ପାଇବାର ସମ୍ଭାବ୍ୟତା 9 ଟି H (ମୁଣ୍ଡ) ପାଇବା ସହ ସମାନ, ତେବେ 2 ଟି H (ମୁଣ୍ଡ) ପାଇବାର ସମ୍ଭାବ୍ୟତା ଅଟେ :

Options :

70819167317. $\frac{15}{2^8}$

70819167318. $\frac{15}{2^{12}}$

70819167319. $\frac{15}{2^{13}}$

70819167320. $\frac{15}{2^{14}}$

Question Number : 76 Question Id : 70819120719 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If $\frac{\sin^{-1} x}{a} = \frac{\cos^{-1} x}{b} = \frac{\tan^{-1} y}{c}$; $0 < x < 1$, then the value of $\cos\left(\frac{\pi c}{a + b}\right)$ is :

Options :

70819167321. $1 - y^2$

70819167322. $\frac{1 - y^2}{y\sqrt{y}}$

70819167323. $\frac{1 - y^2}{1 + y^2}$

70819167324. $\frac{1 - y^2}{2y}$

Question Number : 76 Question Id : 70819120719 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଉଦାହରଣ $\frac{\sin^{-1} x}{a} = \frac{\cos^{-1} x}{b} = \frac{\tan^{-1} y}{c}$, $0 < x < 1$, ଯେଉଁଠି $\cos\left(\frac{\pi c}{a+b}\right)$ ର ମୂଲ୍ୟ ଅଟେ :

Options :

70819167321. $1 - y^2$

70819167322. $\frac{1 - y^2}{y\sqrt{y}}$

70819167323. $\frac{1 - y^2}{1 + y^2}$

70819167324. $\frac{1 - y^2}{2y}$

Question Number : 77 Question Id : 70819120720 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In an increasing geometric series, the sum of the second and the sixth term is $\frac{25}{2}$ and the product of the third and fifth term is 25. Then, the sum of 4th, 6th and 8th terms is equal to :

Options :

70819167325. 26

70819167326. 30

70819167327. 32

70819167328. 35

Question Number : 77 Question Id : 70819120720 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଏକ ବର୍ଦ୍ଧିଷ୍ଣୁ ଗୁଣୋତ୍ତର ଶ୍ରେଣୀରେ ଦ୍ୱିତୀୟ ଓ ଷଷ୍ଠ ପଦର ସମଷ୍ଟି $\frac{25}{2}$ ଏବଂ ତୃତୀୟ ଓ ପଞ୍ଚମ ପଦର ଗୁଣଫଳ 25 ଅଟେ ।

ତେବେ ଚତୁର୍ଥ, ଷଷ୍ଠ ଓ ଅଷ୍ଟମ ପଦର ସମଷ୍ଟି ସମାନ :

Options :

70819167325. 26

70819167326. 30

70819167327. 32

70819167328. 35

Question Number : 78 Question Id : 70819120721 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The sum of the infinite series $1 + \frac{2}{3} + \frac{7}{3^2} + \frac{12}{3^3} + \frac{17}{3^4} + \frac{22}{3^5} + \dots$ is equal to :

Options :

70819167329. $\frac{9}{4}$

70819167330. $\frac{11}{4}$

70819167331. $\frac{13}{4}$

70819167332. $\frac{15}{4}$

Question Number : 78 Question Id : 70819120721 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$1 + \frac{2}{3} + \frac{7}{3^2} + \frac{12}{3^3} + \frac{17}{3^4} + \frac{22}{3^5} + \dots$ ଅସୀମ ଶ୍ରେଣୀର ନିଶାଣ ଫଳ ସମାନ :

Options :

70819167329. $\frac{9}{4}$

70819167330. $\frac{11}{4}$

70819167331. $\frac{13}{4}$

70819167332. $\frac{15}{4}$

Question Number : 79 Question Id : 70819120722 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Consider the three planes

$P_1 : 3x + 15y + 21z = 9,$

$P_2 : x - 3y - z = 5,$ and

$P_3 : 2x + 10y + 14z = 5$

Then, which one of the following is true ?

Options :

70819167333. P_1 and P_2 are parallel.

70819167334. P_1 and P_3 are parallel.

70819167335. P_1, P_2 and P_3 all are parallel.

70819167336. P_2 and P_3 are parallel.

Question Number : 79 Question Id : 70819120722 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ସମତଳ $P_1 : 3x + 15y + 21z = 9,$

$P_2 : x - 3y - z = 5, \text{ ଓ}$

$P_3 : 2x + 10y + 14z = 5$ ତିନିଗୋଟିକୁ ବିଚାର କର ।

ତେବେ, ନିମ୍ନରୁ କେଉଁ ଗୋଟିଏ ସତ ଅଟେ ?

Options :

70819167333. P_1 ଏବଂ P_2 ସମାନ୍ତର

70819167334. P_1 ଏବଂ P_3 ସମାନ୍ତର

70819167335. P_1, P_2 ଏବଂ P_3 ସମସ୍ତେ ସମାନ୍ତର

70819167336. P_2 ଏବଂ P_3 ସମାନ୍ତର

Question Number : 80 Question Id : 70819120723 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The value of $\sum_{n=1}^{100} \int_{n-1}^n e^{x-[x]} dx$, where $[x]$ is the greatest integer $\leq x$, is :

Options :

70819167337. $100(1 - e)$

70819167338. $100(1 + e)$

70819167339. $100e$

70819167340. $100(e - 1)$

Question Number : 80 Question Id : 70819120723 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\sum_{n=1}^{100} \int_{n-1}^n e^{x-[x]} dx$, (ଯେଉଁଠି $[x]$ ର ଅର୍ଥ x ର ମୂଲ୍ୟ ଏକ ସର୍ବାଧିକ ପୂର୍ଣ୍ଣସଂଖ୍ୟା $\leq x$,) ର ମୂଲ୍ୟ ଅଟେ :

Options :

70819167337. $100(1 - e)$

70819167338. $100(1 + e)$

70819167339. $100e$

70819167340. $100(e - 1)$

Mathematics Section B

Section Id :	708191921
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 :

708191120

Question Shuffling Allowed :

Yes

Question Number : 81 Question Id : 70819120724 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The difference between degree and order of a differential equation that represents the family of curves given by $y^2 = a\left(x + \frac{\sqrt{a}}{2}\right)$, $a > 0$ is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 81 Question Id : 70819120724 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$y^2 = a\left(x + \frac{\sqrt{a}}{2}\right)$ $a > 0$ ଅବକଳ ସମୀକରଣଟି ବକ୍ରରେଖା ମାନଙ୍କର ଏକ ଶ୍ରେଣୀକୁ ସୂଚିତ କରେ । ଏହାର ଅର୍ଦ୍ଧର ଓ ଘାତ(ଡିଗ୍ରୀ) ମଧ୍ୟରେ ପାର୍ଥକ୍ୟ ଅଟେ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 82 Question Id : 70819120725 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The sum of 162^{th} power of the roots of the equation $x^3 - 2x^2 + 2x - 1 = 0$ is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 82 Question Id : 70819120725 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ସମୀକରଣ $x^3 - 2x^2 + 2x - 1 = 0$ ର ବୀଜ (ମୂଳ) ଗୁଡ଼ିକର 162 ଡମ ଘାତର ସମଷ୍ଟି ଅଟେ _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 83 Question Id : 70819120726 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The area bounded by the lines $y = ||x - 1| - 2|$ is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 83 Question Id : 70819120726 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ରେଖା $y = ||x - 1| - 2|$ ଗୁଡ଼ିକ ଦ୍ଵାରା ଆବଦ୍ଧ କ୍ଷେତ୍ରର କ୍ଷେତ୍ରଫଳ ଅଟେ _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 84 Question Id : 70819120727 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If $y = y(x)$ is the solution of the equation $e^{\sin y} \cos y \frac{dy}{dx} + e^{\sin y} \cos x = \cos x$, $y(0) = 0$; then

$1 + y\left(\frac{\pi}{6}\right) + \frac{\sqrt{3}}{2}y\left(\frac{\pi}{3}\right) + \frac{1}{\sqrt{2}}y\left(\frac{\pi}{4}\right)$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 84 Question Id : 70819120727 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଯଦି $y=y(x)$, ସମୀକରଣ $e^{\sin y} \cos y \frac{dy}{dx} + e^{\sin y} \cos x = \cos x$, $y(0)=0$ ର ଏକ ସମାଧାନ ହୁଏ, ତେବେ

$$1 + y\left(\frac{\pi}{6}\right) + \frac{\sqrt{3}}{2}y\left(\frac{\pi}{3}\right) + \frac{1}{\sqrt{2}}y\left(\frac{\pi}{4}\right) \text{ ସମାନ } \underline{\hspace{2cm}}$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 85 **Question Id :** 70819120728 **Question Type :** SA

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

The number of solutions of the equation $\log_4(x-1) = \log_2(x-3)$ is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 85 **Question Id :** 70819120728 **Question Type :** SA

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

$\log_4(x-1) = \log_2(x-3)$ ସମୀକରଣର ସମାଧାନ ସଂଖ୍ୟା ଅଟେ _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 86 Question Id : 70819120729 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The number of integral values of 'k' for which the equation $3\sin x + 4\cos x = k + 1$ has a solution, $k \in \mathbb{R}$ is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 86 Question Id : 70819120729 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$k \in \mathbb{R}$, 'k' ର ପୂର୍ଣ୍ଣସଂଖ୍ୟା ମୂଲ୍ୟ ସଂଖ୍ୟା, ଯେପରିକି ସମୀକରଣ $3\sin x + 4\cos x = k + 1$ ର ଏକ ସମାଧାନ ରହିବ, ଅଟେ _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 87 Question Id : 70819120730 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $(\lambda, 2, 1)$ be a point on the plane which passes through the point $(4, -2, 2)$. The plane is perpendicular to the line joining the points $(-2, -21, 29)$ and $(-1, -16, 23)$, then

$$\left(\frac{\lambda}{11}\right)^2 - \frac{4\lambda}{11} - 4 \text{ is equal to } \underline{\hspace{2cm}}.$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 87 **Question Id :** 70819120730 **Question Type :** SA

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

ମନେକର $(\lambda, 2, 1)$ ବିନ୍ଦୁଟି ଏକ ସମତଳ ଉପରେ ଅବସ୍ଥିତ । ଏବଂ ଏହି ସମତଳଟି ବିନ୍ଦୁ $(4, -2, 2)$ ମଧ୍ୟ ଦେଇ ଗତି କରେ । ଯଦି ସମତଳଟି $(-2, -21, 29)$ ଓ $(-1, -16, 23)$ ବିନ୍ଦୁ ଦ୍ୱୟକୁ ଯୋଗ କରୁଥିବା ରେଖାକୁ ଲମ୍ବ ହୁଏ, ତେବେ

$$\left(\frac{\lambda}{11}\right)^2 - \frac{4\lambda}{11} - 4 \text{ ସମାନ } \underline{\hspace{2cm}}।$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 88 **Question Id :** 70819120731 **Question Type :** SA

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

The value of the integral $\int_0^{\pi} |\sin 2x| dx$ is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 88 Question Id : 70819120731 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$$\int_0^{\pi} |\sin 2x| dx \text{ ସମାକଳନଟିର ମୂଲ୍ୟ ଅଟେ } \underline{\hspace{2cm}}$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 89 Question Id : 70819120732 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If $\sqrt{3}(\cos^2 x) = (\sqrt{3} - 1)\cos x + 1$, the number of solutions of the given equation when

$$x \in \left[0, \frac{\pi}{2}\right] \text{ is } \underline{\hspace{2cm}}.$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 89 Question Id : 70819120732 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଯଦି $\sqrt{3}(\cos^2 x) = (\sqrt{3} - 1)\cos x + 1$, ଯେତେବେଳେ $x \in \left[0, \frac{\pi}{2}\right]$ ତେବେ ଦିଆଯାଇଥିବା ସମୀକରଣର ସମାଧାନ ସଂଖ୍ୟା

ଅଟେ _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 90 Question Id : 70819120733 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $m, n \in \mathbb{N}$ and $\gcd(2, n) = 1$. If $30\binom{30}{0} + 29\binom{30}{1} + \dots + 2\binom{30}{28} + 1\binom{30}{29} = n \cdot 2^m$, then

$n + m$ is equal to _____.

(Here $\binom{n}{k} = {}^nC_k$)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 90 Question Id : 70819120733 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ମନେକର $m, n \in \mathbb{N}$ ଏବଂ $(2, n)$ ର ସାଧାରଣ ଗଠିତ ଭାଜକ $=1$ । ଯଦି

$$30\binom{30}{0} + 29\binom{30}{1} + \dots + 2\binom{30}{28} + 1\binom{30}{29} = n \cdot 2^m, \text{ ତେବେ } n+m \text{ ସମୀକ୍ଷା } \underline{\hspace{2cm}}$$

$$\left(\text{ଏଠାରେ } \binom{n}{k} = {}^n C_k \right)$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

