

National Testing Agency

Question Paper Name : B TECH EO 16th March 2021 Shift 2
Subject Name : B TECH EO
Creation Date : 2021-03-16 21:03:24
Duration : 180
Number of Questions : 90
Total Marks : 300
Display Marks: Yes

B TECH EO

Group Number : 1
Group Id : 86435120
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 : 864351115
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 : 864351115
Question Shuffling Allowed : Yes

Question Number : 1 Question Id : 8643511711 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Two identical antennas mounted on identical towers are separated from each other by a distance of 45 km. What should nearly be the minimum height of receiving antenna to receive the signals in line of sight ?

(Assume radius of earth is 6400 km)

Options :

8643515131. 79.1 m

8643515132. 39.55 m

8643515133. 158.2 m

8643515134. 19.77 m

Question Number : 1 Question Id : 8643511711 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ପରସ୍ପର ଠାରୁ 45 km ଦୂରତାରେ ଥିବା ଦୁଇଟି ଏକାପ୍ରକାରର ଗମ୍ଭୂଜ ଉପରେ ଦୁଇଟି ଏକାଭଳି ଆଣ୍ଟେନା ବସାଯାଇଛି । ଦୃଶ୍ୟମାନ ରେଖା (ଲାଇନ୍ ଅଫ୍ ସାଇଟ୍) ରେ ସଂକେତଗୁଡ଼ିକ ଗ୍ରହଣ କରିବା ପାଇଁ ଆଣ୍ଟେନାର ସର୍ବନିମ୍ନ ଉଚ୍ଚତା ପଞ୍ଜାପାଖି କେତେ ହେବା ଉଚିତ ?

(ଧର ପୃଥିବୀର ବ୍ୟାସାର୍ଦ୍ଧ 6400 km)

Options :

8643515131. 79.1 m

8643515132. 39.55 m

8643515133. 158.2 m

8643515134. 19.77 m

Question Number : 2 Question Id : 8643511712 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The de-Broglie wavelength associated with an electron and a proton were calculated by accelerating them through same potential of 100 V. What should nearly be the ratio of their wavelengths ? ($m_p = 1.00727u$ $m_e = 0.00055u$)

Options :

8643515135. 43 : 1

8643515136. 1860 : 1

8643515137. 41.4 : 1

8643515138. $(1860)^2 : 1$

Question Number : 2 Question Id : 8643511712 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଗୋଟିଏ ଇଲେକ୍ଟ୍ରନ୍ ଏବଂ ଗୋଟିଏ ପ୍ରୋଟନ୍‌କୁ 100 V ର ସମାନ ବିଭବ ପାର୍ଥକ୍ୟରେ ତ୍ୱରିତ କରାଯାଇ ସଂପୃକ୍ତ ଡିଭ୍ରେଗଲି ତରଙ୍ଗ ଦୈର୍ଘ୍ୟ କଳନା କରାଗଲା । ସେମାନଙ୍କର ତରଙ୍ଗ ଦୈର୍ଘ୍ୟର ଅନୁପାତ ପାଖାପାଖି କେତେ ହେବ ?

$(m_p = 1.00727u \ m_e = 0.00055u)$

Options :

8643515135. 43 : 1

8643515136. 1860 : 1

8643515137. 41.4 : 1

8643515138. $(1860)^2 : 1$

Question Number : 3 Question Id : 8643511713 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The refractive index of a converging lens is 1.4. What will be the focal length of this lens if it is placed in a medium of same refractive index ? Assume the radii of curvature of the faces of lens are R_1 and R_2 respectively.

Options :

8643515139. Zero

8643515140. 1

8643515141. Infinite

$$\frac{R_1 R_2}{R_1 - R_2}$$

8643515142.

Question Number : 3 Question Id : 8643511713 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଗୋଟିଏ ଏକ ବିନ୍ଦୁ ଅଭିମୁଖୀ(ଅଭିସାରକ) ଯବକାଚର ପ୍ରତିସରଣାଙ୍କ 1.4 ଅଟେ । ଯଦି ଏହି ଯବକାଚଟିକୁ ସମାନ ପ୍ରତିସରଣାଙ୍କ ଥିବା ଏକ ମାଧ୍ୟମରେ ରଖାଯାଏ ଏହାର ଫୋକସ୍ ଦୈର୍ଘ୍ୟ କେତେ ହେବ ? ଧରିନିଅ ଯବକାଚଟିର ବକ୍ରପୃଷ୍ଠର ବ୍ୟାସାର୍ଦ୍ଧ ଯଥାକ୍ରମେ R_1 ଓ R_2 ।

Options :

8643515139. ଶୂନ୍ୟ

8643515140. 1

8643515141. ଅନନ୍ତ ଦୂରତା

$$\frac{R_1 R_2}{R_1 - R_2}$$

8643515142.

Question Number : 4 Question Id : 8643511714 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Red light differs from blue light as they have :

Options :

8643515143. Same frequencies and same wavelengths

8643515144. Different frequencies and different wavelengths

8643515145. Same frequencies and different wavelengths

8643515146. Different frequencies and same wavelengths

Question Number : 4 Question Id : 8643511714 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଲୀଳ ଆଲୋକ ନୀଳ ଆଲୋକ ଠାରୁ ଭିନ୍ନ ହୋଇଥାଏ ଯେହେତୁ ସେମାନଙ୍କର ଅଛି :

Options :

8643515143. ସମାନ ଆବୃତ୍ତି ଏବଂ ସମାନ ତରଙ୍ଗ ଦୈର୍ଘ୍ୟ

8643515144. ଭିନ୍ନ ଆବୃତ୍ତି ଏବଂ ଭିନ୍ନ ତରଙ୍ଗ ଦୈର୍ଘ୍ୟ

8643515145. ସମାନ ଆବୃତ୍ତି ଏବଂ ଭିନ୍ନ ତରଙ୍ଗ ଦୈର୍ଘ୍ୟ

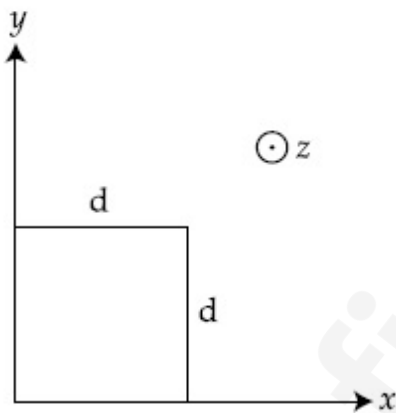
8643515146. ଭିନ୍ନ ଆବୃତ୍ତି ଏବଂ ସମାନ ତରଙ୍ଗ ଦୈର୍ଘ୍ୟ

Question Number : 5 Question Id : 8643511715 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The magnetic field in a region is given by $\vec{B} = B_0 \left(\frac{x}{a}\right) \hat{k}$. A square loop of side d is placed with its edges along the x and y axes. The loop is moved with a constant velocity $\vec{v} = v_0 \hat{i}$.

The emf induced in the loop is :



Options :

8643515147. $\frac{B_0 v_0 d}{2a}$

8643515148. $\frac{B_0 v_0 d^2}{a}$

8643515149. $\frac{B_0 v_0^2 d}{2a}$

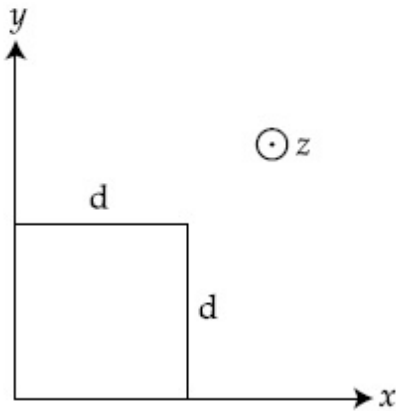
$$\frac{B_0 v_0 d^2}{2a}$$

8643515150.

Question Number : 5 Question Id : 8643511715 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଏକ ଅକ୍ଷଳରେ ତୁମ୍ଭକାନ୍ୟ କ୍ଷେତ୍ରକୁ $\vec{B} = B_0 \left(\frac{x}{a}\right) \hat{k}$ ରୂପେ ଦିଆଯାଇଛି । ପାର୍ଶ୍ୱ d ଥିବା ଏକ ବର୍ଗାକାର ଲୁପକୁ x ଅକ୍ଷ ଓ y -ଅକ୍ଷ ଦିଗରେ ରଖାଗଲା । ଲୁପଟିକୁ ଏକ ସ୍ଥିର ପରିବେଶ $\vec{v} = v_0 \hat{i}$ ରେ ଗତିଶୀଳ କରାଗଲା । ଲୁପଟିରେ ପ୍ରେରିତ ବିଦ୍ୟୁତ୍ ବାହକ ବଳ ହେଉଛି :



Options :

$$\frac{B_0 v_0 d}{2a}$$

8643515147.

$$\frac{B_0 v_0 d^2}{a}$$

8643515148.

$$\frac{B_0 v_0^2 d}{2a}$$

8643515149.

$$\frac{B_0 v_0 d^2}{2a}$$

8643515150.

Question Number : 6 Question Id : 8643511716 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Amplitude of a mass-spring system, which is executing simple harmonic motion decreases with time. If mass = 500g, Decay constant = 20 g/s then how much time is required for the amplitude of the system to drop to half of its initial value ?

($\ln 2 = 0.693$)

Options :

8643515151. 34.65 s

8643515152. 15.01 s

8643515153. 0.034 s

8643515154. 17.32 s

Question Number : 6 Question Id : 8643511716 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ସରଳ ହାରମୋନିକ ଗତି ସମ୍ପାଦନ କରୁଥିବା ଏକ ଭର-ସ୍ପ୍ରିଙ୍ଗ୍ ବ୍ୟବସ୍ଥାଟି ଆୟାମ(ଆମ୍ପ୍ଲିଚ୍ୟୁଡ୍) ସମୟ ସହ କମିକମି ଯାଉଛି । ଏହି ବ୍ୟବସ୍ଥାଟିର ଆୟାମ ପାଇଁ ଏହାର ମୂଳ ମୂଲ୍ୟର ଅଧାକୁ ଖସିବା ପାଇଁ କେତେ ସମୟ ଦରକାର ?

(ଧର ବସ୍ତୁର = 500 g, କ୍ଷୟ ଧ୍ରୁବାଙ୍କ = 20 g/s $\ln 2 = 0.693$)

Options :

8643515151. 34.65 s

8643515152. 15.01 s

8643515153. 0.034 s

8643515154. 17.32 s

Question Number : 7 Question Id : 8643511717 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Calculate the value of mean free path (λ) for oxygen molecules at temperature 27°C and pressure 1.01×10^5 Pa. Assume the molecular diameter 0.3 nm and the gas is ideal. ($k = 1.38 \times 10^{-23}$ JK $^{-1}$)

Options :

8643515155. 32 nm

8643515156. 58 nm

8643515157. 86 nm

8643515158. 102 nm

Question Number : 7 Question Id : 8643511717 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

27°C ତାପମାତ୍ରା ଓ 1.01×10^5 Pa ତାପରେ ଥିବା ଅମ୍ଳଜାନ ଅଣୁଗୁଡ଼ିକର ମାଧ୍ୟମୁକ୍ତ ପଥ (ମିନି ଟ୍ରି ପାଥ) କଳନା କର ।
ଧରିନିଅ ଯେ ଆଣବିକ ବ୍ୟାସ 0.3 nm ଅଟେ ଏବଂ ଗ୍ୟାସଟି ଏକ ଆଦର୍ଶ ଗ୍ୟାସ । ($k = 1.38 \times 10^{-23}$ JK⁻¹)

Options :

8643515155. 32 nm

8643515156. 58 nm

8643515157. 86 nm

8643515158. 102 nm

Question Number : 8 Question Id : 8643511718 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

What will be the nature of flow of water from a circular tap, when its flow rate increased from 0.18 L/min to 0.48 L/min ? The radius of the tap and viscosity of water are 0.5 cm and 10^{-3} Pa s, respectively.

(Density of water : 10^3 kg/m³)

Options :

8643515159. Steady flow to unsteady flow

8643515160. Unsteady to steady flow

8643515161. Remains steady flow

8643515162. Remains turbulent flow

Question Number : 8 Question Id : 8643511718 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯେତେବେଳେ ଗୋଟିଏ ବୃତ୍ତାକାର ଟ୍ୟାପରୁ ଜଳପ୍ରବାହ ହାର 0.18 L/ମିନିଟ୍ ରୁ 0.48 L/ମିନିଟ୍ କୁ ବୃଦ୍ଧି ପାଇଥାଏ, ଜଳ ପ୍ରବାହର ପ୍ରକୃତି କ'ଣ ହେବ ? ବୃତ୍ତାକାର ଟ୍ୟାପର ବ୍ୟାସାର୍ଦ୍ଧ ଏବଂ ଜଳର ବହଳତା (ଭିସ୍କୋସିଟି) ଯଥାକ୍ରମେ 0.5 cm ଏବଂ 10^{-3} Pa s ଅଟେ । (ଜଳର ସାନ୍ଦ୍ରତା 10^3 kg/m^3)

Options :

8643515159. ସ୍ଥିର ପ୍ରବାହରୁ ଅସ୍ଥିର ପ୍ରବାହ

8643515160. ଅସ୍ଥିର ପ୍ରବାହରୁ ସ୍ଥିର ପ୍ରବାହ

8643515161. ସ୍ଥିର ପ୍ରବାହରେ ରହିଥାଏ

8643515162. ଅଶାନ୍ତ(ଟର୍ବୁଲେଣ୍ଟ) ପ୍ରବାହରେ ଥାଏ

Question Number : 9 Question Id : 8643511719 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A charge Q is moving \vec{dl} distance in the magnetic field \vec{B} . Find the value of work done by \vec{B} .

Options :

8643515163. 1

8643515164. Zero

8643515165. Infinite

8643515166. -1

Question Number : 9 Question Id : 8643511719 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଚୁମ୍ବକୀୟ କ୍ଷେତ୍ର \vec{B} ରେ ଗୋଟିଏ ଚାର୍ଜ Q \vec{dl} ଦୂରତା ଅତିକ୍ରମ କରେ । \vec{B} ଦ୍ୱାରା ସଂପାଦିତ କାର୍ଯ୍ୟର ପରିମାଣ ବାହାର କର ।

Options :

8643515163. 1

8643515164. ଶୂନ୍ୟ

8643515165. ଅସୀମ

8643515166. -1

Question Number : 10 Question Id : 8643511720 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Calculate the time interval between 33% decay and 67% decay if half-life of a substance is 20 minutes.

Options :

8643515167. 20 minutes

8643515168. 40 minutes

8643515169. 60 minutes

8643515170. 13 minutes

Question Number : 10 Question Id : 8643511720 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି ଗୋଟିଏ ପଦାର୍ଥର ଅର୍ଦ୍ଧ-ଆୟୁ 20 ମିନିଟ୍ ଅଟେ, ତେବେ ପଦାର୍ଥର 33% କ୍ଷୟ ଏବଂ 67% କ୍ଷୟ ମଧ୍ୟରେ ସମୟ ଅନ୍ତରାଳ ଗଣନା କର ।

Options :

8643515167. 20 ମିନିଟ୍

8643515168. 40 ମିନିଟ୍

8643515169. 60 ମିନିଟ୍

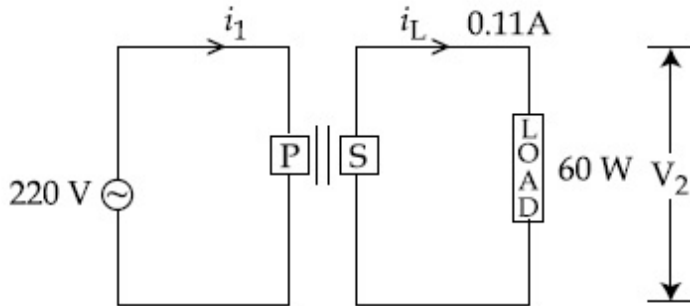
8643515170. 13 ମିନିଟ୍

Question Number : 11 Question Id : 8643511721 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

For the given circuit, comment on the type of transformer used.



Options :

8643515171. Step - up transformer

8643515172. Step down transformer

8643515173. Auto transformer

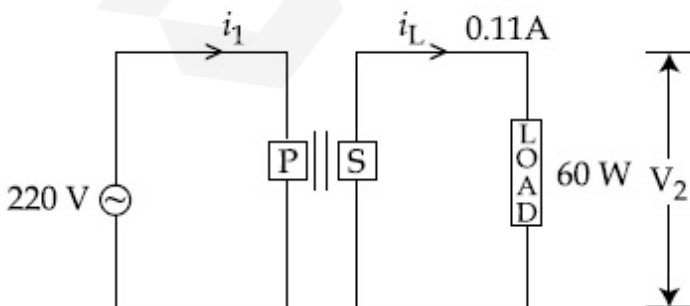
8643515174. Auxilliary transformer

Question Number : 11 Question Id : 8643511721 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଦତ୍ତ ବୈଦ୍ୟୁତିକ ପରିପଥ ପାଇଁ, ବ୍ୟବହୃତ ହୋଇଥିବା ଟ୍ରାନ୍ସଫରମର ଉପରେ ଚିହ୍ନଟା ଦିଅ :



Options :

8643515171. ସେୟ- ଅଘ ଗ୍ରାନ୍ତସଫରମର

8643515172. ସେୟ- ଡାଉର ଗ୍ରାନ୍ତସଫରମର

8643515173. ଅଗେ ଗ୍ରାନ୍ତସଫରମର

8643515174. ଅଡିରିକ(ଅକ୍ସିଲିଆରୀ) ଗ୍ରାନ୍ତସଫରମର

Question Number : 12 Question Id : 8643511722 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The half-life of Au^{198} is 2.7 days. The activity of 1.50 mg of Au^{198} if its atomic weight is 198 g mol^{-1} is, ($N_A = 6 \times 10^{23} / \text{mol}$).

Options :

8643515175. 240 Ci

8643515176. 357 Ci

8643515177. 252 Ci

8643515178. 535 Ci

Question Number : 12 Question Id : 8643511722 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Au^{198} ର ଅର୍ଦ୍ଧଆୟୁ 2.7 ଦିନ ଅଟେ । ଯଦି Au^{198} ର ପରମାଣବିକ ଓଜନ 198 g mol^{-1} ହୁଏ, ତେବେ 1.50 mg Au^{198} ର ଅନୁଜ୍ଞାପନ ହେବ _____ । ($N_A = 6 \times 10^{23} / \text{mol}$)

Options :

8643515175. 240 Ci

8643515176. 357 Ci

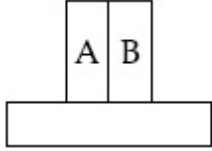
8643515177. 252 Ci

8643515178. 535 Ci

Question Number : 13 Question Id : 8643511723 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A bimetallic strip consists of metals A and B. It is mounted rigidly as shown. The metal A has higher coefficient of expansion compared to that of metal B. When the bimetallic strip is placed in a cold bath, it will :



Options :

8643515179. Bend towards the right

8643515180. Bend towards the left

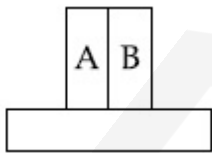
8643515181. Not bend but shrink

8643515182. Neither bend nor shrink

Question Number : 13 Question Id : 8643511723 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A ଏବଂ B ଦୁଇଟି ଧାତୁରେ ଏକ ଦ୍ଵିଧାତୁ ପାତ ତିଆରି ହୋଇଛି । ଏହାକୁ ଚିତ୍ରରେ ଦର୍ଶାଯାଇଥିବା ଅନୁସାରେ ଦୃଢ଼ ଭାବରେ ଖଞ୍ଜା ଯାଇଛି । B ଧାତୁ ତୁଳନାରେ A ଧାତୁଟିର ଅଧିକ ପ୍ରସାରଣ ଧୂବାଙ୍କ ରହିଛି । ଯେତେବେଳେ ଦ୍ଵିଧାତୁ ପାତକୁ ଏକ ଶୀତଳ ଆଧାର(କୋଇଲ୍ ବାଥ) ମଧ୍ୟରେ ରଖାଯାଏ, ଏହା :



Options :

8643515179. ଡାହାଣକୁ ବଙ୍କେଇ ହୋଇଯିବ

8643515180. ବାମକୁ ବଙ୍କେଇ ହୋଇଯିବ

8643515181. ବଙ୍କା ନ ହୋଇ ସଂକୁଚିତ ହୋଇଯିବ

8643515182. ନା ବକ୍ସା ହେବ ନା ସଂକ୍ଷୁଚିତ ହେବ

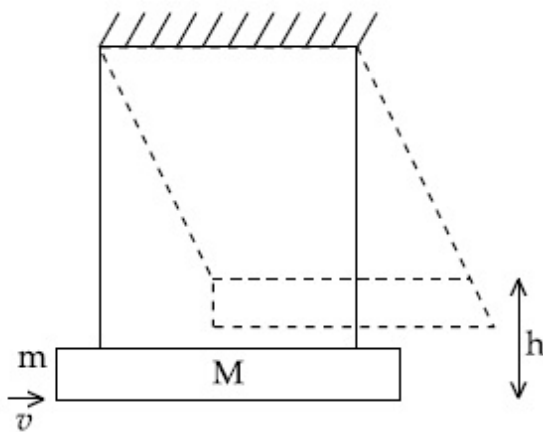
Question Number : 14 Question Id : 8643511724 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A large block of wood of mass $M = 5.99 \text{ kg}$ is hanging from two long massless cords. A bullet of mass $m = 10 \text{ g}$ is fired into the block and gets embedded in it. The (block + bullet) then swing upwards, their centre of mass rising a vertical distance $h = 9.8 \text{ cm}$ before the (block + bullet) pendulum comes momentarily to rest at the end of its arc. The speed of the bullet just before collision is :

(take $g = 9.8 \text{ ms}^{-2}$)



Options :

8643515183. 811.4 m/s

8643515184. 821.4 m/s

8643515185. 831.4 m/s

8643515186. 841.4 m/s

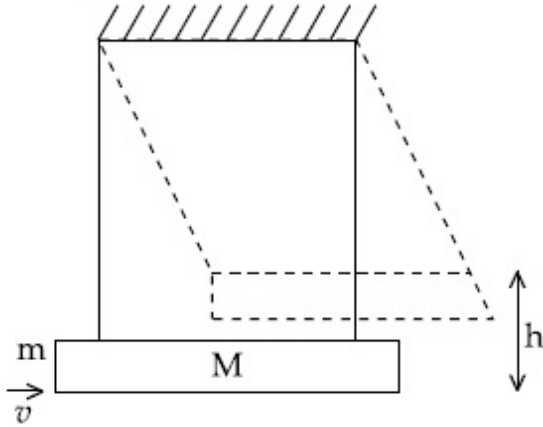
Question Number : 14 Question Id : 8643511724 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ବସ୍ତୁ $M=5.99 \text{ kg}$ ର ଏକ ବଡ଼ କାଠଖଣ୍ଡକୁ ବସ୍ତୁ ବିହୀନ ଦୁଇଟି ଦଉଡ଼ି ଦ୍ୱାରା ଝୁଲାଇ ଦିଆଯାଇଛି । ବସ୍ତୁ $m=10 \text{ g}$ ବିଶିଷ୍ଟ ଏକ ଗୁଳି(ବୁଲେଟ୍) କୁ କାଠଖଣ୍ଡ ମଧ୍ୟକୁ ଫୁଟାଇ ଦିଆଗଲା ଏବଂ ଏହା ଭିତରେ ରହିଗଲା । ଏହାପରେ (କାଠଖଣ୍ଡ + ଗୁଳି) ଉପର ଆଡ଼କୁ ଝୁଲିଲା, ଚାପର ଶେଷ ମୁଣ୍ଡରେ ଅସ୍ଥାୟୀ ଭାବେ (କାଠଖଣ୍ଡ + ଗୁଳି) ଯେଉଁଠି ଘିର ଅବସ୍ଥାକୁ ଆସିବା ପୂର୍ବରୁ ସେମାନଙ୍କର ବସ୍ତୁକେନ୍ଦ୍ରଟି ଭୂଲମ୍ବ ଉଚ୍ଚତା $h=9.8$ କୁ ଉଠିଥାଏ । ଠିକ୍ ଧକ୍କା ପୂର୍ବରୁ ଗୁଳିଟିର ବେଗ ହେଉଛି :

(ନିଅ $g=9.8 \text{ ms}^{-2}$)



Options :

8643515183. 811.4 m/s
8643515184. 821.4 m/s
8643515185. 831.4 m/s
8643515186. 841.4 m/s

Question Number : 15 Question Id : 8643511725 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Statement I : A cyclist is moving on an unbanked road with a speed of 7 kmh^{-1} and takes a sharp circular turn along a path of radius of 2m without reducing the speed. The static friction coefficient is 0.2 . The cyclist will not slip and pass the curve. ($g=9.8 \text{ m/s}^2$)

Statement II : If the road is banked at an angle of 45° , cyclist can cross the curve of 2m radius with the speed of 18.5 kmh^{-1} without slipping.

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

Options :

8643515187. Both statement I and statement II are true

8643515188. Both statement I and statement II are false

8643515189. Statement I is correct and statement II is incorrect

8643515190. Statement I is incorrect and statement II is correct

Question Number : 15 Question Id : 8643511725 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଉକ୍ତି I : ଜଣେ ସାଇକେଲ୍ ଚଳାଇ 7 kmh⁻¹ ବେଗରେ ଏକ ଜାଳବିହୀନ (ଅନ୍‌ବ୍ୟାକ୍‌ଡ୍) ରାସ୍ତାରେ ଗତି କରୁଛି ଏବଂ ଗତିର ବେଗ ନ କମାଇ ରାସ୍ତାରେ ଥିବା 2 ମିଟର ବ୍ୟାସାର୍ଦ୍ଧର ଏକ ତୀକ୍ଷ୍ଣ ବୃତ୍ତାକାର ପଥରେ ବୁଲିଗଲା । ସ୍ଥିର ଘର୍ଷଣ ଧ୍ରୁବାଙ୍କ 0.2 ଅଟେ । ସାଇକେଲ୍ ଆରୋହୀ ତଳକୁ ଖସି ପଡ଼ିବ ନାହିଁ ଏବଂ ବକ୍ରପଥ ଦେଇ ଗତି କରିବ । (g = 9.8 m/s²)

ଉକ୍ତି II : ଯଦି ରାସ୍ତାଟି 45° କୋଣରେ ଜାଲୁଆ(ବ୍ୟାକ୍‌ଡ୍) ଅଛି, ସାଇକେଲ୍ ଆରୋହୀ 2 ମି. ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ ବକ୍ରାକାର ପଥକୁ 18.5 kmh⁻¹ ବେଗରେ ନ ଖସି ପଡ଼ି ଅତିକ୍ରମ କରିପାରେ ।

ଉପରୋକ୍ତ ଉକ୍ତିଗୁଡ଼ିକ ଅନୁସାରେ, ନିମ୍ନରେ ଦତ୍ତ ବିକଳଗୁଡ଼ିକରୁ ସଠିକ୍ ଉତ୍ତରଟି ଚୟନ କର :

Options :

8643515187. ଉଭୟ ଉକ୍ତି I ଏବଂ ଉକ୍ତି II ସଠିକ୍ ଅଟନ୍ତି ।

8643515188. ଉଭୟ ଉକ୍ତି I ଏବଂ ଉକ୍ତି II ଭୁଲ୍ ଅଟନ୍ତି ।

8643515189. ଉକ୍ତି I ଠିକ୍ କିନ୍ତୁ ଉକ୍ତି II ଠିକ୍ ଭୁଲ୍ ଅଟେ ।

8643515190. ଉକ୍ତି I ଠିକ୍ ଭୁଲ୍ କିନ୍ତୁ ଉକ୍ତି II ଠିକ୍ ଅଟେ ।

Question Number : 16 Question Id : 8643511726 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A mosquito is moving with a velocity $\vec{v} = 0.5 t^2 \hat{i} + 3t \hat{j} + 9 \hat{k}$ m/s and accelerating in uniform conditions. What will be the direction of mosquito after 2 s ?

Options :

$$\tan^{-1}\left(\frac{5}{2}\right) \text{ from } x\text{-axis}$$

8643515191.

8643515192. $\tan^{-1}\left(\frac{5}{2}\right)$ from y -axis

8643515193. $\tan^{-1}\left(\frac{2}{3}\right)$ from x -axis

8643515194. $\tan^{-1}\left(\frac{2}{3}\right)$ from y -axis

Question Number : 16 Question Id : 8643511726 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଗୋଟିଏ ମଣା $\vec{v} = 0.5 t^2 \hat{i} + 3t \hat{j} + 9\hat{k}$ m/s ପରିବେଗରେ ଗତି କରୁଅଛି ଏବଂ ସମପରିସ୍ଥିତିରେ ବେଗକୁ ଦୂରୀତ କରୁଅଛି । 2 ସେକେଣ୍ଡ ପରେ ମଣାଟିର ଦିଗ କ'ଣ ହେବ ?

Options :

8643515191. x -ଅକ୍ଷରୁ $\tan^{-1}\left(\frac{5}{2}\right)$

8643515192. y -ଅକ୍ଷରୁ $\tan^{-1}\left(\frac{5}{2}\right)$

8643515193. x -ଅକ୍ଷରୁ $\tan^{-1}\left(\frac{2}{3}\right)$

8643515194. y -ଅକ୍ଷରୁ $\tan^{-1}\left(\frac{2}{3}\right)$

Question Number : 17 Question Id : 8643511727 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In order to determine the Young's Modulus of a wire of radius 0.2 cm (measured using a scale of least count=0.001 cm) and length 1m (measured using a scale of least count=1 mm), a weight of mass 1 kg (measured using a scale of least count=1 g) was hanged to get the elongation of 0.5 cm (measured using a scale of least count 0.001 cm). What will be the fractional error in the value of Young's Modulus determined by this experiment ?

Options :

8643515195. 1.4 %

8643515196. 0.9%

8643515197. 0.14%

8643515198. 9%

Question Number : 17 Question Id : 8643511727 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

1 m (କ୍ଷୁଦ୍ରତମ ମାପ 1 mm ଥିବା ସ୍କେଲ ଦ୍ୱାରା ମାପ କରାଯାଇଥିବ) ଦୈର୍ଘ୍ୟ ଓ 0.2 cm (କ୍ଷୁଦ୍ରତମ ମାପ 0.001 cm ଥିବା ସ୍କେଲ ଦ୍ୱାରା ମାପ କରାଯାଇଥିବା) ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ ଗୋଟିଏ ତାରର ଯଦ୍ ଗୁଣାଙ୍କ ନିର୍ଣ୍ଣୟ କରିବା ବେଳେ, 0.5 cm (କ୍ଷୁଦ୍ରତମ ମାପ 0.001 cm) ଥିବା ସ୍କେଲ ଦ୍ୱାରା ମାପ କରାଯାଇଥିବା) ର ପ୍ରସାରଣ ପାଇଁ 1 kg (କ୍ଷୁଦ୍ରତମ ମାପ = 1 g ଥିବା ସ୍କେଲ ଦ୍ୱାରା ମାପ କରାଯାଇଥିବା) ବସ୍ତୁ ବିଶିଷ୍ଟ ଏକ ଓଜନକୁ ଓହ୍ଲାଇ ଦିଆଗଲା । ଏହି ପରୀକ୍ଷା ଦ୍ୱାରା ନିର୍ଣ୍ଣୟ କରାଯାଉଥିବା ଯଦ୍ ଗୁଣାଙ୍କ ମୂଲ୍ୟରେ ଶତକଡ଼ା ତ୍ରୁଟି କେତେ ହେବ ?

Options :

8643515195. 1.4 %

8643515196. 0.9%

8643515197. 0.14%

8643515198. 9%

Question Number : 18 Question Id : 8643511728 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A resistor develops 500 J of thermal energy in 20 s when a current of 1.5A is passed through it. If the current is increased from 1.5 A to 3 A, what will be the energy developed in 20 s.

Options :

8643515199. 500 J

8643515200. 1000 J

8643515201. 1500 J

8643515202. 2000 J

Question Number : 18 Question Id : 8643511728 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯେତେବେଳେ ଗୋଟିଏ ବିଦ୍ୟୁତ୍ ପ୍ରତିରୋଧୀ ଦେଇ 1.5 A ର ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ପ୍ରବାହିତ ହୋଇଥାଏ, 20 ସେକେଣ୍ଡ ମଧ୍ୟରେ ଏହା ମଧ୍ୟରେ 500 J ର ତାପଶକ୍ତି ଉତ୍ପନ୍ନ ହୋଇଥାଏ । ଯଦି ବିଦ୍ୟୁତ୍ ସ୍ରୋତକୁ 1.5 A ରୁ 3 A କୁ ବୃଦ୍ଧି କରାଯାଏ, ତେବେ 20 ସେକେଣ୍ଡରେ ଏଥିରେ କେତେ ପରିମାଣର ତାପଶକ୍ତି ଉତ୍ପନ୍ନ ହେବ ?

Options :

8643515199. 500 J

8643515200. 1000 J

8643515201. 1500 J

8643515202. 2000 J

Question Number : 19 Question Id : 8643511729 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Find out the surface charge density at the intersection of point $x=3$ m plane and x -axis, in the region of uniform line charge of 8 nC/m lying along the z -axis in free space.

Options :

8643515203. 47.88 C/m

8643515204. 0.07 nC m⁻²

8643515205. 0.424 nC m⁻²

8643515206. 4.0 nC m⁻²

Question Number : 19 Question Id : 8643511729 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଶୂନ୍ୟରେ z -ଅକ୍ଷରେ ଥିବା 8 nC/m ର ଏକ ଘୂନିତୀୟ ରେଖୀୟ ଚାର୍ଜର ଅକ୍ଷଳରେ ଥିବା $x=3 \text{ m}$ ସମତଳ ଓ x -ଅକ୍ଷର ଛେଦବିନ୍ଦୁ ଠାରେ ପୃଷ୍ଠଚାର୍ଜ ଘନତା ବାହାର କର ।

Options :

8643515203. 47.88 C/m

8643515204. 0.07 nC m^{-2}

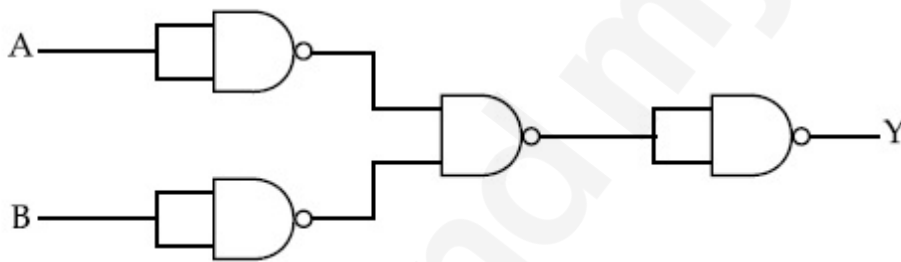
8643515205. 0.424 nC m^{-2}

8643515206. 4.0 nC m^{-2}

Question Number : 20 Question Id : 8643511730 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The following logic gate is equivalent to :



Options :

8643515207. AND Gate

8643515208. NAND Gate

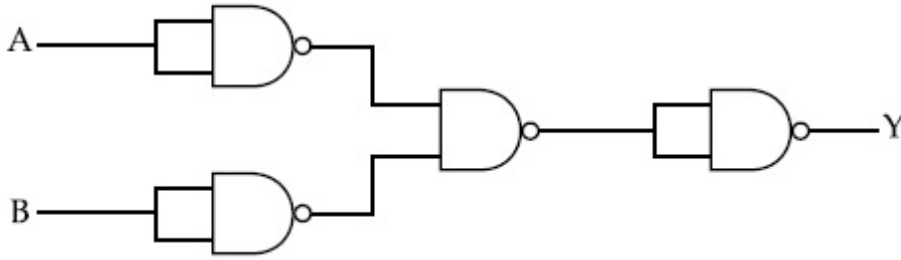
8643515209. OR Gate

8643515210. NOR Gate

Question Number : 20 Question Id : 8643511730 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନରେ ଦତ୍ତ ଲଜିକ୍ ଗେଟ୍ ସମତୁଲ୍ୟ ଅଟେ :



Options :

8643515207. AND ଗେଟ୍

8643515208. NAND ଗେଟ୍

8643515209. OR ଗେଟ୍

8643515210. NOR ଗେଟ୍

Physics Section B

Section Id :	864351116
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 :	864351116
Question Shuffling Allowed :	Yes

Question Number : 21 Question Id : 8643511731 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

If one wants to remove all the mass of the earth to infinity in order to break it up completely.

The amount of energy that needs to be supplied will be $\frac{x}{5} \frac{GM^2}{R}$ where x is _____

(Round off to the Nearest Integer)

(M is the mass of earth, R is the radius of earth, G is the gravitational constant)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 21 **Question Id :** 8643511731 **Question Type :** SA

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

ଯଦି ଜଣେ ପୃଥିବୀକୁ ସମ୍ପୂର୍ଣ୍ଣ ଭାବେ ଭାଙ୍ଗି ଏହାର ସବୁ ବସ୍ତୁକୁ ଅସୀମ ଦୂରତାକୁ ଅପସାରଣ କରିବା ପାଇଁ ଚାହେଁ, ତେବେ

ଏଥିପାଇଁ ଆବଶ୍ୟକ ପଡୁଥିବା ଶକ୍ତିର ପରିମାଣ ହେବ $\frac{x}{5} \frac{GM^2}{R}$ ଯେଉଁଠାରେ x ଅଟେ _____ ଏବଂ y ଅଟେ

_____। (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପ୍ରକାଶ କର)

(M ଅଟେ ପୃଥିବୀର ବସ୍ତୁତ୍ୱ, R ଅଟେ ପୃଥିବୀର ବ୍ୟାସାର୍ଦ୍ଧ, G ଅଟେ ମହାକର୍ଷଣ ଛିରାଙ୍କ)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 22 **Question Id :** 8643511732 **Question Type :** SA

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

A swimmer can swim with velocity of 12 km/h in still water. Water flowing in a river has velocity 6 km/h. The direction with respect to the direction of flow of river water he should swim in order to reach the point on the other bank just opposite to his starting point is _____°. (Round off to the Nearest Integer)

(Find the angle in degrees)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 22 Question Id : 8643511732 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଗୋଟିଏ ନଦୀରେ 6 km/h ବେଗରେ ପ୍ରବାହିତ ଜଳ ତୁଳନାରେ ଜଣେ ସନ୍ତରଣକାରୀ 12 km/h ବେଗରେ ପହଁରି ପାରେ । ସନ୍ତରଣକାରୀ ପହଁରା ଆରମ୍ଭ ସ୍ଥାନର ନଦୀର ଠିକ୍ ବିପରୀତ ପାର୍ଶ୍ୱରେ ପହଞ୍ଚିବା ପାଇଁ ନଦୀସ୍ରୋତର ଦିଗ ସହ ତାର ପହଁରିବାର ଦିଗ କରୁଥିବା କୋଣ ଅଟେ _____° । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 23 Question Id : 8643511733 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A body of mass 2 kg moves under a force of $(2\hat{i} + 3\hat{j} + 5\hat{k})$ N. It starts from rest and was at the origin initially. After 4 s, its new coordinates are (8, b, 20). The value of b is _____.

(Round off to the Nearest Integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 23 Question Id : 8643511733 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$(2\hat{i} + 3\hat{j} + 5\hat{k})$ N ର ବଳ ପ୍ରଭାବରେ 2 kg ବସ୍ତୁ ବିଶିଷ୍ଟ ଏକ ବସ୍ତୁ ଗତିକରେ । ଏହା ସ୍ଥିର ଅବସ୍ଥାରୁ ଗତି ଆରମ୍ଭ କରିଥାଏ ଏବଂ ଏହା ପ୍ରାରମ୍ଭରେ ମୂଳବିନ୍ଦୁ (ଅରିଜିନ) ରେ ଥିଲା । 4 s ପରେ, ଏହାର ନୂତନ ସ୍ଥାନାଙ୍କଗୁଡ଼ିକ ହେଲା (8, b, 20) । b ର ମୂଲ୍ୟ ଅଟେ _____ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 24 Question Id : 8643511734 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A force $\vec{F} = 4\hat{i} + 3\hat{j} + 4\hat{k}$ is applied on an intersection point of $x = 2$ plane and x -axis. The

magnitude of torque of this force about a point $(2, 3, 4)$ is _____. (Round off to the Nearest Integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 24 Question Id : 8643511734 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$x = 2$ ସମତଳ ଏବଂ x -ଅକ୍ଷର ଏକ ଛେଦ ବିନ୍ଦୁରେ ଏକ ବଳ $\vec{F} = 4\hat{i} + 3\hat{j} + 4\hat{k}$ କୁ ପ୍ରୟୋଗ କରାଯାଏ । $(2, 3, 4)$

ବିନ୍ଦୁ ଚାରିପଟେ ଏହି ବଳଟିର ଆତ୍ମତ୍ୱର ପରମାଣ ଅଟେ _____ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

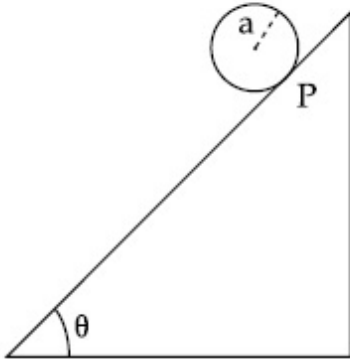
Question Number : 25 Question Id : 8643511735 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A solid disc of radius 'a' and mass 'm' rolls down without slipping on an inclined plane making an angle θ with the horizontal. The acceleration of the disc will be $\frac{2}{b} g \sin\theta$ where b is _____. (Round off to the Nearest Integer)

(g = acceleration due to gravity

θ = angle as shown in figure)



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 25 **Question Id :** 8643511735 **Question Type :** SA

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

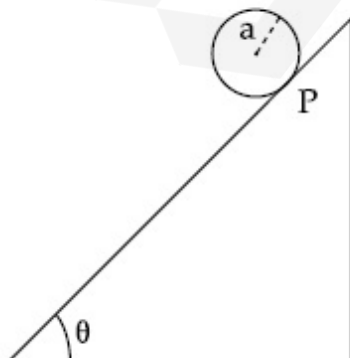
ଧରାତଳ ସହ θ କୋଣ ଉତ୍ତଳ କରୁଥିବା ଏକ ଗଡ଼ାଣିଆ ସମତଳ ଉପରେ 'a' ବ୍ୟାସାର୍ଦ୍ଧ ଏବଂ 'm' ବସ୍ତୁତ୍ୱ ବିଶିଷ୍ଟ ଏକ ନିଦା ଡିସ୍କ

ନିଖସି ଗଡ଼ିଗଡ଼ି ତଳକୁ ଯାଉଛି । ଡିସ୍କର ତ୍ୱରଣ ହେବ $\frac{2}{b} g \sin\theta$, ଯେଉଁଠାରେ b ଅଟେ _____ । (ନିକଟତମ

ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

(g = ମାଧ୍ୟାକର୍ଷଣଜନିତ ତ୍ୱରଣ

θ = ଦର୍ଶାଯାଇଥିବା କୋଣ)



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 26 Question Id : 8643511736 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

For an ideal heat engine, the temperature of the source is 127°C . In order to have 60% efficiency the temperature of the sink should be _____ $^{\circ}\text{C}$. (Round off to the Nearest Integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 26 Question Id : 8643511736 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଗୋଟିଏ ତାପ ଇଞ୍ଜିନ୍ ପାଇଁ, ଉତ୍ସ ତାପମାତ୍ରା 127°C ଅଟେ । ଏହା 60% ଦକ୍ଷତା ସହ ଚାଲିବା ପାଇଁ ସିଙ୍କ୍ ତାପମାତ୍ରା _____ $^{\circ}\text{C}$ ହେବା ଉଚିତ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

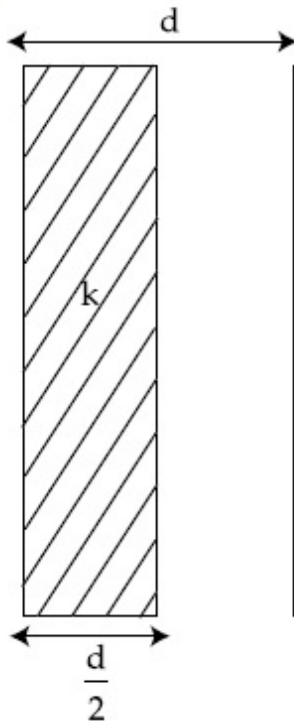
Possible Answers :

100

Question Number : 27 Question Id : 8643511737 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

In a parallel plate capacitor set up, the plate area of capacitor is 2 m^2 and the plates are separated by 1 m . If the space between the plates are filled with a dielectric material of thickness 0.5 m and area 2 m^2 (see fig) the capacitance of the set-up will be _____ ϵ_0 . (Dielectric constant of the material = 3.2) (Round off to the Nearest Integer)



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

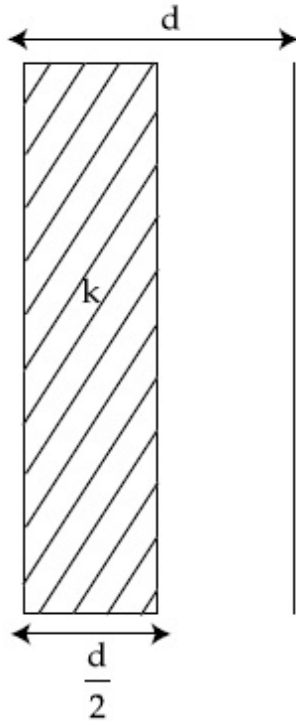
Possible Answers :

100

Question Number : 27 **Question Id :** 8643511737 **Question Type :** SA

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

ଗୋଟିଏ ସମାନ୍ତରାଳ ପ୍ଲେଟ୍ ଧାରିତ୍ର ବିନ୍ୟାସରେ ପ୍ଲେଟ୍ କ୍ଷେତ୍ରଫଳ 2 m^2 ଅଟେ ଏବଂ ପ୍ଲେଟ୍ ଦୁଇଟି 1 m ଦୂରତାରେ ରହିଛନ୍ତି । ଯଦି ପ୍ଲେଟ୍ ଗୁଡ଼ିକ ମଧ୍ୟରେ ଥିବା ସ୍ଥାନକୁ 0.5 m ମୋଟା ବିଶିଷ୍ଟ କ୍ଷେତ୍ରଫଳ 2 m^2 ର ଏକ ପରାବୈଦ୍ୟୁତିକ ପଦାର୍ଥରେ ପୂରଣ କରିଦିଆଯାଏ, (ଚିତ୍ର ଦେଖ) ଏହି ବିନ୍ୟାସର ଧାରିତା ହେବ _____ ϵ_0 । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)



(ପଦାର୍ଥଟିର ପରାବୈଦ୍ୟୁତାଙ୍କ = 3.2)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 28 Question Id : 8643511738 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The energy dissipated by a resistor is 10 mJ in 1 s when an electric current of 2 mA flows through it. The resistance is _____ Ω . (Round off to the Nearest Integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 28 Question Id : 8643511738 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଯେତେବେଳେ ଗୋଟିଏ ପ୍ରତିରୋଧକ ମଧ୍ୟବେଳ 2 mA ର ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ପ୍ରବାହିତ ହୋଇଥାଏ, 1 s ରେ ପ୍ରତିରୋଧକ ଦ୍ୱାରା ଶକ୍ତି ଅପଚୟ 10 mJ ଅଟେ । ବିଦ୍ୟୁତ୍ ପ୍ରତିରୋଧ ଅଟେ _____ Ω । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 29 Question Id : 8643511739 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A deviation of 2° is produced in the yellow ray when prism of crown and flint glass are achromatically combined. Taking dispersive powers of crown and flint glass as 0.02 and 0.03 respectively and refractive index for yellow light for these glasses are 1.5 and 1.6 respectively. The refracting angles for crown glass prism will be _____ $^\circ$ (in degree). (Round off to the Nearest Integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 29 Question Id : 8643511739 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଯେତେବେଳେ କ୍ରାଇନ୍ ଓ ଫ୍ଲିଣ୍ଟ କାଚର ପ୍ରିଜମକୁ ଅବର୍ଣ୍ଣକ ଭାବେ (ଆକ୍ରୋମାଟିକାଲି) ଯୋଡ଼ାଯାଏ, ହଳଦିଆ ଆଲୋକ ରଶ୍ମିରେ 2° ର ବିଚ୍ୟୁତି ହୋଇଥାଏ । କ୍ରାଇନ୍ ଏବଂ ଫ୍ଲିଣ୍ଟ କାଚର ପ୍ରକାଶିତା କ୍ଷମତା (ଡିସ୍ପରସିଭ ପାଊର) ଯଥାକ୍ରମେ 0.02 ଏବଂ 0.03 ଓ ପ୍ରତିସରଣାଙ୍କ 1.5 ଏବଂ 1.6 ନେଲେ, କ୍ରାଇନ୍ କାଚ ପାଇଁ ପ୍ରତିସରଣ କୋଣ ହେବ _____ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 30 Question Id : 8643511740 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A closed organ pipe of length L and an open organ pipe contain gases of densities ρ_1 and ρ_2 respectively. The compressibility of gases are equal in both the pipes. Both the pipes are

vibrating in their first overtone with same frequency. The length of the open pipe is $\frac{x}{3} L \sqrt{\frac{\rho_1}{\rho_2}}$

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

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 30 Question Id : 8643511740 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

L ଦୈର୍ଘ୍ୟ ବିଶିଷ୍ଟ ଗୋଟିଏ ମୁଣ୍ଡ ବନ୍ଦ ଥିବା ଅର୍ଗାନ ନଳୀ ଏବଂ ଦୁଇ ମୁଣ୍ଡ ଖୋଲାଥିବା ଅନ୍ୟ ଏକ ଅର୍ଗାନ ନଳୀରେ ଯଥାକ୍ରମେ ρ_1 ଓ ρ_2 ସାନ୍ଦ୍ରତା ବିଶିଷ୍ଟ ଦୁଇଟି ଗ୍ୟାସ୍ ଅଛି । ଉଭୟ ନଳୀର ଗ୍ୟାସ୍‌ଗୁଡ଼ିକର ସଂକୋଚନ ଗୁଣ ସମାନ ଅଟେ । ଉଭୟ ନଳୀ ସମାନ

ଆବୃତ୍ତିରେ ସେମାନଙ୍କର ପ୍ରଥମ ଅଧିତୋଳରେ କମ୍ପିତ ହେଉଛନ୍ତି । ଦୁଇମୁଣ୍ଡ ଖୋଲାଥିବା ନଳୀର ଦୈର୍ଘ୍ୟ ହେବ $\frac{x}{3} L \sqrt{\frac{\rho_1}{\rho_2}}$

ଯେଉଁଠାରେ x ହେଉଛି _____ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Chemistry Section A

Section Id :	864351117
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 : 864351117
Question Shuffling Allowed : Yes

Question Number : 31 Question Id : 8643511741 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The INCORRECT statement regarding the structure of C_{60} is :

Options :

8643515221. It contains 12 six-membered rings and 24 five-membered rings.
8643515222. The six-membered rings are fused to both six and five-membered rings.
8643515223. The five-membered rings are fused only to six-membered rings.
8643515224. Each carbon atom forms three sigma bonds.

Question Number : 31 Question Id : 8643511741 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

C_{60} ର ସଂରଚନା ବିଷୟରେ ଭୁଲ୍ ଉକ୍ତିଟି ହେଉଛି :

Options :

8643515221. ଏଥିରେ ଛ ସଭ୍ୟ ବିଶିଷ୍ଟ ବାରଟି ବଳୟ ଏବଂ ପାଞ୍ଚ ସଭ୍ୟ ବିଶିଷ୍ଟ ଚବିଶଟି ବଳୟ ରହିଛି ।
8643515222. ଛ ସଭ୍ୟ ବିଶିଷ୍ଟ ବଳୟ ଗୁଡ଼ିକ ଏକତ୍ରିତ ହୋଇ ଉଭୟ ଛ ଏବଂ ପାଞ୍ଚ ସଭ୍ୟ ବିଶିଷ୍ଟ ବଳୟ ଗଠନ କରନ୍ତି ।
8643515223. ପାଞ୍ଚ ସଭ୍ୟ ବିଶିଷ୍ଟ ବଳୟଗୁଡ଼ିକ ଏକତ୍ର ହୋଇ କେବଳ ଛ ସଭ୍ୟ ବିଶିଷ୍ଟ ବଳୟ ଗଠନ କରନ୍ତି ।
8643515224. ପ୍ରତ୍ୟେକ କାରବନ ପରମାଣୁ ତିନୋଟି ସିଗ୍ମା ବନ୍ଧ ଗଠନ କରେ ।

Question Number : 32 Question Id : 8643511742 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The INCORRECT statements below regarding colloidal solutions is :

Options :

8643515225. A colloidal solution shows colligative properties.

8643515226. A colloidal solution shows Brownian motion of colloidal particles.

8643515227. The flocculating power of Al^{3+} is more than that of Na^+ .

8643515228. An ordinary filter paper can stop the flow of colloidal particles.

Question Number : 32 Question Id : 8643511742 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

କଲିଲ ଦ୍ରବଣ ବିଷୟରେ ନିମ୍ନରେ ପ୍ରଦତ୍ତ ଭୁଲ ଉକ୍ତିଟି ହେଉଛି :

Options :

8643515225. କଲିଲ ଦ୍ରବଣ ଅଣୁ ସଂଖ୍ୟା ଗୁଣ ଦେଖାଏ ।

8643515226. କଲିଲ ଦ୍ରବଣରେ କଣିକାଗୁଡ଼ିକ ବ୍ରାଉନିଆନ୍ ଗତି ଦେଖାନ୍ତି ।

8643515227. Al^{3+} ର ସ୍କୁଲେଟିଙ୍ଗ୍ କ୍ଷମତା Na^+ ର କ୍ଷମତା ଠାରୁ ଅଧିକ ।

8643515228. ସାମାନ୍ୟ ଫିଲ୍ଟର କାଗଜ କଲିଲ କଣିକାର ପ୍ରବାହକୁ ବନ୍ଦ କରିପାରେ ।

Question Number : 33 Question Id : 8643511743 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The characteristics of elements X, Y and Z with atomic numbers, respectively, 33, 53 and 83 are :

Options :

8643515229. X, Y and Z are metals.

8643515230. X and Z are non-metals and Y is a metalloid.

8643515231. X is a metalloid, Y is a non-metal and Z is a metal.

8643515232. X and Y are metalloids and Z is a metal.

Question Number : 33 Question Id : 8643511743 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମୌଳିକ ଗୁଡ଼ିକ X, Y ଏବଂ Z ଯାହାର ପାରମାଣବିକ ସଂଖ୍ୟା ଯଥାକ୍ରମେ 33, 53 ଏବଂ 83 । ସେମାନଙ୍କର ଲକ୍ଷଣ ଗୁଡ଼ିକ ହେଉଛି :

Options :

8643515229. X, Y ଏବଂ Z ଗୁଡ଼ିକ ଧାତୁ

8643515230. X ଏବଂ Z ଗୁଡ଼ିକ ଅଧାତୁ ଏବଂ Y ହେଉଛି ଉପଧାତୁ ।

8643515231. X ହେଉଛି ଉପଧାତୁ, Y ଏକ ଅଧାତୁ ଏବଂ Z ଏକ ଧାତୁ ଅଟେ ।

8643515232. X ଏବଂ Y ହେଉଛି ଉପଧାତୁ ଏବଂ Z ଏକ ଧାତୁ ଅଟେ ।

Question Number : 34 Question Id : 8643511744 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following reduction reaction CANNOT be carried out with coke ?

Options :

8643515233. $\text{Fe}_2\text{O}_3 \rightarrow \text{Fe}$

8643515234. $\text{ZnO} \rightarrow \text{Zn}$

8643515235. $\text{Cu}_2\text{O} \rightarrow \text{Cu}$

8643515236. $\text{Al}_2\text{O}_3 \rightarrow \text{Al}$

Question Number : 34 Question Id : 8643511744 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନଲିଖିତ କେଉଁ ବିଜାରଣ ପ୍ରକ୍ରିୟା କୋକ୍ ସହିତ କରାଯାଇପାରେ ନାହିଁ ?

Options :

8643515233. $\text{Fe}_2\text{O}_3 \rightarrow \text{Fe}$

8643515234. $ZnO \rightarrow Zn$

8643515235. $Cu_2O \rightarrow Cu$

8643515236. $Al_2O_3 \rightarrow Al$

Question Number : 35 Question Id : 8643511745 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The correct statements about H_2O_2 are :

- (A) used in the treatment of effluents.
- (B) used as both oxidising and reducing agents.
- (C) the two hydroxyl groups lie in the same plane.
- (D) miscible with water.

Choose the correct answer from the options given below :

Options :

8643515237. (A), (B) and (D) only

8643515238. (B), (C) and (D) only

8643515239. (A), (C) and (D) only

8643515240. (A), (B), (C) and (D)

Question Number : 35 Question Id : 8643511745 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

H_2O_2 ବିଶୟରେ ସଠିକ୍ ଉକ୍ତି ହେଉଛି :

- (A) ବହିଃସ୍ଵାଦୀର ତ୍ରିମେଣ୍ଡରେ ବ୍ୟବହୃତ ହୁଏ ।
- (B) ଉତ୍ତମ ଜୀବନ ଏବଂ ବିଜୀବନ ଭାବେ ବ୍ୟବହୃତ ହୁଏ ।
- (C) ଦୁଇଟି ହାଇଡ୍ରୋଜିଲ୍ ଗ୍ରୁପ୍ ସମାନ ସମତଳରେ ଅବସ୍ଥାନ କରନ୍ତି ।
- (D) ଜଳ ସହତ ମିଶ୍ରଣୀୟ

ନିମ୍ନଲିଖିତ ବିକଳ୍ପ ମଧ୍ୟରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛି :

Options :

8643515237. (A), (B) ଏବଂ (D) କେବଳ

8643515238. (B), (C) ଏବଂ (D) କେବଳ

8643515239. (A), (C) ଏବଂ (D) କେବଳ

8643515240. (A), (B), (C) ଏବଂ (D) କେବଳ

Question Number : 36 Question Id : 8643511746 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Identify the elements X and Y using the ionisation energy values given below :

Ionization energy (kJ/mol)

	1 st	2 nd
X	495	4563
Y	731	1450

Options :

8643515241. X = Na ; Y = Mg

8643515242. X = Mg ; Y = Na

8643515243. X = F ; Y = Mg

8643515244. X = Mg ; Y = F

Question Number : 36 Question Id : 8643511746 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନଲିଖିତ ଆୟନୀକରଣ ଶକ୍ତିର ମୂଲ୍ୟକୁ ବ୍ୟବହାର କରି ମୌଳିକ X ଏବଂ Y କୁ ଚିହ୍ନଟାଅ :

ଆୟନୀକରଣ ଶକ୍ତି (kJ/mol)

	1 st	2 nd
X	495	4563
Y	731	1450

Options :

8643515241. $X = \text{Na}$; $Y = \text{Mg}$

8643515242. $X = \text{Mg}$; $Y = \text{Na}$

8643515243. $X = \text{F}$; $Y = \text{Mg}$

8643515244. $X = \text{Mg}$; $Y = \text{F}$

Question Number : 37 Question Id : 8643511747 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The exact volumes of 1 M NaOH solution required to neutralise 50 mL of 1 M H_3PO_3 solution and 100 mL of 2 M H_3PO_2 solution, respectively, are :

Options :

8643515245. 50 mL and 50 mL

8643515246. 100 mL and 50 mL

8643515247. 100 mL and 200 mL

8643515248. 100 mL and 100 mL

Question Number : 37 Question Id : 8643511747 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

50 mL 1 M H_3PO_3 ଦ୍ରବଣ ଏବଂ 100 mL 2 M H_3PO_2 ଦ୍ରବଣଗୁଡ଼ିକୁ ନ୍ୟୁଟ୍ରାଲାଇଜ୍ କରିବା ପାଇଁ ଆବଶ୍ୟକ 1 M NaOH ର ସଠିକ୍ ଆୟତନ ହେଉଛି :

Options :

8643515245. 50 mL ଏବଂ 50 mL

8643515246. 100 mL ଏବଂ 50 mL

8643515247. 100 mL ଏବଂ 200 mL

8643515248. 100 mL ଏବଂ 100 mL

Question Number : 38 Question Id : 8643511748 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Arrange the following metal complex/compounds in the increasing order of spin only magnetic moment. Presume all the three, high spin system.

(Atomic numbers Ce = 58, Gd = 64 and Eu = 63.)

(a) $(\text{NH}_4)_2[\text{Ce}(\text{NO}_3)_6]$ (b) $\text{Gd}(\text{NO}_3)_3$ and (c) $\text{Eu}(\text{NO}_3)_3$

Answer is :

Options :

8643515249. (a) < (b) < (c)

8643515250. (a) < (c) < (b)

8643515251. (b) < (a) < (c)

8643515252. (c) < (a) < (b)

Question Number : 38 Question Id : 8643511748 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ସମସ୍ତ ତିନୋଟିଯାକ କମ୍ପ୍ଲେକ୍ସ କୁ ଉଚ୍ଚ ସ୍ପିନ୍ କମ୍ପ୍ଲେକ୍ସ ଭାବେ ଗ୍ରହଣ କରି ନିମ୍ନଲିଖିତ ଧାତୁ କମ୍ପ୍ଲେକ୍ସ/ଯୌଗିକ ମାନକର କେବଳ ତୁଲ୍ୟକାରୀ ଆୟତ୍ତର ସାନରୁ ବଡ଼ କ୍ରମରେ ସଜାଡ଼ି ଲେଖ ।

(ପରମାଣବିକ ସଂଖ୍ୟା Ce = 58, Gd = 64 ଏବଂ Eu = 63)

(a) $(\text{NH}_4)_2[\text{Ce}(\text{NO}_3)_6]$ (b) $\text{Gd}(\text{NO}_3)_3$ ଏବଂ (c) $\text{Eu}(\text{NO}_3)_3$

ଉତ୍ତର

Options :

8643515249. (a) < (b) < (c)

8643515250. (a) < (c) < (b)

8643515251. (b) < (a) < (c)

8643515252. (c) < (a) < (b)

Question Number : 39 Question Id : 8643511749 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Fex_2 and Fey_3 are known when x and y are :

Options :

8643515253. $x = F, Cl, Br, I$ and $y = F, Cl, Br, I$

8643515254. $x = F, Cl, Br, I$ and $y = F, Cl, Br$

8643515255. $x = F, Cl, Br$ and $y = F, Cl, Br, I$

8643515256. $x = Cl, Br, I$ and $y = F, Cl, Br, I$

Question Number : 39 Question Id : 8643511749 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Fex_2 ଏବଂ Fey_3 ଜଣାପଡ଼େ ଯେତେବେଳେ x ଏବଂ y ଯଥାକ୍ରମେ ହୋଇଥାଏ :

Options :

8643515253. $x = F, Cl, Br, I$ ଏବଂ $y = F, Cl, Br, I$

8643515254. $x = F, Cl, Br, I$ ଏବଂ $y = F, Cl, Br$

8643515255. $x = F, Cl, Br$ ଏବଂ $y = F, Cl, Br, I$

8643515256. $x = Cl, Br, I$ ଏବଂ $y = F, Cl, Br, I$

Question Number : 40 Question Id : 8643511750 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The green house gas/ es is (are) :

- (A) Carbon dioxide
- (B) Oxygen
- (C) Water vapour
- (D) Methane

Choose the most appropriate answer from the options given below :

Options :

8643515257. (A) only

8643515258. (A) and (C) only

8643515259. (A), (C) and (D) only

8643515260. (A) and (B) only

Question Number : 40 Question Id : 8643511750 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ସବୁଜଗୃହ ଗ୍ୟାସଗୁଡ଼ିକ ହେଉଛି :

- (A) ଅଜାରକାମ୍
- (B) ଅମ୍ଳଜାନ
- (C) ଜଳୀୟ ବାଷ୍ପ
- (D) ମିଥେନ୍ ଗ୍ୟାସ୍

ନିମ୍ନଲିଖିତ ବିକଳ୍ପ ମଧ୍ୟରୁ ସର୍ବାଧିକ ଉପଯୁକ୍ତ ଉତ୍ତରଟି ବାଛି :

Options :

8643515257. (A) କେବଳ

8643515258. (A) ଏବଂ (C) କେବଳ

8643515259. (A), (C) ଏବଂ (D) କେବଳ

8643515260. (A) ଏବଂ (B) କେବଳ

Question Number : 41 Question Id : 8643511751 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
Test/Reagents/Observation(s)	Species detected
(a) Lassaigne's Test	(i) Carbon
(b) Cu(II) oxide	(ii) Sulphur
(c) Silver nitrate	(iii) N, S, P, and halogen
(d) The sodium fusion extract gives black precipitate with acetic acid and lead acetate	(iv) Halogen Specifically

The correct match is :

Options :

8643515261. (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

8643515262. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

8643515263. (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

8643515264. (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)

Question Number : 41 Question Id : 8643511751 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ତାଲିକା-I ସହିତ ତାଲିକା-II କୁ ମିଳାଅ :

ତାଲିକା-I	ତାଲିକା-II
ପରୀକ୍ଷା/ଅଭିକର୍ଷକ/ପର୍ଯ୍ୟବେକ୍ଷଣ	ପ୍ରକାରି ମିଳିଥାଏ
(a) ଲାସାଇଗ୍ ପରୀକ୍ଷା	(i) କାରବନ୍
(b) କପର Cu(II) ଅକ୍ସାଇଡ୍	(ii) ସଲ୍‌ଫର
(c) ସିଲ୍‌ଭର ନାଇଟ୍ରେଟ୍	(iii) ନାଇଟ୍ରୋଜେନ୍, ସଲ୍‌ଫର, ଫସ୍‌ଫରସ୍ ଏବଂ ହାଲୋଜେନ୍
(d) ଏସିଟିକ୍ ଅମ୍ଳ ଏବଂ ଲେଡ୍ ଏସିଟେଟ୍	(iv) ହାଲୋଜେନ୍ ନିର୍ଦ୍ଦିଷ୍ଟ ଭାବେ

ସହିତ ସୋଡ଼ିୟମ୍ ପୁଂଜନ ଏକ୍ସଟ୍ରାକ୍ଟ ପ୍ରତିକ୍ରିୟା କରି କଳା

ଅବକ୍ଷେପ ଉତ୍ପନ୍ନ କରେ

ସଠିକ୍ ମେଳକଟି ହେଉଛି :

Options :

8643515261. (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

8643515262. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

8643515263. (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

8643515264. (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)

Question Number : 42 Question Id : 8643511752 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Statement I : Sodium hydride can be used as an oxidising agent.

Statement II : The lone pair of electrons on nitrogen in pyridine makes it basic.

Choose the **CORRECT** answer from the options given below :

Options :

8643515265. Both statement I and statement II are true

8643515266. Both statement I and statement II are false

8643515267. Statement I is true but statement II is false

8643515268. Statement I is false but statement II is true

Question Number : 42 Question Id : 8643511752 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଉକ୍ତି I : ସୋଡ଼ିୟମ୍ ହାଇଡ୍ରୋକ୍ସାଇଡ୍ ଏକ ଜାରକ ଭାବେ ବ୍ୟବହୃତ ହୁଏ ।

ଉକ୍ତି II : ନାଇଟ୍ରୋଜେନ୍‌ରେ ଥିବା ଏକାକୀ ଇଲେକ୍ଟ୍ରନ୍ ଯୋଡ଼ା ପିରିଡିନ୍‌କୁ କ୍ଷାରରେ ପରିଣତ କରିଥାଏ ।

ନିମ୍ନଲିଖିତ ବିକଳ୍ପ ମଧ୍ୟରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛି :

Options :

8643515265. ଉଭୟ ଉକ୍ତି I ଏବଂ II ସତ୍ୟ ଅଟେ ।

8643515266. ଉଭୟ ଉକ୍ତି I ଏବଂ II ମିଥ୍ୟା ଅଟେ ।

8643515267. ଉକ୍ତି I ସତ୍ୟ ଏବଂ ଉକ୍ତି II ମିଥ୍ୟା ଅଟେ ।

8643515268. ଉକ୍ତି I ମିଥ୍ୟା ଏବଂ ଉକ୍ତି II ସତ୍ୟ ଅଟେ ।

Question Number : 43 Question Id : 8643511753 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An unsaturated hydrocarbon X on ozonolysis gives A. Compound A when warmed with ammonical silver nitrate forms a bright silver mirror along the sides of the test tube. The unsaturated hydrocarbon X is :

Options :

8643515269. $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3$

8643515270. $\text{CH}_3 - \underset{\text{CH}_3}{\text{C}} = \underset{\text{CH}_3}{\text{C}} - \text{CH}_3$

8643515271. $\text{HC} \equiv \text{C} - \text{CH}_2 - \text{CH}_3$

8643515272. $\text{CH}_3 - \underset{\text{CH}_3}{\text{C}} = \triangle$

Question Number : 43 Question Id : 8643511753 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

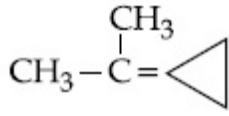
ଏକ ଅପରିପୂର୍ଣ୍ଣ ହାଇଡ୍ରୋକାର୍ବନ୍ X ର ଓଜୋନୋଲିସିସ୍ରେ A ଉତ୍ପନ୍ନ ହୁଏ । ଯୌଗିକ A ପରୀକ୍ଷା ନିମ୍ନର ଭିତର ପାଖରେ ଏକ ଉଜ୍ଜ୍ୱଳ ରୌପ୍ୟ ଦର୍ପଣ ଗଠନ କରେ ଯେତେବେଳେ ଏହି ଯୌଗିକକୁ ଆମୋନିଆକାଲ୍ ସିଲ୍ଭର ନାଇଟ୍ରେଟ୍ ସହିତ ଅଳ୍ପ ଗରମ କରାଯାଏ । ଅପରିପୂର୍ଣ୍ଣ ହାଇଡ୍ରୋକାର୍ବନ୍ X ଚି ହେଉଛି :

Options :

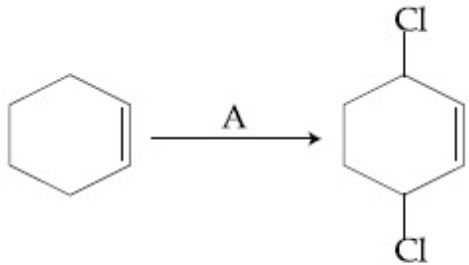
8643515269. $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3$

8643515270. $\text{CH}_3 - \underset{\text{CH}_3}{\text{C}} = \underset{\text{CH}_3}{\text{C}} - \text{CH}_3$

8643515271. $\text{HC}\equiv\text{C}-\text{CH}_2-\text{CH}_3$

8643515272. 

Question Number : 44 Question Id : 8643511754 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1



Identify the reagent(s) 'A' and condition(s) for the reaction

Options :

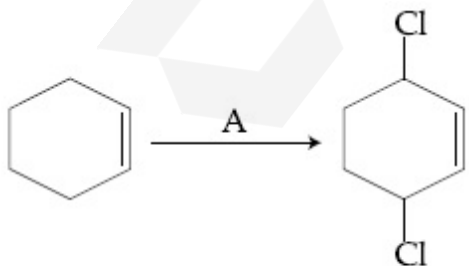
8643515273. A = Cl_2 ; dark, Anhydrous AlCl_3

8643515274. A = HCl , ZnCl_2

8643515275. A = Cl_2 ; UV light

8643515276. A = HCl ; Anhydrous AlCl_3

Question Number : 44 Question Id : 8643511754 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1



ପ୍ରତିକ୍ରିୟାର ଅଭିକର୍ଷକ(ଗୁଡ଼ିକ) 'A' ଏବଂ ସର୍ତ୍ତ(ଗୁଡ଼ିକ) ଚିହ୍ନଟାଅ :

Options :

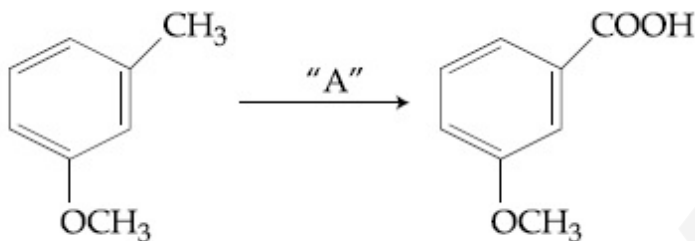
8643515273. A = Cl₂ ; dark, Anhydrous AlCl₃

8643515274. A = HCl, ZnCl₂

8643515275. A = Cl₂ ; UV light

8643515276. A = HCl ; Anhydrous AlCl₃

Question Number : 45 Question Id : 8643511755 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1



In the above reaction, the reagent "A" is :

Options :

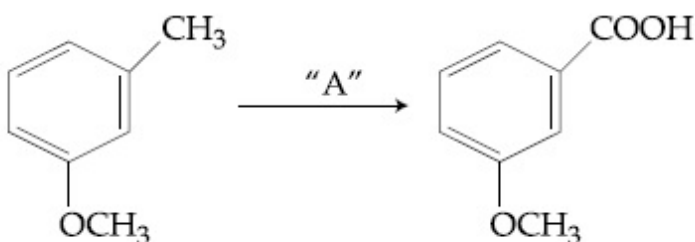
8643515277. LiAlH₄

8643515278. Alkaline KMnO₄, H⁺

8643515279. HCl, Zn - Hg

8643515280. NaBH₄, H₃O⁺

Question Number : 45 Question Id : 8643511755 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1



ଉପରଲିଖିତ ପ୍ରତିକ୍ରିୟାରେ ଅଭିକର୍ଷକ "A" ହେଉଛି :

Options :

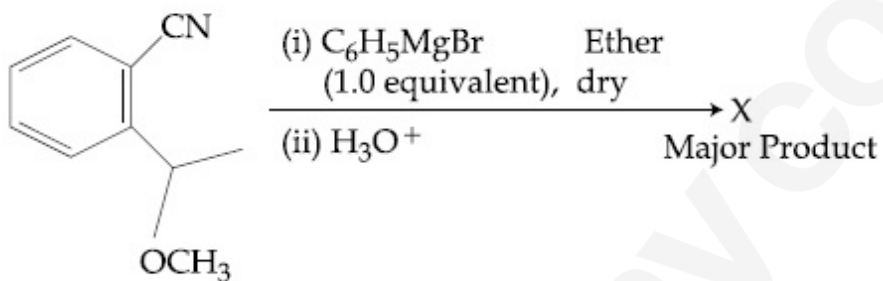
8643515277. LiAlH_4

8643515278. Alkaline KMnO_4 , H^+

8643515279. HCl , Zn-Hg

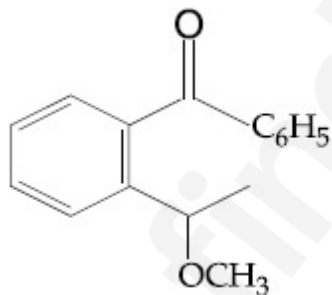
8643515280. NaBH_4 , H_3O^+

Question Number : 46 Question Id : 8643511756 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

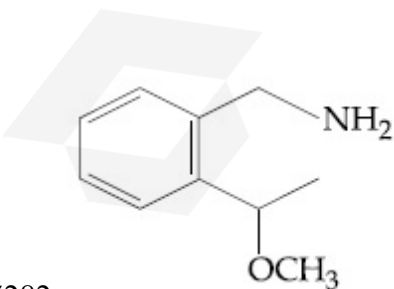


The structure of X is :

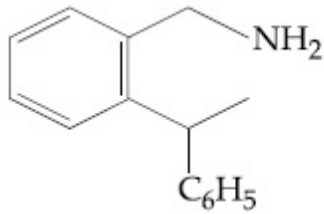
Options :



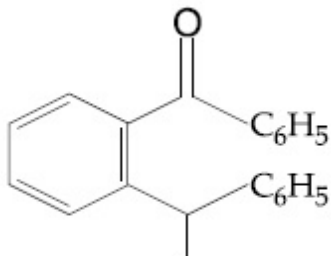
8643515281.



8643515282.



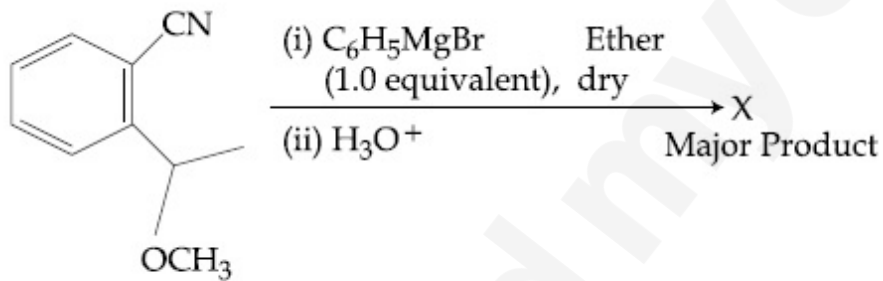
8643515283.



8643515284.

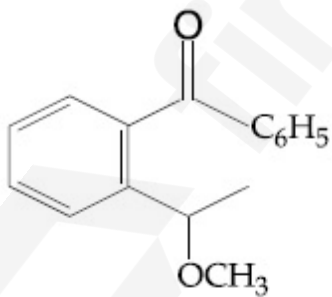
Question Number : 46 Question Id : 8643511756 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

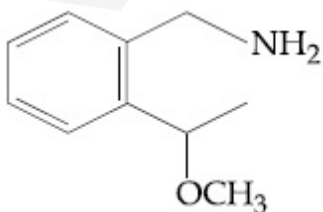


'X' ର ସଂରଚନା ହେଉଛି :

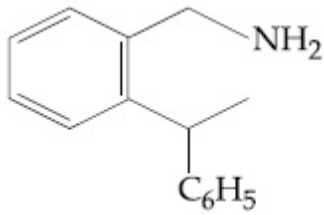
Options :



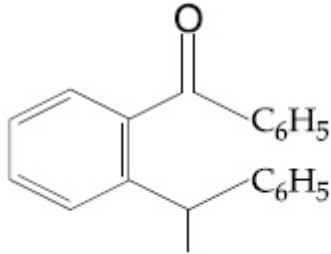
8643515281.



8643515282.



8643515283.



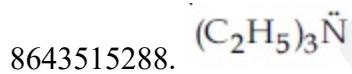
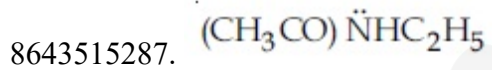
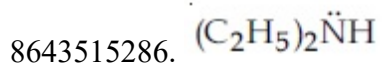
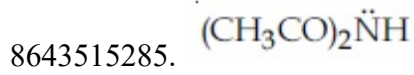
8643515284.

Question Number : 47 Question Id : 8643511757 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following is least basic ?

Options :

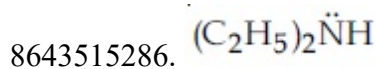
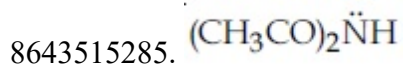


Question Number : 47 Question Id : 8643511757 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନଲିଖିତ ମଧ୍ୟରୁ କେଉଁଟି ସର୍ବନିମ୍ନ କ୍ଷାରୀୟ :

Options :



8643515287. $(\text{CH}_3\text{CO})\ddot{\text{N}}\text{HC}_2\text{H}_5$

8643515288. $(\text{C}_2\text{H}_5)_3\ddot{\text{N}}$

Question Number : 48 Question Id : 8643511758 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Ammonolysis of Alkyl halides followed by the treatment with NaOH solution can be used to prepare primary, secondary and tertiary amines. The purpose of NaOH in the reaction is :

Options :

8643515289. to remove basic impurities

8643515290. to activate NH_3 used in the reaction

8643515291. to increase the reactivity of alkyl halide

8643515292. to remove acidic impurities

Question Number : 48 Question Id : 8643511758 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ପ୍ରାରମ୍ଭିକ ଦ୍ୱିତୀୟକ ଏବଂ ତୃତୀୟକ ଆମିନ୍ ପ୍ରସ୍ତୁତ କରିବା ପାଇଁ ଆଲକିଲ ହାଲାଇଡର ଅମୋନୋଲିସିସ୍ ଏବଂ ତାପରେ NaOH ଦ୍ରବଣ ସହ ପ୍ରତିକ୍ରିୟା କରାଯାଏ । ଉକ୍ତ ପ୍ରତିକ୍ରିୟାରେ NaOH ର ଉଦ୍ଦେଶ୍ୟ ହେଉଛି :

Options :

8643515289. କ୍ଷରୀୟ ଖାଦକୁ ଦୂର କରିବା

8643515290. ପ୍ରତିକ୍ରିୟାରେ ବ୍ୟବହୃତ NH_3 କୁ ସକ୍ରିୟ କରିବା

8643515291. ଆଲକିଲ ହାଲାଇଡର ପ୍ରତିକ୍ରିୟାଶୀଳତା ବୃଦ୍ଧି କରିବା

8643515292. ଅମ୍ଳୀୟ ଖାଦକୁ ଦୂର କରିବା

Question Number : 49 Question Id : 8643511759 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following polymer is used in the manufacture of wood laminates ?

Options :

8643515293. Melamine formaldehyde resin
8643515294. Urea formaldehyde resin
8643515295. *cis*-poly isoprene
8643515296. Phenol and formaldehyde resin

Question Number : 49 Question Id : 8643511759 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନଲିଖିତ ବହୁଳକ ମଧ୍ୟରୁ କେଉଁଟି କାଠ ଲାମିନେଟ୍ ଉତ୍ପାଦନ କରିବା ପାଇଁ ବ୍ୟବହୃତ ହୁଏ ?

Options :

8643515293. ମେଲାମିନ୍, ଫରମାଲଡିହାଇଡ୍, ରେଜିନ୍
8643515294. ୟୁରିଆ ଫରମାଲଡିହାଇଡ୍, ରେଜିନ୍
8643515295. ଶିଷ୍-ପଲିଆଇସୋପ୍ରିନ୍
8643515296. ଫିନଲ୍ ଫରମାଲଡିହାଇଡ୍, ରେଜିନ୍

Question Number : 50 Question Id : 8643511760 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The secondary structure of protein is stabilised by :

Options :

8643515297. van der Waals forces
8643515298. Peptide bond
8643515299. Hydrogen bonding

8643515300. glycosidic bond

Question Number : 50 Question Id : 8643511760 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ପ୍ରୋଟିନ୍‌ର ଦ୍ୱିତୀୟକ ସଂରଚନା ସ୍ଥାୟୀକରଣ ହୋଇଥାଏ ଏହା ଦ୍ୱାରା :

Options :

8643515297. ଭେଣ୍ଟରିଲ୍ ବଳ ସମୂହ

8643515298. ପେପ୍ଟାଇଡ୍ ବନ୍ଧ

8643515299. ହାଇଡ୍ରୋଜେନ୍ ବନ୍ଧ

8643515300. ଗ୍ଲାଇକୋସିଡିକ୍ ବନ୍ଧ

Chemistry Section B

Section Id :	864351118
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 :	864351118
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 8643511761 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

When 35 mL of 0.15 M lead nitrate solution is mixed with 20 mL of 0.12 M chromic sulphate solution, _____ $\times 10^{-5}$ moles of lead sulphate precipitate out. (Round off to the Nearest Integer).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 51 Question Id : 8643511761 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଯେତେବେଳେ 35 mL 0.15 M ଲେଡ୍ ନାଇଟ୍ରେଟ୍ ଦ୍ରବଣ 20 mL 0.12 M କ୍ରୋମିକ୍ ସଲଫେଟ୍ ଦ୍ରବଣ ସହିତ ମିଶାଯାଏ, _____ $\times 10^{-5}$ ମୋଲ୍ ସ୍ୱଳ୍ପ ଲେଡ୍ ସଲଫେଟ୍ ଅବକ୍ଷେପ ହୋଇଥାଏ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟା କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 52 Question Id : 8643511762 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Ga (atomic mass 70 u) crystallizes in a hexagonal close packed structure. The total number of voids in 0.581 g of Ga is _____ $\times 10^{21}$. (Round off to the Nearest Integer).

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

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 52 Question Id : 8643511762 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Ga (ପାରମାଣବିକ ବସ୍ତୁତ୍ୱ 70 u) ଏକ ହେକ୍ସାଗୋନାଲ୍ କ୍ଲୋଜ୍ ପେକ୍ଡ୍ ସଂରଚନାର ଦାନା ଧାରଣ କରେ । 0.581 g Ga ରେ ମୋଟ ଶୂନ୍ୟସ୍ଥାନ ସଂଖ୍ୟା _____ $\times 10^{21}$ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟା କର)

(ଦତ୍ତ : $N_A = 6.023 \times 10^{23}$)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 53 Question Id : 8643511763 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

The number of orbitals with $n=5$, $m_l = +2$ is _____. (Round off to the Nearest Integer).

Response Type : Numeric**Evaluation Required For SA : Yes****Show Word Count : Yes****Answers Type : Equal****Text Areas : PlainText****Possible Answers :**

100

Question Number : 53 Question Id : 8643511763 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

$n=5$, $m_l = +2$ ଥିଲେ ଅରବିଚାଲ୍ ସଂଖ୍ୟା _____ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟା କର)

Response Type : Numeric**Evaluation Required For SA : Yes****Show Word Count : Yes****Answers Type : Equal****Text Areas : PlainText****Possible Answers :**

100

Question Number : 54 Question Id : 8643511764 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

At 25°C , 50 g of iron reacts with HCl to form FeCl_2 . The evolved hydrogen gas expands against a constant pressure of 1 bar. The work done by the gas during this expansion is _____ J.

(Round off to the Nearest Integer).

[Given : $R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$. Assume, hydrogen is an ideal gas]

[Atomic mass of Fe is 55.85 u]

Response Type : Numeric**Evaluation Required For SA : Yes****Show Word Count : Yes****Answers Type : Equal****Text Areas : PlainText****Possible Answers :**

100

Question Number : 54 Question Id : 8643511764 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

FeCl_2 ଗଠନ କରିବା ପାଇଁ 50 g ଲୁହା HCl ସହିତ 25°C ରେ ପ୍ରତିକ୍ରିୟା କରେ । ଏକ ଛିର ଚାପ 1 bar ବିପକ୍ଷରେ ନିର୍ଗତ ହାଇଡ୍ରୋଜେନ୍ ଗ୍ୟାସ୍ ସଂପ୍ରସାରଣ ହୁଏ । ସଂପ୍ରସାରଣ ସମୟରେ ଗ୍ୟାସ୍ ଦ୍ୱାରା ହେଉଥିବା କାର୍ଯ୍ୟ _____ J ଅଟେ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

(ଦତ୍ତ : $R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$ ହାଇଡ୍ରୋଜେନ୍‌କୁ ଆଦର୍ଶ ଗ୍ୟାସ ଭାବେ ଗ୍ରହଣ କର)

(Fe ର ପାରମାଣବିକ ବସ୍ତୁତ୍ୱ ହେଉଛି 55.85 u)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 55 Question Id : 8643511765 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

At 363 K, the vapour pressure of A is 21 kPa and that of B is 18 kPa. One mole of A and 2 moles of B are mixed. Assuming that this solution is ideal, the vapour pressure of the mixture is _____ kPa. (Round off to the Nearest Integer).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 55 Question Id : 8643511765 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

363 K ତାପମାତ୍ରାରେ A ଏବଂ B ର ବାଷ୍ପୀୟ ଚାପ ଯଥାକ୍ରମେ 21 kPa ଏବଂ 18 kPa । A ର ଏକ ମୋଲ୍ ଏବଂ B ର ଦୁଇମୋଲ୍ ମିଶା ହୋଇଛି । ଉକ୍ତ ଦ୍ରବଣଟିକୁ ଆଦର୍ଶ ଦ୍ରବଣ ଭାବେ ଗ୍ରହଣ କଲେ ମିଶ୍ରଣର ବାଷ୍ପୀୟ ଚାପ ହେଉଛି _____ kPa । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 56 Question Id : 8643511766 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

Sulphurous acid (H_2SO_3) has $K_{a_1} = 1.7 \times 10^{-2}$ and $K_{a_2} = 6.4 \times 10^{-8}$. The pH of 0.588 M H_2SO_3 is _____. (Round off to the Nearest Integer).

Response Type : Numeric**Evaluation Required For SA : Yes****Show Word Count : Yes****Answers Type : Equal****Text Areas : PlainText****Possible Answers :**

100

Question Number : 56 Question Id : 8643511766 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

ସଲ୍‌ଫ୍ୟୁରସ୍ ଅମ୍ଳ (H_2SO_3) ର $K_{a_1} = 1.7 \times 10^{-2}$ ଏବଂ $K_{a_2} = 6.4 \times 10^{-8}$ ର 0.588 M H_2SO_3 pH ହେଉଛି _____ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

Response Type : Numeric**Evaluation Required For SA : Yes****Show Word Count : Yes****Answers Type : Equal****Text Areas : PlainText****Possible Answers :**

100

Question Number : 57 Question Id : 8643511767 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

A 5.0 m mol dm^{-3} aqueous solution of KCl has a conductance of 0.55 mS when measured in a cell of cell constant 1.3 cm^{-1} . The molar conductivity of this solution is _____ $\text{mSm}^2 \text{ mol}^{-1}$. (Round off to the Nearest Integer).

Response Type : Numeric**Evaluation Required For SA : Yes****Show Word Count : Yes****Answers Type : Equal****Text Areas : PlainText****Possible Answers :**

100

Question Number : 57 Question Id : 8643511767 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

1.3 cm^{-1} ସେଲ୍ ଛିରାକ ରହିଥିବା ଏକ ସେଲ୍‌ରେ 5.0 mol dm^{-3} KCl ଜଳୀୟ ଦ୍ରବଣର ମପାଯାଇଥିବା ପରିବାହକତା ହେଉଛି 0.55 mS । ଉକ୍ତ ଦ୍ରବଣର ମୋଲାର ପରିବାହିତା ହେଉଛି _____ $\text{mSm}^2 \text{ mol}^{-1}$ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 58 Question Id : 8643511768 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A and B decompose via first order kinetics with half-lives 54.0 min and 18.0 min respectively. Starting from an equimolar non reactive mixture of A and B, the time taken for the concentration of A to become 16 times that of B is _____ min. (Round off to the Nearest Integer).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 58 Question Id : 8643511768 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ପ୍ରଥମ କ୍ରମ ପ୍ରତିକ୍ରିୟା ମାଧ୍ୟମରେ A ଏବଂ B ବିଘଟିତ ହୋଇଅଛି ଯାହାର ଅର୍ଦ୍ଧ-ଆୟୁ ଯଥାକ୍ରମେ 54.0 ମିନିଟ୍ ଏବଂ 18.0 ମିନିଟ୍ । A ଏବଂ B ର ପ୍ରତିକ୍ରିୟାବିହୀନ ଏକ ସମଆଣୁକ ମିଶ୍ରଣରୁ ଆରମ୍ଭ କରି, A ର ଗାଢ଼କରଣ B ର ଗାଢ଼କରଣର 16 ଗୁଣ ହେବା ପାଇଁ ଲାଗୁଥିବା (ଆବଶ୍ୟକ) ସମୟ ଅଟେ _____ ମିନିଟ୍ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 59 Question Id : 8643511769 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ absorbs light of wavelength 498 nm during a d – d transition. The octahedral splitting energy for the above complex is _____ $\times 10^{-19}$ J. (Round off to the Nearest Integer). $h = 6.626 \times 10^{-34}$ Js; $c = 3 \times 10^8$ ms^{-1}

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 59 Question Id : 8643511769 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

d – d ସଂକ୍ରମଣରେ $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$, 498 nm ତରଙ୍ଗ ଦୈର୍ଘ୍ୟ ବିଶିଷ୍ଟ ଆଲୋକକୁ ବିଶୋଷଣ କରେ । ଉପରୋକ୍ତ ଯୌଗିକ ପାଇଁ ଅଷ୍ଟପକକୀୟ ଭାଙ୍ଗିବା ଶକ୍ତି ଥରେ _____ $\times 10^{-19}$ J । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର) $h = 6.626 \times 10^{-34}$ Js; $c = 3 \times 10^8$ ms^{-1}

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 60 Question Id : 8643511770 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

In Duma's method of estimation of nitrogen, 0.1840 g of an organic compound gave 30 mL of nitrogen collected at 287 K and 758 mm of Hg pressure. The percentage composition of nitrogen in the compound is _____. (Round off to the Nearest Integer).

[Given : Aqueous tension at 287 K = 14 mm of Hg]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 60 Question Id : 8643511770 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ତୁମାଙ୍କ ପ୍ରତିକ୍ରିୟାରେ ଯଦକ୍ଷାରଜାନ(ନାଇଟ୍ରୋଜେନ୍) ର ଆକଳନ କରାଯାଇଥିଲେ, 0.1840 ଗ୍ରାମର ଏକ ଜୈବ ଯୌଗିକ, 287 K ତାପ ଓ 758 mm Hg ତାପରେ 30 ମି.ଲି. ଯଦକ୍ଷାରଜାନ ଦେଇଥାଏ । ଏହି ଯୌଗିକରେ ଯଦକ୍ଷାରଜାନର ଶତକଡ଼ା ସଂଘଟନ ଅଟେ _____। (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପ୍ରକାଶ କର)

(ଦର ଅଛି : ଜଳୀୟ ତାନ (ଟେନ୍ସନ୍) 287 K = 14 mm Hg)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Mathematics Section A

Section Id :	864351119
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 :	864351119
Question Shuffling Allowed :	Yes

Question Number : 61 Question Id : 8643511771 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the foot of the perpendicular from point (4, 3, 8) on the line $L_1 : \frac{x - a}{l} = \frac{y - 2}{3} = \frac{z - b}{4}$,

$l \neq 0$ is (3, 5, 7), then the shortest distance between the line L_1 and line

$L_2 : \frac{x - 2}{3} = \frac{y - 4}{4} = \frac{z - 5}{5}$ is equal to :

Options :

8643515311. $\frac{1}{\sqrt{6}}$

8643515312. $\frac{1}{2}$

8643515313. $\frac{1}{\sqrt{3}}$

8643515314. $\sqrt{\frac{2}{3}}$

Question Number : 61 Question Id : 8643511771 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି $L_1 : \frac{x-a}{l} = \frac{y-2}{3} = \frac{z-b}{4}$ ରେଖା ଉପରେ ($l \neq 0$) ବିନ୍ଦୁ $(4, 3, 8)$ ଠାରୁ ଅଙ୍କିତ ଲମ୍ବର ପାଦ ବିନ୍ଦୁ

$(3, 5, 7)$ ଅଟେ, ତେବେ ରେଖା L_1 ଏବଂ ରେଖା $L_2 : \frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$ ମଧ୍ୟରେ ସର୍ବନିମ୍ନ ଦୂରତ୍ୱ ସମାନ :

Options :

8643515311. $\frac{1}{\sqrt{6}}$

8643515312. $\frac{1}{2}$

8643515313. $\frac{1}{\sqrt{3}}$

8643515314. $\sqrt{\frac{2}{3}}$

Question Number : 62 Question Id : 8643511772 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let the lengths of intercepts on x -axis and y -axis made by the circle $x^2 + y^2 + ax + 2ay + c = 0$, ($a < 0$) be $2\sqrt{2}$ and $2\sqrt{5}$, respectively. Then the shortest distance from origin to a tangent to this circle which is perpendicular to the line $x + 2y = 0$, is equal to :

Options :

8643515315. $\sqrt{10}$

8643515316. $\sqrt{11}$

8643515317. $\sqrt{7}$

8643515318. $\sqrt{6}$

Question Number : 62 Question Id : 8643511772 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର $(a < 0)$ ପାଇଁ ବୃତ୍ତ $x^2 + y^2 + ax + 2ay + c = 0$ ଦ୍ୱାରା, x -ଅକ୍ଷ ଓ y -ଅକ୍ଷ ଦ୍ୱୟ ଉପରେ ଛେଦାଂଶର ଦୈର୍ଘ୍ୟ ଯଥାକ୍ରମେ $2\sqrt{2}$ ଏବଂ $2\sqrt{5}$ । ତେବେ ଏହି ବୃତ୍ତ ପ୍ରତି ଅଙ୍କିତ ସ୍ୱର୍ଣ୍ଣକ ଯାହା ରେଖା $x + 2y = 0$ ପ୍ରତି ଲମ୍ବ ଓ ମୂଳବିନ୍ଦୁ ମଧ୍ୟରେ ସର୍ବନିମ୍ନ ଦୂରତ୍ୱ ସମାନ :

Options :

8643515315. $\sqrt{10}$

8643515316. $\sqrt{11}$

8643515317. $\sqrt{7}$

8643515318. $\sqrt{6}$

Question Number : 63 Question Id : 8643511773 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $\vec{a} = \hat{i} + 2\hat{j} - 3\hat{k}$ and $\vec{b} = 2\hat{i} - 3\hat{j} + 5\hat{k}$. If $\vec{r} \times \vec{a} = \vec{b} \times \vec{r}$, $\vec{r} \cdot (\alpha\hat{i} + 2\hat{j} + \hat{k}) = 3$

and $\vec{r} \cdot (2\hat{i} + 5\hat{j} - \alpha\hat{k}) = -1$, $\alpha \in \mathbb{R}$, then the value of $\alpha + |\vec{r}|^2$ is equal to :

Options :

8643515319. 9

8643515320. 11

8643515321. 13

8643515322. 15

Question Number : 63 Question Id : 8643511773 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର $\vec{a} = \hat{i} + 2\hat{j} - 3\hat{k}$ ଏବଂ $\vec{b} = 2\hat{i} - 3\hat{j} + 5\hat{k}$ । ଯଦି $\vec{r} \times \vec{a} = \vec{b} \times \vec{r}$,

$\vec{r} \cdot (\alpha\hat{i} + 2\hat{j} + \hat{k}) = 3$ ଏବଂ $\vec{r} \cdot (2\hat{i} + 5\hat{j} - \alpha\hat{k}) = -1$, $\alpha \in \mathbb{R}$, ତେବେ $\alpha + |\vec{r}|^2$ ର ମୂଲ୍ୟ ସମାନ :

Options :

8643515319. 9

8643515320. 11

8643515321. 13

8643515322. 15

Question Number : 64 Question Id : 8643511774 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let f be a real valued function, defined on $\mathbb{R} - \{-1, 1\}$ and given by

$$f(x) = 3 \log_e \left| \frac{x-1}{x+1} \right| - \frac{2}{x-1}.$$

Then in which of the following intervals, function $f(x)$ is increasing ?

Options :

8643515323. $(-\infty, \infty) - \{-1, 1\}$

8643515324. $(-\infty, -1) \cup \left[\frac{1}{2}, \infty \right) - \{1\}$

8643515325. $(-\infty, \frac{1}{2}] - \{-1\}$

$$(-1, \frac{1}{2}]$$

8643515326.

Question Number : 64 Question Id : 8643511774 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର f ଏକ ବାସ୍ତବ ମୂଲ୍ୟ ଥିବା ଫଳନ, ଯାହାକୁ $\mathbf{R} - \{-1, 1\}$ ଅନ୍ତରାଳରେ $f(x) = 3 \log_e \left| \frac{x-1}{x+1} \right| - \frac{2}{x-1}$

ଆକାରରେ ବର୍ଣ୍ଣନା କରାଯାଇଛି । ତେବେ ନିମ୍ନ କେଉଁ ଅନ୍ତରାଳରେ ଫଳନ $f(x)$ ଚି କ୍ରମବର୍ଦ୍ଧିଷ୍ଣୁ ?

Options :

8643515323. $(-\infty, \infty) - \{-1, 1\}$

8643515324. $(-\infty, -1) \cup \left(\left[\frac{1}{2}, \infty \right) - \{1\} \right)$

8643515325. $(-\infty, \frac{1}{2}] - \{-1\}$

8643515326. $(-1, \frac{1}{2}]$

Question Number : 65 Question Id : 8643511775 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the points of intersections of the ellipse $\frac{x^2}{16} + \frac{y^2}{b^2} = 1$ and the circle $x^2 + y^2 = 4b$, $b > 4$ lie

on the curve $y^2 = 3x^2$, then b is equal to :

Options :

8643515327. 5

8643515328. 6

8643515329. 10

8643515330. 12

Question Number : 65 Question Id : 8643511775 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି ଇଲିପସ୍ (ଦୀର୍ଘବୃତ୍ତ) $\frac{x^2}{16} + \frac{y^2}{b^2} = 1$ ଏବଂ ବୃତ୍ତ $x^2 + y^2 = 4b$, $b > 4$ ର ଛେଦବିନ୍ଦୁ ଗୁଡ଼ିକ $y^2 = 3x^2$ ବକ୍ରରେଖା

ଉପରେ ଅବସ୍ଥିତ ହୁଅନ୍ତି ତେବେ b ସମାନ :

Options :

8643515327. 5

8643515328. 6

8643515329. 10

8643515330. 12

Question Number : 66 Question Id : 8643511776 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let C be the locus of the mirror image of a point on the parabola $y^2 = 4x$ with respect to the line $y = x$. Then the equation of tangent to C at P(2, 1) is :

Options :

8643515331. $x + 3y = 5$

8643515332. $2x + y = 5$

8643515333. $x - y = 1$

8643515334. $x + 2y = 4$

Question Number : 66 Question Id : 8643511776 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର ପାରାବୋଲା (ପରିବୃତ୍ତ) $y^2=4x$ ଉପରେ ଏକ ବିନ୍ଦୁ $y=x$ ରେଖାଭିତ୍ତିକ ପ୍ରତିବିମ୍ବ ବିନ୍ଦୁମାନଙ୍କର ସଂଚାର ପଥ C ଅଟେ । ତେବେ ବିନ୍ଦୁ $P(2, 1)$ ଠାରେ ସଂଚାର ପଥ C ର ସ୍ପର୍ଶକର ସମୀକରଣ ଅଟେ :

Options :

8643515331. $x + 3y = 5$

8643515332. $2x + y = 5$

8643515333. $x - y = 1$

8643515334. $x + 2y = 4$

Question Number : 67 Question Id : 8643511777 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let A denote the event that a 6-digit integer formed by 0, 1, 2, 3, 4, 5, 6 without repetitions, be divisible by 3. Then probability of event A is equal to :

Options :

8643515335. $\frac{4}{9}$

8643515336. $\frac{3}{7}$

8643515337. $\frac{11}{27}$

8643515338. $\frac{9}{56}$

Question Number : 67 Question Id : 8643511777 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର ଘଟଣା $A = (0, 1, 2, 3, 4, 5, 6$ ଅଙ୍କକୁ ମାତ୍ର ଥରେ ବ୍ୟବହାର କରି 3 ଦ୍ୱାରା ବିଭାଜ୍ୟ ଏକ ଛଅ ଅଙ୍କ ବିଶିଷ୍ଟ ସଂଖ୍ୟା ତିଆରି କରିବା) । ତେବେ ଘଟଣା A ଘଟିବାର ସମ୍ଭାବ୍ୟତା ସମାନ :

Options :

8643515335. $\frac{4}{9}$

8643515336. $\frac{3}{7}$

8643515337. $\frac{11}{27}$

8643515338. $\frac{9}{56}$

Question Number : 68 Question Id : 8643511778 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If $y = y(x)$ is the solution of the differential equation $\frac{dy}{dx} + (\tan x) y = \sin x$, $0 \leq x \leq \frac{\pi}{3}$, with $y(0) = 0$, then $y\left(\frac{\pi}{4}\right)$ equal to :

Options :

8643515339. $\left(\frac{1}{2\sqrt{2}}\right) \log_e 2$

8643515340. $\frac{1}{2} \log_e 2$

8643515341. $\log_e 2$

8643515342. $\frac{1}{4} \log_e 2$

Question Number : 68 Question Id : 8643511778 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

ଯଦି $y = y(x)$, $\frac{dy}{dx} + (\tan x) y = \sin x$, $0 \leq x \leq \frac{\pi}{3}$, $y(0) = 0$, ଅବକଳ ସମୀକରଣର ସମାଧାନ ଅଟେ, ତେବେ

$y\left(\frac{\pi}{4}\right)$ ସମାନ :

Options :

8643515339. $\left(\frac{1}{2\sqrt{2}}\right) \log_e 2$

8643515340. $\frac{1}{2} \log_e 2$

8643515341. $\log_e 2$

8643515342. $\frac{1}{4} \log_e 2$

Question Number : 69 Question Id : 8643511779 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $\alpha \in \mathbb{R}$ be such that the function $f(x) = \begin{cases} \frac{\cos^{-1}(1 - \{x\}^2) \sin^{-1}(1 - \{x\})}{\{x\} - \{x\}^3}, & x \neq 0 \\ \alpha, & x = 0 \end{cases}$ is

continuous at $x=0$, where $\{x\} = x - [x]$, $[x]$ is the greatest integer less than or equal to x .
Then :

Options :

8643515343. $\alpha = 0$

8643515344. no such α exists

8643515345. $\alpha = \frac{\pi}{\sqrt{2}}$

8643515346. $\alpha = \frac{\pi}{4}$

Question Number : 69 Question Id : 8643511779 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର $\alpha \in \mathbf{R}$, ଯେପରିକି ଫଳନ $f(x) = \begin{cases} \frac{\cos^{-1}(1 - \{x\}^2) \sin^{-1}(1 - \{x\})}{\{x\} - \{x\}^3}, & x \neq 0 \\ \alpha, & x = 0 \end{cases}$, $x = 0$ (ମୂଳବିନ୍ଦୁ ଠାରେ)

ଏକ ଅବିଚ୍ଛିନ୍ନ ଫଳନ ଅଟେ । ଯେଉଁଠାରେ $\{x\} = x - [x]$, $[x]$ ର ଅର୍ଥ x ର ସର୍ବାଧିକ ବାସ୍ତବ ମୂଲ୍ୟ ଫଳନ, x ସହ ସମାନ ବା x ଠାରୁ ସାନ ସଂଖ୍ୟା ପାଇଁ । ତେବେ

Options :

8643515343. $\alpha = 0$

8643515344. ଏପରି କୌଣସି α ଚିହ୍ନିବ ନାହିଁ

8643515345. $\alpha = \frac{\pi}{\sqrt{2}}$

8643515346. $\alpha = \frac{\pi}{4}$

Question Number : 70 Question Id : 8643511780 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If (x, y, z) be an arbitrary point lying on a plane P which passes through the points $(42, 0, 0)$,

$(0, 42, 0)$ and $(0, 0, 42)$, then the value of the expression

$$3 + \frac{x-11}{(y-19)^2 (z-12)^2} + \frac{y-19}{(x-11)^2 (z-12)^2} + \frac{z-12}{(x-11)^2 (y-19)^2} - \frac{x+y+z}{14(x-11)(y-19)(z-12)}$$

is equal to :

Options :

8643515347. -45

8643515348. 39

8643515349. 0

8643515350. 3

Question Number : 70 Question Id : 8643511780 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଯଦି (x, y, z) ଏକ ସମତଳ P ଉପରେ ମନଇଚ୍ଛା ଏକ ବିନ୍ଦୁ, ଯାହା $(42, 0, 0)$, $(0, 42, 0)$ ଓ $(0, 0, 42)$ ବିନ୍ଦୁ ମଧ୍ୟ ଦେଇ ଗଠି କରେ, ତେବେ ଉକ୍ତ ଉକ୍ତି

$$3 + \frac{x-11}{(y-19)^2 (z-12)^2} + \frac{y-19}{(x-11)^2 (z-12)^2} + \frac{z-12}{(x-11)^2 (y-19)^2} - \frac{x+y+z}{14(x-11)(y-19)(z-12)} \text{ ର ମୂଲ୍ୟ}$$

ସମାନ :

Options :

8643515347. -45

8643515348. 39

8643515349. 0

8643515350. 3

Question Number : 71 Question Id : 8643511781 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $A = \{2, 3, 4, 5, \dots, 30\}$ and ' \simeq ' be an equivalence relation on $A \times A$, defined by $(a, b) \simeq (c, d)$, if and only if $ad = bc$. Then the number of ordered pairs which satisfy this equivalence relation with ordered pair $(4, 3)$ is equal to :

Options :

8643515351. 5

8643515352. 6

8643515353. 7

8643515354. 8

Question Number : 71 Question Id : 8643511781 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର $A = \{2, 3, 4, 5, \dots, 30\}$ ଏବଂ ' \simeq ' ସେତେ $A \times A$ ଉପରେ ଏକ ସମତୁଲ୍ୟ ସଂପର୍କ ଯେପରିକି $(a, b) \simeq (c, d)$ ଯଦି କେବଳ ଯଦି $ad = bc$ । ତେବେ ଶୁଖିଳ ଯୋଡ଼ି $(4, 3)$ ସହ ଏହି ସମତୁଲ୍ୟ ସଂପର୍କ ରଖୁଥିବା ଶୁଖିଳ ଯୋଡ଼ି ମାନକର ସଂଖ୍ୟା ସମାନ :

Options :

8643515351. 5

8643515352. 6

8643515353. 7

8643515354. 8

Question Number : 72 Question Id : 8643511782 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $P(x) = x^2 + bx + c$ be a quadratic polynomial with real coefficients such that $\int_0^1 P(x) dx = 1$

and $P(x)$ leaves remainder 5 when it is divided by $(x - 2)$. Then the value of $9(b + c)$ is equal to :

Options :

8643515355. 7

8643515356. 9

8643515357. 11

8643515358. 15

Question Number : 72 Question Id : 8643511782 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର $P(x) = x^2 + bx + c$ ଏକ ଦ୍ଵିଘାତ ବହୁପଦ ବିଶିଷ୍ଟ ରାଶି ଯାହାର ସହଗ ଗୁଡ଼ିକ ବାସ୍ତବ, ଯେପରିକି $\int_0^1 P(x) dx = 1$

ଏବଂ $P(x)$ କୁ $(x-2)$ ଦ୍ଵାରା ଭାଗକଲେ ଭାଗଶେଷ 5 ରୁହେ । ତେବେ $9(b+c)$ ର ମୂଲ୍ୟ ସମାନ :

Options :

8643515355. 7

8643515356. 9

8643515357. 11

8643515358. 15

Question Number : 73 Question Id : 8643511783 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Consider a rectangle ABCD having 5, 7, 6, 9 points in the interior of the line segments AB, CD, BC, DA respectively. Let α be the number of triangles having these points from different sides as vertices and β be the number of quadrilaterals having these points from different sides as vertices. Then $(\beta - \alpha)$ is equal to :

Options :

8643515359. 1173

8643515360. 1890

8643515361. 717

8643515362. 795

Question Number : 73 Question Id : 8643511783 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ABCD ଏକ ଆୟତ କ୍ଷେତ୍ରକୁ ବିଚାର କର ଯାହାର ରେଖାଖଣ୍ଡ AB, CD, BC, DA ମାନଙ୍କର ଭିତର ଭାଗ (ମଧ୍ୟଭାଗ) ମାନଙ୍କର ବିନ୍ଦୁ ସଂଖ୍ୟା ଯଥାକ୍ରମେ 5, 7, 6, 9 । ମନେକର ବିଭିନ୍ନ ପାର୍ଶ୍ଵରୁ ଏହି ବିନ୍ଦୁ ମାନଙ୍କୁ ଶୀର୍ଷ ବିନ୍ଦୁ ନେଇ ତିଆରି କରାଯାଇଥିବା ତ୍ରିଭୁଜ ମାନଙ୍କର ସଂଖ୍ୟା α ଓ ଚତୁର୍ଭୁଜ ମାନଙ୍କର ସଂଖ୍ୟା β । ତେବେ $(\beta - \alpha)$ ସମାନ :

Options :

8643515359. 1173

8643515360. 1890

8643515361. 717

8643515362. 795

Question Number : 74 Question Id : 8643511784 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Consider the integral

$$I = \int_0^{10} \frac{[x] e^{[x]}}{e^{x-1}} dx,$$

where $[x]$ denotes the greatest integer less than or equal to x . Then the value of I is equal

to :

Options :

8643515363. 45 (e + 1)

8643515364. 9 (e + 1)

8643515365. 45 (e - 1)

8643515366. 9 (e - 1)

Question Number : 74 Question Id : 8643511784 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$I = \int_0^{10} \frac{[x] e^{[x]}}{e^{x-1}} dx, \text{ ସମାକନଟିକୁ ବିଚାର କର ।}$$

(ଯେଉଁଠାରେ $[x]$ ର ଅର୍ଥ x ର ମୂଲ୍ୟ x ଠାରୁ ସାନ ବା x ସହ ସମାନ ପାଇଁ ସର୍ବାଧିକ ଏକ ପୂର୍ଣ୍ଣ ବାସ୍ତବ ସଂଖ୍ୟା)

ତେବେ ସମାକନ I ର ମୂଲ୍ୟ ସମାନ :

Options :

8643515363. $45(e+1)$

8643515364. $9(e+1)$

8643515365. $45(e-1)$

8643515366. $9(e-1)$

Question Number : 75 Question Id : 8643511785 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $A(-1, 1)$, $B(3, 4)$ and $C(2, 0)$ be given three points. A line $y = mx$, $m > 0$, intersects lines AC and BC at point P and Q respectively. Let A_1 and A_2 be the areas of ΔABC and ΔPQC respectively, such that $A_1 = 3A_2$, then the value of m is equal to :

Options :

8643515367. 1

8643515368. $\frac{4}{15}$

8643515369. 2

8643515370. 3

Question Number : 75 Question Id : 8643511785 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର $A(-1, 1)$, $B(3, 4)$ ଏବଂ $C(2, 0)$ ତିନିଗୋଟି ଦତ୍ତ ବିନ୍ଦୁ । ଏକ ରେଖା $y = mx$, $m > 0$ AC ଏବଂ BC ରେଖାକୁ ଯଥାକ୍ରମେ P ଓ Q ବିନ୍ଦୁରେ ଛେଦ କରେ । ମନେକର ତ୍ରିଭୁଜ ΔABC ର କ୍ଷେତ୍ରଫଳ A_1 ଏବଂ ତ୍ରିଭୁଜ ΔPQC ର କ୍ଷେତ୍ରଫଳ A_2 ଯେପରିକି $A_1 = 3A_2$, ତେବେ 'm' ର ମୂଲ୍ୟ ସମାନ :

Options :

8643515367. 1

8643515368. $\frac{4}{15}$

8643515369. 2

8643515370. 3

Question Number : 76 Question Id : 8643511786 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The least value of $|z|$ where z is complex number which satisfies the inequality

$$\exp\left(\frac{(|z| + 3)(|z| - 1)}{|z| + 1} \log_e 2\right) \geq \log_{\sqrt{2}} |5\sqrt{7} + 9i|, i = \sqrt{-1}, \text{ is equal to :}$$

Options :

8643515371. 2

8643515372. $\sqrt{5}$

8643515373. 3

8643515374. 8

Question Number : 76 Question Id : 8643511786 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର z ଏକ ମିଶ୍ର ସଂଖ୍ୟା (କମ୍ପ୍ଲେକ୍ସ ସଂଖ୍ୟା), ଯାହା

$$\exp\left(\frac{(|z| + 3)(|z| - 1)}{|z| + 1} \log_e 2\right) \geq \log_{\sqrt{2}} |5\sqrt{7} + 9i|, i = \sqrt{-1}, \text{ ଅସମୀକରଣକୁ ସିଦ୍ଧ କରେ । ତେବେ } |z|$$

ର ସର୍ବନିମ୍ନ ମୂଲ୍ୟ ସମାନ :

Options :

8643515371. 2

8643515372. $\sqrt{5}$

8643515373. 3

8643515374. 8

Question Number : 77 Question Id : 8643511787 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The maximum value of $f(x) = \begin{vmatrix} \sin^2 x & 1 + \cos^2 x & \cos 2x \\ 1 + \sin^2 x & \cos^2 x & \cos 2x \\ \sin^2 x & \cos^2 x & \sin 2x \end{vmatrix}, x \in \mathbf{R}$ is :

Options :

8643515375. $\sqrt{5}$

8643515376. 5

8643515377. $\sqrt{7}$

8643515378. $\frac{3}{4}$

Question Number : 77 Question Id : 8643511787 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$f(x) = \begin{vmatrix} \sin^2 x & 1 + \cos^2 x & \cos 2x \\ 1 + \sin^2 x & \cos^2 x & \cos 2x \\ \sin^2 x & \cos^2 x & \sin 2x \end{vmatrix}, (x \in \mathbf{R})$ ର ସର୍ବାଧିକ ମୂଲ୍ୟ ଅଟେ :

Options :

8643515375. $\sqrt{5}$

8643515376. 5

8643515377. $\sqrt{7}$

8643515378. $\frac{3}{4}$

Question Number : 78 Question Id : 8643511788 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given that the inverse trigonometric functions take principal values only. Then, the number

of real values of x which satisfy $\sin^{-1}\left(\frac{3x}{5}\right) + \sin^{-1}\left(\frac{4x}{5}\right) = \sin^{-1}x$ is equal to :

Options :

8643515379. 0

8643515380. 1

8643515381. 2

8643515382. 3

Question Number : 78 Question Id : 8643511788 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ଦତ୍ତ ଅଛି ଯେ ବିପରୀତ ତ୍ରିକୋଣମିତ୍ତିକ ଫଳନଗୁଡ଼ିକ କେବଳ ମୁଖ୍ୟମାନ ନେଇଥାଆନ୍ତି । ତେବେ ସମୀକରଣ

$\sin^{-1}\left(\frac{3x}{5}\right) + \sin^{-1}\left(\frac{4x}{5}\right) = \sin^{-1}x$, କୁ ସିଦ୍ଧ କରୁଥିବା x ର ବାସ୍ତବ ମୂଲ୍ୟମାନଙ୍କର ସଂଖ୍ୟା ସମାନ :

Options :

8643515379. 0

8643515380. 1

8643515381. 2

8643515382. 3

Question Number : 79 Question Id : 8643511789 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $f: S \rightarrow S$ where $S = (0, \infty)$ be a twice differentiable function such that $f(x+1) = xf(x)$. If $g: S \rightarrow \mathbb{R}$ be defined as $g(x) = \log_e f(x)$, then the value of $|g''(5) - g''(1)|$ is equal to :

Options :

8643515383. $\frac{205}{144}$

8643515384. $\frac{197}{144}$

8643515385. $\frac{187}{144}$

8643515386. 1

Question Number : 79 Question Id : 8643511789 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର $f: S \rightarrow S$ (ଯେଉଁଠାରେ $S = (0, \infty)$) ଏକ ଦୁଇଥର ଅବକଳନୀୟ ଫଳନ ଯେପରିକି $f(x+1) = xf(x)$ । ଯଦି $g: S \rightarrow \mathbb{R}$ ଫଳନଟିକୁ $g(x) = \log_e f(x)$, ରୂପେ ବର୍ଣ୍ଣିତ କରାଯାଏ, ତେବେ $|g''(5) - g''(1)|$ ର ମୂଲ୍ୟ ସମାନ :

Options :

8643515383. $\frac{205}{144}$

8643515384. $\frac{197}{144}$

8643515385. $\frac{187}{144}$

8643515386. 1

Question Number : 80 Question Id : 8643511790 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let C_1 be the curve obtained by the solution of differential equation $2xy \frac{dy}{dx} = y^2 - x^2, x > 0$.

Let the curve C_2 be the solution of $\frac{2xy}{x^2 - y^2} = \frac{dy}{dx}$. If both the curves pass through $(1, 1)$, then

the area enclosed by the curves C_1 and C_2 is equal to :

Options :

8643515387. $\frac{\pi}{4} + 1$

8643515388. $\pi - 1$

8643515389. $\frac{\pi}{2} - 1$

8643515390. $\pi + 1$

Question Number : 80 Question Id : 8643511790 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ମନେକର $2xy \frac{dy}{dx} = y^2 - x^2, (x > 0)$ ଅବକଳ ସମୀକରଣଟିକୁ ସମାଧାନ କରି ବକ୍ରରେଖା C_1 ମିଳେ । $\frac{2xy}{x^2 - y^2} = \frac{dy}{dx}$

ଅବକଳ ସମୀକରଣଟିକୁ ସମାଧାନ କରି ବକ୍ରରେଖା C_2 ମିଳେ । ଯଦି ଉଭୟ ବକ୍ରରେଖା, ବିନ୍ଦୁ $(1, 1)$ ମଧ୍ୟବେଳ ଗତିକରେ, ତେବେ ବକ୍ରରେଖା C_1 ଓ C_2 ଦ୍ୱାରା ଆବଦ୍ଧ କ୍ଷେତ୍ରର କ୍ଷେତ୍ରଫଳ ସମାନ :

Options :

8643515387. $\frac{\pi}{4} + 1$

8643515388. $\pi - 1$

8643515389. $\frac{\pi}{2} - 1$

8643515390. $\pi + 1$

Mathematics Section B

Section Id :	864351120
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 :	864351120
Question Shuffling Allowed :	Yes

**Question Number : 81 Question Id : 8643511791 Question Type : SA
Correct Marks : 4 Wrong Marks : 0**

For real numbers α , β , γ and δ , if

$$\int \frac{(x^2-1) + \tan^{-1}\left(\frac{x^2+1}{x}\right)}{(x^4+3x^2+1) \tan^{-1}\left(\frac{x^2+1}{x}\right)} dx$$

$$= \alpha \log_e \left(\tan^{-1} \left(\frac{x^2+1}{x} \right) \right) + \beta \tan^{-1} \left(\frac{\gamma(x^2-1)}{x} \right) + \delta \tan^{-1} \left(\frac{x^2+1}{x} \right) + C$$

where C is an arbitrary constant, then the value of $10(\alpha + \beta\gamma + \delta)$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

**Question Number : 81 Question Id : 8643511791 Question Type : SA
Correct Marks : 4 Wrong Marks : 0**

ବାସ୍ତବ ସଂଖ୍ୟା α, β, γ ଏବଂ δ , ପାଇଁ, ଯଦି

$$\int \frac{(x^2-1) + \tan^{-1}\left(\frac{x^2+1}{x}\right)}{(x^4+3x^2+1) \tan^{-1}\left(\frac{x^2+1}{x}\right)} dx$$

$$= \alpha \log_e \left(\tan^{-1} \left(\frac{x^2+1}{x} \right) \right) + \beta \tan^{-1} \left(\frac{\gamma(x^2-1)}{x} \right) + \delta \tan^{-1} \left(\frac{x^2+1}{x} \right) + C$$

ଯେଉଁଠାରେ C ଏକ ନିରାକାର

ସ୍ଥିରାଙ୍କ । ତେବେ $10(\alpha + \beta\gamma + \delta)$ ର ମୂଲ୍ୟ ସମାନ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 82 **Question Id :** 8643511792 **Question Type :** SA

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

In ΔABC , the lengths of sides AC and AB are 12 cm and 5 cm, respectively. If the area of ΔABC is 30 cm^2 and R and r are respectively the radii of circumcircle and incircle of ΔABC , then the value of $2R + r$ (in cm) is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 82 **Question Id :** 8643511792 **Question Type :** SA

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

ଏକ ତ୍ରିଭୁଜ ΔABC ରେ ପାର୍ଶ୍ୱ AC ଏବଂ ପାର୍ଶ୍ୱ AB ର ଦୈର୍ଘ୍ୟ ଯଥାକ୍ରମେ 12 ସେ.ମି ଓ 5 ସେ.ମି । ଯଦି ତ୍ରିଭୁଜ ΔABC ର କ୍ଷେତ୍ରଫଳ 30 ବର୍ଗସେ.ମି ଏବଂ R ଓ r ଯଥାକ୍ରମେ ତ୍ରିଭୁଜ ΔABC ର ପରିବୃତ୍ତ ଓ ଅନ୍ତଃବୃତ୍ତର ବ୍ୟାସାର୍ଦ୍ଧ ହୁଅନ୍ତି ତେବେ $2R + r$ (ସେ.ମିରେ) ର ମୂଲ୍ୟ ସମାନ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 83 Question Id : 8643511793 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the distance of the point $(1, -2, 3)$ from the plane $x + 2y - 3z + 10 = 0$ measured parallel to

the line, $\frac{x-1}{3} = \frac{2-y}{m} = \frac{z+3}{1}$ is $\sqrt{\frac{7}{2}}$, then the value of $|m|$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 83 Question Id : 8643511793 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଯଦି ରେଖା $\frac{x-1}{3} = \frac{2-y}{m} = \frac{z+3}{1}$ ସହ ସମାନ୍ତର କରି, ସମତଳ $x + 2y - 3z + 10 = 0$ ଠାରୁ ବିନ୍ଦୁ $(1, -2, 3)$

ମଧ୍ୟରେ ମପାଯାଇଥିବା ଦୂରତା $\sqrt{\frac{7}{2}}$ ଅଟେ, ତେବେ $|m|$ ର ମୂଲ୍ୟ ସମାନ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 84 Question Id : 8643511794 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let \vec{c} be a vector perpendicular to the vectors $\vec{a} = \hat{i} + \hat{j} - \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} + \hat{k}$. If

$\vec{c} \cdot (\hat{i} + \hat{j} + 3\hat{k}) = 8$ then the value of $\vec{c} \cdot (\vec{a} \times \vec{b})$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 84 Question Id : 8643511794 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ମନେକର \vec{c} ଦିଶାଙ୍କଟି $\vec{a} = \hat{i} + \hat{j} - \hat{k}$ ଏବଂ $\vec{b} = \hat{i} + 2\hat{j} + \hat{k}$ ଦିଶାଙ୍କ ଦ୍ୱୟ ପ୍ରତି ଲମ୍ବ । ଯଦି $\vec{c} \cdot (\hat{i} + \hat{j} + 3\hat{k}) = 8$, ତେବେ $\vec{c} \cdot (\vec{a} \times \vec{b})$ ର ମୂଲ୍ୟ ସମାନ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 85 Question Id : 8643511795 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $f: \mathbb{R} \rightarrow \mathbb{R}$ and $g: \mathbb{R} \rightarrow \mathbb{R}$ be defined as

$$f(x) = \begin{cases} x + a, & x < 0 \\ |x - 1|, & x \geq 0 \end{cases} \text{ and } g(x) = \begin{cases} x + 1, & x < 0 \\ (x - 1)^2 + b, & x \geq 0 \end{cases}$$

where a, b are non-negative real numbers. If $(g \circ f)(x)$ is continuous for all $x \in \mathbb{R}$, then $a + b$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 85 Question Id : 8643511795 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ମନେକର $f : \mathbb{R} \rightarrow \mathbb{R}$ ଏବଂ $g : \mathbb{R} \rightarrow \mathbb{R}$ ଫଳନଗୁଡ଼ିକୁ $f(x) = \begin{cases} x+a, & x < 0 \\ |x-1|, & x \geq 0 \end{cases}$ ଏବଂ

$g(x) = \begin{cases} x+1, & x < 0 \\ (x-1)^2+b, & x \geq 0 \end{cases}$ ରୂପେ ବର୍ଣ୍ଣନା କରାଯାଇଅଛି, ଯେଉଁଠାରେ a, b ଅଣରଣାତ୍ମକ ବାସ୍ତବ ସଂଖ୍ୟା । ଯଦି

$(g \circ f)(x)$, x ର ସମସ୍ତ ବାସ୍ତବ ମୂଲ୍ୟ ପାଇଁ ଅବିଚ୍ଛିନ୍ନ ଅଟେ, ତେବେ $a+b$ ସମାନ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 86 **Question Id :** 8643511796 **Question Type :** SA

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

Consider the statistics of two sets of observations as follows :

	Size	Mean	Variance
Observation I	10	2	2
Observation II	n	3	1

If the variance of the combined set of these two observations is $\frac{17}{9}$, then the value of n is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 86 **Question Id :** 8643511796 **Question Type :** SA

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

ଦୁଇ ସେଟ୍ ପର୍ଯ୍ୟବେକ୍ଷଣର ପରିସଂଖ୍ୟାନକୁ ବିଚାର କର ।

	ଆକାର	ମଧ୍ୟକ (ମିନ)	ପ୍ରସରଣ(ଭାରିଆନ୍ସ)
ପର୍ଯ୍ୟବେକ୍ଷଣ I	10	2	2
ପର୍ଯ୍ୟବେକ୍ଷଣ II	n	3	1

ଯଦି ଦୁଇସେଟ୍ ପର୍ଯ୍ୟବେକ୍ଷଣର ଯୁଗ୍ମ ପ୍ରସରଣ $\frac{17}{9}$ ଅଟେ, ତେବେ 'n' ର ମୂଲ୍ୟ ସମାନ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 87 **Question Id :** 8643511797 **Question Type :** SA

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

Let n be a positive integer. Let $A = \sum_{k=0}^n (-1)^k nC_k \left[\left(\frac{1}{2}\right)^k + \left(\frac{3}{4}\right)^k + \left(\frac{7}{8}\right)^k + \left(\frac{15}{16}\right)^k + \left(\frac{31}{32}\right)^k \right]$

If $63A = 1 - \frac{1}{2^{30}}$, then n is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 87 **Question Id :** 8643511797 **Question Type :** SA

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

ମନେକର n ଏକ ଯୁଗ୍ମ ପୂର୍ଣ୍ଣସଂଖ୍ୟା । ଧରାଯାଉ $A = \sum_{k=0}^n (-1)^k nC_k \left[\left(\frac{1}{2}\right)^k + \left(\frac{3}{4}\right)^k + \left(\frac{7}{8}\right)^k + \left(\frac{15}{16}\right)^k + \left(\frac{31}{32}\right)^k \right]$ ।

ଯଦି $63A = 1 - \frac{1}{2^{30}}$, ତେବେ n ସମାନ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 88 Question Id : 8643511798 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $A = \begin{bmatrix} a_1 \\ a_2 \end{bmatrix}$ and $B = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix}$ be two 2×1 matrices with real entries such that $A = XB$, where

$X = \frac{1}{\sqrt{3}} \begin{bmatrix} 1 & -1 \\ 1 & k \end{bmatrix}$, and $k \in \mathbb{R}$. If $a_1^2 + a_2^2 = \frac{2}{3}(b_1^2 + b_2^2)$ and $(k^2 + 1) b_2^2 \neq -2 b_1 b_2$, then the

value of k is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 88 Question Id : 8643511798 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ମନେକର ବାସ୍ତବ ଉପାଦାନ ବିଶିଷ୍ଟ $A = \begin{bmatrix} a_1 \\ a_2 \end{bmatrix}$ ଏବଂ $B = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix}$ ଦୁଇଟି, 2×1 ଅର୍ଡର ବିଶିଷ୍ଟ ମାଟ୍ରିକ୍ସ (ସାରଣୀ),

ଯେପରିକି $A = XB$, ଯେଉଁଠାରେ $X = \frac{1}{\sqrt{3}} \begin{bmatrix} 1 & -1 \\ 1 & k \end{bmatrix}$ ଏବଂ $k \in \mathbb{R}$, ଯଦି $a_1^2 + a_2^2 = \frac{2}{3}(b_1^2 + b_2^2)$ ଏବଂ

$(k^2 + 1) b_2^2 \neq -2 b_1 b_2$, ତେବେ k ର ମୂଲ୍ୟ ଅଟେ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 89 Question Id : 8643511799 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $\frac{1}{16}$, a and b be in G.P. and $\frac{1}{a}$, $\frac{1}{b}$, 6 be in A.P., where $a, b > 0$. Then $72(a + b)$ is equal to

_____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 89 Question Id : 8643511799 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ମନେକର $\frac{1}{16}$, a ଏବଂ b ଏକ ଗୁଣୋତ୍ତର ପ୍ରଗତି(ଶ୍ରେଣୀ) ଓ $\frac{1}{a}$, $\frac{1}{b}$ ଏବଂ 6 ଏକ ସମାନ୍ତର ପ୍ରଗତି (ଶ୍ରେଣୀ)ରେ

ଅଛନ୍ତି । ଯେଉଁଠାରେ $a, b > 0$ । ତେବେ $72(a + b)$ ର ମୂଲ୍ୟ ସମାନ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 90 Question Id : 8643511800 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let

$$S_n(x) = \log_{a/2} x + \log_{a/3} x + \log_{a/6} x + \log_{a/11} x + \log_{a/18} x + \log_{a/27} x + \dots \text{ up to } n\text{-terms,}$$

where $a > 1$. If $S_{24}(x) = 1093$ and $S_{12}(2x) = 265$, then value of a is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 90 Question Id : 8643511800 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ମନେକର

$$S_n(x) = \log_{a^{1/2}} x + \log_{a^{1/3}} x + \log_{a^{1/6}} x + \log_{a^{1/11}} x + \log_{a^{1/18}} x + \log_{a^{1/27}} x + \dots n\text{-ପଦ ପର୍ଯ୍ୟନ୍ତ}$$

ଯେଉଁଠାରେ $a > 1$ । ଯଦି $S_{24}(x) = 1093$ ଏବଂ $S_{12}(2x) = 265$, ତେବେ a ର ମୂଲ୍ୟ ସମାନ _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

