

# National Testing Agency

<b>Question Paper Name :</b>	B TECH EO 24th Feb 2021 Shift 2
<b>Subject Name :</b>	B TECH EO
<b>Creation Date :</b>	2021-02-25 09:54:34
<b>Duration :</b>	180
<b>Number of Questions :</b>	90
<b>Total Marks :</b>	300
<b>Display Marks:</b>	Yes

## **B TECH EO**

<b>Group Number :</b>	1
<b>Group Id :</b>	708191183
<b>Group Maximum Duration :</b>	0
<b>Group Minimum Duration :</b>	180
<b>Show Attended Group? :</b>	No
<b>Edit Attended Group? :</b>	No
<b>Break time :</b>	0
<b>Group Marks :</b>	300
<b>Is this Group for Examiner? :</b>	No

## **Physics Section A**

<b>Section Id :</b>	708191676
<b>Section Number :</b>	1
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	20
<b>Number of Questions to be attempted :</b>	20

**Section Marks :** 80  
**Mark As Answered Required? :** Yes  
**Sub-Section Number :** 1  
**Sub-Section Id :** 708191956  
**Question Shuffling Allowed :** Yes

**Question Number : 1 Question Id : 70819117044 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The period of oscillation of a simple pendulum is  $T = 2\pi\sqrt{\frac{L}{g}}$ . Measured value of 'L' is 1.0 m from meter scale having a minimum division of 1 mm and time of one complete oscillation is 1.95 s measured from stopwatch of 0.01 s resolution. The percentage error in the determination of 'g' will be :

**Options :**

70819156281. 1.33%

70819156282. 1.03%

70819156283. 1.13%

70819156284. 1.30%

**Question Number : 1 Question Id : 70819117044 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଗୋଟିଏ ସରଳ ଦୋଳକର ଦୋଳନର ଆବର୍ତ୍ତକାଳ  $T = 2\pi \sqrt{\frac{L}{g}}$  ଅଟେ । ସର୍ବନିମ୍ନ 1 mm ଭାଗଥିବା ଏକ ମିଟର ସ୍କେଲରେ

'L' ର ମପାଯାଇଥିବା ଦୈର୍ଘ୍ୟ ଅଟେ 1.00 m ଏବଂ 0.01 s ବିଭେଦନ ଥିବା ଗୋଟିଏ ଷ୍ଟପ୍ ଡ୍ଵାରରେ ମପାଯାଇଥିବା ଏକ ସମ୍ପୂର୍ଣ୍ଣ ଦୋଳନ ସମୟ 1.95 s ଅଟେ ।

'g' ର ମୂଲ୍ୟ ନିର୍ଣ୍ଣୟରେ ହେଉଥିବା ଶତକଡ଼ା ତ୍ରୁଟି ହେବ \_\_\_\_\_ ।

**Options :**

70819156281. 1.33 %

70819156282. 1.03 %

70819156283. 1.13 %

70819156284. 1.30 %

**Question Number : 2 Question Id : 70819117045 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

A particle is projected with velocity  $v_0$  along  $x$ -axis. A damping force is acting on the particle which is proportional to the square of the distance from the origin i.e.  $ma = -\alpha x^2$ . The distance at which the particle stops :

**Options :**

70819156285.  $\left(\frac{2v_0^2}{3\alpha}\right)^{\frac{1}{2}}$

70819156286.  $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{2}}$

$$\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{3}}$$

70819156287.

$$\left(\frac{2v_0}{3\alpha}\right)^{\frac{1}{3}}$$

70819156288.

**Question Number : 2 Question Id : 70819117045 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଗୋଟିଏ କଣିକା  $x$ -ଅକ୍ଷ ଦିଗରେ  $v_0$  ପରିବେଗରେ କ୍ଷେପଣ କରାଗଲା । ଗୋଟିଏ ମନ୍ଦନ ବଳ କଣିକାଟି ଉପରେ କାର୍ଯ୍ୟ କରୁଅଛି ଯାହା ମୂଳବିନ୍ଦୁ(ଅରିଜିନ) ଠାରୁ ଦୂରତାର ବର୍ଗ ସହ ସମାନୁପାତି ଅଟେ ଯଥା  $ma = -\alpha x^2$  । କଣିକାଟି ସ୍ଥିର ଅବସ୍ଥାକୁ ଆସୁଥିବା ସ୍ଥାନର ଦୂରତା ହେଉଛି \_\_\_\_\_ ।

**Options :**

$$\left(\frac{2v_0^2}{3\alpha}\right)^{\frac{1}{2}}$$

70819156285.

$$\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{2}}$$

70819156286.

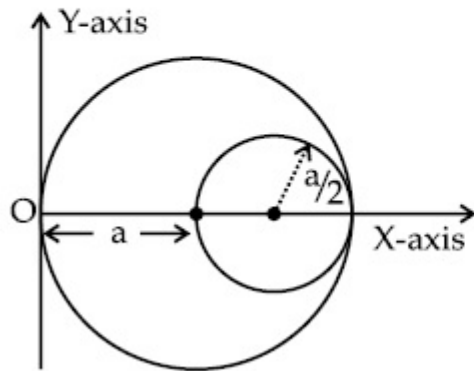
$$\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{3}}$$

70819156287.

70819156288.  $\left(\frac{2v_0}{3\alpha}\right)^{\frac{1}{3}}$

**Question Number : 3 Question Id : 70819117046 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

A circular hole of radius  $\left(\frac{a}{2}\right)$  is cut out of a circular disc of radius 'a' as shown in figure. The centroid of the remaining circular portion with respect to point 'O' will be :



**Options :**

70819156289.  $\frac{1}{6}a$

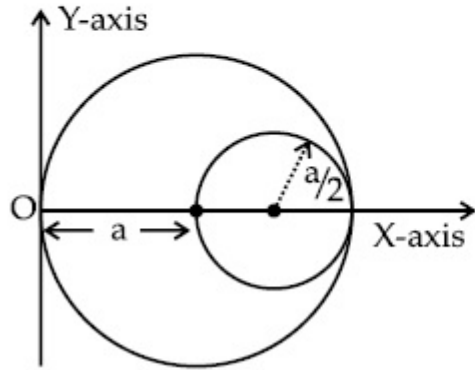
70819156290.  $\frac{5}{6}a$

70819156291.  $\frac{2}{3}a$

70819156292.  $\frac{10}{11}a$

**Question Number : 3 Question Id : 70819117046 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଚିତ୍ରରେ ଦର୍ଶାଯାଇଥିବା ଅନୁସାରେ 'a' ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ ଗୋଟିଏ ଗୋଲାକାର ଡିସ୍କରୁ  $\left(\frac{a}{2}\right)$  ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ ଗୋଲାକାର ଗର୍ଭ କାଢ଼ିନିଆଗଲା । ଅବଶିଷ୍ଟ ବୃତ୍ତାଂଶର 'O' ପ୍ରତି ଭରକେନ୍ଦ୍ର ହେବ \_\_\_\_\_ ।



**Options :**

70819156289.  $\frac{1}{6}a$

70819156290.  $\frac{5}{6}a$

70819156291.  $\frac{2}{3}a$

70819156292.  $\frac{10}{11}a$

**Question Number : 4 Question Id : 70819117047 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

A body weighs 49 N on a spring balance at the north pole. What will be its weight recorded on the same weighing machine, if it is shifted to the equator ?

[Use  $g = \frac{GM}{R^2} = 9.8 \text{ ms}^{-2}$  and radius of earth,  $R = 6400 \text{ km}$ .]

**Options :**

70819156293. 49.17 N

70819156294. 49 N

70819156295. 48.83 N

70819156296. 49.83 N

**Question Number : 4 Question Id : 70819117047 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଉତ୍ତର ମେରୁରେ ଗୋଟିଏ ସ୍ପ୍ରିଙ୍ଗ୍ ବାଲାନ୍ସ୍ ଦ୍ଵାରା ଏକ ବସ୍ତୁର ଓଜନ ମପାଗଲେ 49 N ହୁଏ । ଯଦି ଏହାକୁ ବିଶୁଦ୍ଧ ରେଖାକୁ ସ୍ଥାନାନ୍ତର କରାଯାଏ ତେବେ ସେହି ଏକା ଓଜନ ମାପକ ଯନ୍ତ୍ରରେ ଏହାର ଓଜନ କେତେ ହେବ ?

[ନିଅ  $g = \frac{GM}{R^2} = 9.8 \text{ ms}^{-2}$  ଏବଂ ପୃଥିବୀର ବ୍ୟାସାର୍ଦ୍ଧ  $R = 6400 \text{ km}$ .]

**Options :**

70819156293. 49.17 N

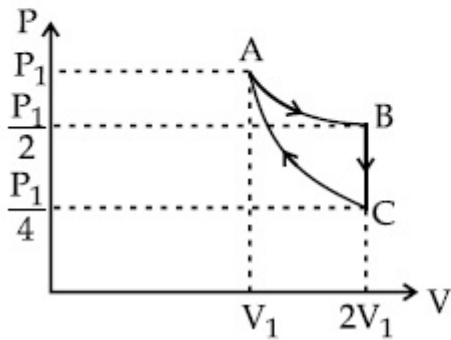
70819156294. 49 N

70819156295. 48.83 N

70819156296. 49.83 N

**Question Number : 5 Question Id : 70819117048 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

If one mole of an ideal gas at  $(P_1, V_1)$  is allowed to expand reversibly and isothermally (A to B) its pressure is reduced to one-half of the original pressure (see figure). This is followed by a constant volume cooling till its pressure is reduced to one-fourth of the initial value (B  $\rightarrow$  C). Then it is restored to its initial state by a reversible adiabatic compression (C to A). The net workdone by the gas is equal to :



**Options :**

$$RT \left( \ln 2 - \frac{1}{2(\gamma - 1)} \right)$$

70819156297.



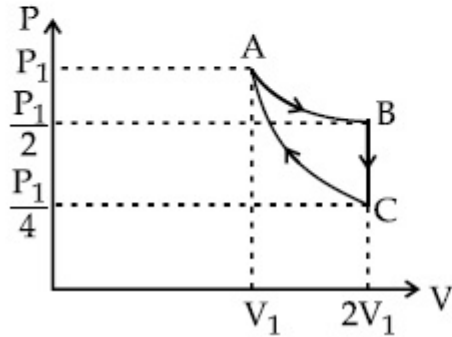
70819156298.  $-\frac{RT}{2(\gamma-1)}$

70819156299.  $RT \ln 2$

70819156300.  $0$

**Question Number : 5 Question Id : 70819117048 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

( $P_1, V_1$ ) ରେ ଥିବା ଏକ ମୋଲ ବିଶିଷ୍ଟ ଗୋଟିଏ ଆଦର୍ଶ ଗ୍ୟାସକୁ ପ୍ରତ୍ୟାବର୍ତ୍ତୀ ଭାବେ ଏବଂ ସମତାପୀୟରେ (A ରୁ B) ପ୍ରସାରିତ ହେବାକୁ ଦିଆଗଲା ଏହାର ଚାପ ମୂଳ ଚାପର ଅଧାକୁ କମିଗଲା (ଚିତ୍ର ଦେଖ) । ଏହାର ଚାପ ମୂଳ ଚାପର ଏକ ଚତୁର୍ଥାଂଶ ହେବା ପର୍ଯ୍ୟନ୍ତ ଏକ ସ୍ଥିର ଆୟତନ ଶୀତଳୀକରଣରେ ଏହାକୁ ପଶ୍ଚାତ୍ୟାବନ କରାଗଲା (B ରୁ C) । ଏହାପରେ ଏହାକୁ ଗୋଟିଏ ପ୍ରତ୍ୟାବର୍ତ୍ତୀ ରୁଦ୍ଧତାପ ସଂକୋଚନ (C ରୁ A) ଦ୍ୱାରା ଏହାର ପ୍ରାଥମିକ ଅବସ୍ଥାକୁ ପୁନଃସ୍ଥାପନ କରାଗଲା । ଗ୍ୟାସଟି ଦ୍ୱାରା ହେଉଥିବା ପ୍ରକୃତ କାର୍ଯ୍ୟ (ନେଟୱାର୍କ) ହେବ \_\_\_\_\_ ।



**Options :**

70819156297.  $RT \left( \ln 2 - \frac{1}{2(\gamma-1)} \right)$

70819156298.  $-\frac{RT}{2(\gamma - 1)}$

70819156299.  $RT \ln 2$

70819156300.  $0$

**Question Number : 6 Question Id : 70819117049 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

On the basis of kinetic theory of gases, the gas exerts pressure because its molecules :

**Options :**

70819156301. continuously lose their energy till it reaches wall.

70819156302. continuously stick to the walls of container.

70819156303. are attracted by the walls of container.

70819156304. suffer change in momentum when impinge on the walls of container.

**Question Number : 6 Question Id : 70819117049 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଗ୍ୟାସର ଗତିଜ ଚତୁ ଅନୁସାରେ, ଗ୍ୟାସଟି ଚାପ ପ୍ରୟୋଗ କରିଥାଏ କାରଣ ଏହାର ଅଣୁ ଗୁଡ଼ିକ :

**Options :**

70819156301. କାନ୍ଥ(ଝାଲ) ରେ ପହଞ୍ଚିବା ପର୍ଯ୍ୟନ୍ତ ଲଗାତର ଭାବେ ସେମାନଙ୍କ ଶକ୍ତି ହରାଇଥାଆନ୍ତି ।

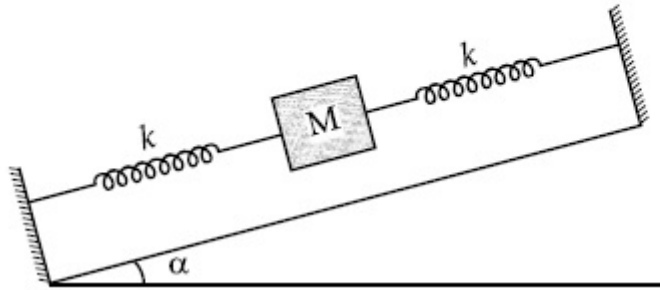
70819156302. ଲଗାତର ଭାବେ ଧାରକଟିର କାନ୍ଧରେ ଲାଖିଯାଆନ୍ତି ।

70819156303. ଧାରକର କାନ୍ଧଗୁଡ଼ିକ ଦ୍ଵାରା ଆକର୍ଷିତ ହୋଇଥାନ୍ତି ।

70819156304. ସଂବେଗ ପରିବର୍ତ୍ତନ ଭୋଗନ୍ତି ଯେତେବେଳେ ଧାରକଟିର କାନ୍ଧରେ ଧକ୍କା ଖାଆନ୍ତି ।

**Question Number : 7 Question Id : 70819117050 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

In the given figure, a body of mass  $M$  is held between two massless springs, on a smooth inclined plane. The free ends of the springs are attached to firm supports. If each spring has spring constant  $k$ , the frequency of oscillation of given body is :



**Options :**

70819156305.  $\frac{1}{2\pi} \sqrt{\frac{k}{Mg \sin \alpha}}$

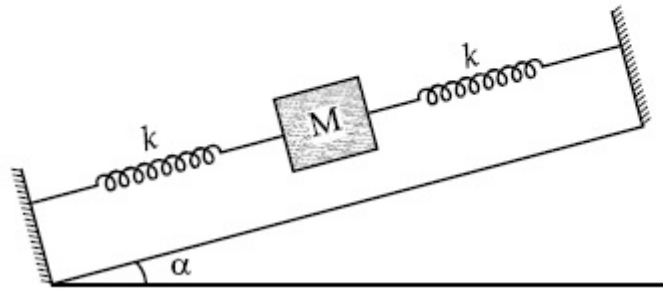
70819156306.  $\frac{1}{2\pi} \sqrt{\frac{2k}{Mg \sin \alpha}}$

70819156307.  $\frac{1}{2\pi} \sqrt{\frac{2k}{M}}$

70819156308.  $\frac{1}{2\pi} \sqrt{\frac{k}{2M}}$

**Question Number : 7 Question Id : 70819117050 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଦଉଳ ଚିତ୍ରରେ, ଗୋଟିଏ ମସୃଣ ଆନତ ପୃଷ୍ଠତଳ ଉପରେ  $M$  ବସ୍ତୁ ବିଶିଷ୍ଟ ଏକ ବସ୍ତୁକୁ ଦୁଇଟି ବସ୍ତୁ ହୀନ ସ୍ପ୍ରିଙ୍ଗ ମଝିରେ ଧରି ରଖାଯାଇଛି । ସ୍ପ୍ରିଙ୍ଗ ଗୁଡ଼ିକର ମୂଳ ମୁଣ୍ଡକୁ ଦୂର ଧାରକକୁ ଲଗାଯାଇଛି । ଯଦି ସ୍ପ୍ରିଙ୍ଗଟିର ସ୍ପ୍ରିଙ୍ଗ ଧୁବାଙ୍କ ' $k$ ' ହୁଏ, ବସ୍ତୁଟିର ଦୋଳନର ଆବୃତ୍ତି ହେବ \_\_\_\_\_ ।



**Options :**

70819156305.  $\frac{1}{2\pi} \sqrt{\frac{k}{Mg \sin \alpha}}$

70819156306.  $\frac{1}{2\pi} \sqrt{\frac{2k}{Mg \sin \alpha}}$

70819156307.  $\frac{1}{2\pi} \sqrt{\frac{2k}{M}}$

70819156308.  $\frac{1}{2\pi} \sqrt{\frac{k}{2M}}$

**Question Number : 8 Question Id : 70819117051 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

When a particle executes SHM, the nature of graphical representation of velocity as a function of displacement is :

**Options :**

70819156309. circular

70819156310. elliptical

70819156311. parabolic

70819156312. straight line

**Question Number : 8 Question Id : 70819117051 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଯେତେବେଳେ ଗୋଟିଏ କଣିକା ସରଳ ହାରମୋନିକ୍ ଗତି (ଏସ୍.ଏଚ୍.ଏମ୍), ସମ୍ପାଦନ କରୁଥାଏ, ବିସ୍ଥାପନର ଫଳନ ଅନୁସାରେ ପରିବେଗର ଲେଖଟିତ୍ରର ପ୍ରକୃତିର ଆକାର ଅଟେ :

**Options :**

70819156309. ବୃତ୍ତାକାର

70819156310. ଦୀର୍ଘ ବୃତ୍ତାକାର (ଇଲିପ୍ଟିକାଲ)

70819156311. ପରବଳକ୍ରିୟକ (ପାରାବୋଲିକ)

70819156312. ସରଳ ରେଖା

**Question Number : 9 Question Id : 70819117052 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Which of the following equations represents a travelling wave ?

**Options :**

70819156313.  $y = Ae^x \cos(\omega t - \theta)$

70819156314.  $y = Ae^{-x^2} (vt + \theta)$

70819156315.  $y = A \sin(15x - 2t)$

70819156316.  $y = A \sin x \cos \omega t$

**Question Number : 9 Question Id : 70819117052 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ନିମ୍ନରେ ଥିବା ସମୀକରଣ ଗୁଡ଼ିକରୁ କେଉଁଟି ଗୋଟିଏ ଗତିଶୀଳ ତରଙ୍ଗକୁ ସୂଚିତ କରୁଛି ?

**Options :**

70819156313.  $y = Ae^x \cos(\omega t - \theta)$

70819156314.  $y = Ae^{-x^2} (vt + \theta)$

70819156315.  $y = A\sin(15x - 2t)$

70819156316.  $y = A\sin x \cos \omega t$

**Question Number : 10 Question Id : 70819117053 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Two electrons each are fixed at a distance ' $2d$ '. A third charge proton placed at the midpoint is displaced slightly by a distance  $x$  ( $x \ll d$ ) perpendicular to the line joining the two fixed charges. Proton will execute simple harmonic motion having angular frequency : ( $m$  = mass of charged particle)

**Options :**

70819156317.  $\left( \frac{q^2}{2\pi\epsilon_0 md^3} \right)^{\frac{1}{2}}$

70819156318.  $\left( \frac{2q^2}{\pi\epsilon_0 md^3} \right)^{\frac{1}{2}}$

70819156319.  $\left( \frac{\pi\epsilon_0 md^3}{2q^2} \right)^{\frac{1}{2}}$

$$\left( \frac{2\pi\epsilon_0 md^3}{q^2} \right)^{\frac{1}{2}}$$

70819156320.

**Question Number : 10 Question Id : 70819117053 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଦୁଇଟି ଇଲେକ୍ଟ୍ରନ୍‌କୁ ପରସ୍ପରଠାରୁ '2d' ଦୂରତାରେ ଦୃଢ଼ ଭାବରେ ରଖାଯାଇଛି । ସେମାନଙ୍କର ଏକ ମଧ୍ୟବର୍ତ୍ତୀ ବିନ୍ଦୁରେ ଥିବା ଗୋଟିଏ ତୃତୀୟ ଚାର୍ଜ ପ୍ରୋଟନ୍‌କୁ ଦୁଇ ଚାର୍ଜକୁ ସଂଯୋଗ କରୁଥିବା ରେଖାକୁ ଲମ୍ବୀୟ ଭାବେ x ( $x \ll d$ ) ଦୂରତାରେ ଘୁଞ୍ଚାଇବାରୁ ପ୍ରୋଟନ୍‌ଟି କେତେ କୌଣିକ ଆବୃତ୍ତିରେ ସରଳ ହାରମୋନିକ୍ ଗତି କରିବ ? ( $m =$  ଚାର୍ଜିତ କଣିକାର ବସ୍ତୁତ୍ଵ)

**Options :**

$$\left( \frac{q^2}{2\pi\epsilon_0 md^3} \right)^{\frac{1}{2}}$$

70819156317.

$$\left( \frac{2q^2}{\pi\epsilon_0 md^3} \right)^{\frac{1}{2}}$$

70819156318.

$$\left( \frac{\pi\epsilon_0 md^3}{2q^2} \right)^{\frac{1}{2}}$$

70819156319.

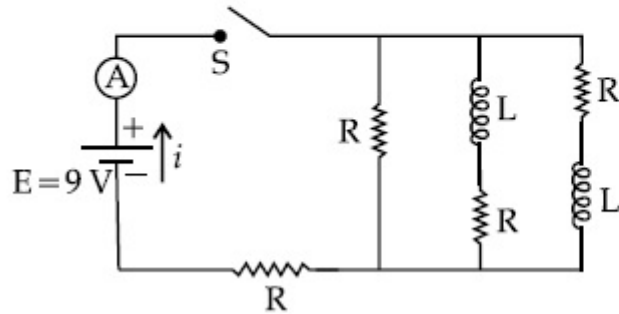
$$\left( \frac{2\pi\epsilon_0 md^3}{q^2} \right)^{\frac{1}{2}}$$

70819156320.



Question Number : 11 Question Id : 70819117054 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

Figure shows a circuit that contains four identical resistors with resistance  $R=2.0 \Omega$ , two identical inductors with inductance  $L=2.0 \text{ mH}$  and an ideal battery with *emf*  $E=9 \text{ V}$ . The current ' $i$ ' just after the switch ' $S$ ' is closed will be :



Options :

70819156321. 2.25 A

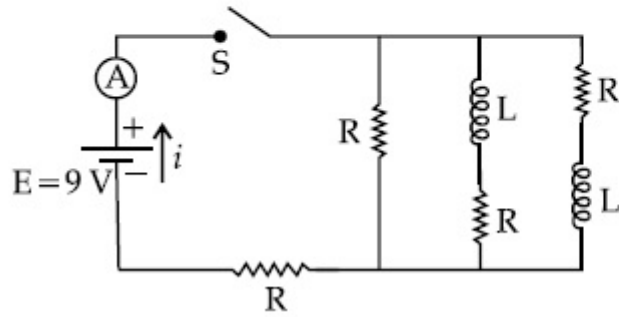
70819156322. 3.0 A

70819156323. 3.37 A

70819156324. 9 A

Question Number : 11 Question Id : 70819117054 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

ଚିତ୍ରଟି ଗୋଟିଏ ବିଦ୍ୟୁତ୍ ପରିପଥକୁ ଦର୍ଶାଉଛି ଯେଉଁଥିରେ ବିଦ୍ୟୁତ୍ ପ୍ରତିରୋଧ  $R=2.0 \Omega$  ବିଶିଷ୍ଟ ଚାରୋଟି ଏକାଭଳିଆ ବିଦ୍ୟୁତ୍ ପ୍ରତିରୋଧୀ, ପ୍ରଶୋଦକତା  $L=2.0 \text{ mH}$  ବିଶିଷ୍ଟ ଦୁଇଟି ଏକାଭଳିଆ ପ୍ରଶୋଦକ ଏବଂ ଇ.ଏମ୍.ଏଫ୍  $E=9 \text{ V}$  ବିଶିଷ୍ଟ ଗୋଟିଏ ଆଦର୍ଶ ବ୍ୟାଟେରୀ ରହିଛି । ସୁଇଚ୍(S)କୁ ଠିକ୍ ବନ୍ଦ କଲାପରେ ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ' $i$ ' ହେବ \_\_\_\_\_ ।



Options :

70819156321. 2.25 A

70819156322. 3.0 A

70819156323. 3.37 A

70819156324. 9 A

Question Number : 12 Question Id : 70819117055 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

A soft ferromagnetic material is placed in an external magnetic field. The magnetic domains :

Options :

70819156325. increase in size but no change in orientation.

70819156326. decrease in size and changes orientation.

70819156327. may increase or decrease in size and change its orientation.

70819156328. have no relation with external magnetic field.

**Question Number : 12 Question Id : 70819117055 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଗୋଟିଏ ନରମ ଲୌହ ରୁମ୍ବକୀୟ ପଦାର୍ଥକୁ ଏକ ବାହ୍ୟ ରୁମ୍ବକୀୟ କ୍ଷେତ୍ରରେ ରଖାଯାଇଛି । ରୁମ୍ବକୀୟ ପରିସର (ଡୋମେନ୍) ଗୁଡ଼ିକର :

**Options :**

70819156325. ଆକାର ବୃଦ୍ଧିପାଏ କିନ୍ତୁ ଅନୁସ୍ଥାପନ (ଓରିଏଣ୍ଟେସନ୍)ରେ କିଛି ପରିବର୍ତ୍ତନ ହେବ ନାହିଁ ।

70819156326. ଆକାର କମିଯିବ ଏବଂ ଅନୁସ୍ଥାପନରେ ପରିବର୍ତ୍ତନ ହେବ ।

70819156327. ଆକାର ବୃଦ୍ଧି ପାଇପାରେ କିମ୍ବା କମିପାରେ ଏବଂ ଏହାର ଅନୁସ୍ଥାପନରେ ପରିବର୍ତ୍ତନ ହେବ ।

70819156328. ବାହ୍ୟ ରୁମ୍ବକୀୟ କ୍ଷେତ୍ର ସହ କୌଣସି ସମ୍ପର୍କ ନଥାଏ ।

**Question Number : 13 Question Id : 70819117056 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Match List - I with List - II.

List - I

- (a) Source of microwave frequency
- (b) Source of infrared frequency
- (c) Source of Gamma Rays
- (d) Source of X-rays

List - II

- (i) Radioactive decay of nucleus
- (ii) Magnetron
- (iii) Inner shell electrons
- (iv) Vibration of atoms and molecules
- (v) LASER
- (vi) RC circuit

Choose the correct answer from the options given below :

**Options :**

70819156329. (a)-(vi), (b)-(v), (c)-(i), (d)-(iv)

70819156330. (a)-(vi), (b)-(iv), (c)-(i), (d)-(v)

70819156331. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819156332. (a)-(ii), (b)-(iv), (c)-(vi), (d)-(iii)

**Question Number : 13 Question Id : 70819117056 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

ତାଲିକା I ସହ ତାଲିକା II କୁ ମିଳାଅ ।

ତାଲିକା - I

ତାଲିକା - II

- |                               |                                       |
|-------------------------------|---------------------------------------|
| (a) ମାଇକ୍ରୋଫୋନ୍ ଆବୃତ୍ତିର ଉତ୍ପ | (i) ନ୍ୟୁକ୍ଲୀୟସର ଚେକସ୍ତ୍ରୟ କ୍ଷୟ        |
| (b) ଅବଲୋହିତ ଆବୃତ୍ତିର ଉତ୍ପ     | (ii) ମାଗ୍ନେଟ୍ରନ୍                      |
| (c) ଗାମା ରଶ୍ମିର ଉତ୍ପ          | (iii) ଅନ୍ତରକ୍ଷ କକ୍ଷ ଇଲେକ୍ଟ୍ରନ୍ ଗୁଡ଼ିକ |
| (d) ଏକ୍ସରେର ଉତ୍ପ              | (iv) ପରମାଣୁ ଏବଂ ଅଣୁଗୁଡ଼ିକର କମ୍ପନ      |
|                               | (v) LASER                             |
|                               | (vi) RC ପରିପଥ                         |

ନିମ୍ନରେ ଦିଆଯାଇଥିବା ବିକଳଗୁଡ଼ିକ ମଧ୍ୟରୁ ଠିକ୍ ଉତ୍ତରଟି ଚୟନ କର :

**Options :**

70819156329. (a)-(vi), (b)-(v), (c)-(i), (d)-(iv)

70819156330. (a)-(vi), (b)-(iv), (c)-(i), (d)-(v)

70819156331. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819156332. (a)-(ii), (b)-(iv), (c)-(vi), (d)-(iii)

**Question Number : 14 Question Id : 70819117057 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

If the source of light used in a Young's double slit experiment is changed from red to violet :

**Options :**

70819156333. the fringes will become brighter.

70819156334. consecutive fringe lines will come closer.

70819156335. the intensity of minima will increase.

70819156336. the central bright fringe will become a dark fringe.

**Question Number : 14 Question Id : 70819117057 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଗୋଟିଏ ଯଙ୍ଗ୍ ଦ୍ୱି-ରେଖାଛିଦ୍ର ପରୀକ୍ଷାରେ ବ୍ୟବହୃତ ଆଲୋକ ଉତ୍ସଟି ଲାଲରୁ ବାଇଗଣୀକୁ ପରିବର୍ତ୍ତନ କରାଗଲା :

**Options :**

70819156333. ପ୍ରିଞ୍ଜିଗୁଡ଼ିକ ଉଜ୍ଜଳ ହୋଇଯିବ ।

70819156334. ପାଖାପାଖି ପ୍ରିଞ୍ଜି-ରେଖାଗୁଡ଼ିକ ନିକଟତର ହେବେ ।

70819156335. ମିନିମାର ତୀବ୍ରତା ବୃଦ୍ଧିପାଇବ ।

70819156336. କେନ୍ଦ୍ରୀୟ ଉଜ୍ଜଳ ପ୍ରିଞ୍ଜିଟି ଅନ୍ଧକାର ପ୍ରିଞ୍ଜି ହୋଇଯିବ ।

**Question Number : 15 Question Id : 70819117058 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

An X-ray tube is operated at 1.24 million volt. The shortest wavelength of the produced photon will be :

**Options :**

70819156337.  $10^{-1}$  nm

70819156338.  $10^{-2}$  nm

70819156339.  $10^{-3}$  nm

70819156340.  $10^{-4}$  nm

**Question Number : 15 Question Id : 70819117058 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

1.24 ମିଲିୟମ୍ ଭୋଲଟରେ ଗୋଟିଏ X-ରେ ଟିୟୁବ୍ କାର୍ଯ୍ୟ କରୁଅଛି । ଉତ୍ତ୍ୱଳ ହେଉଥିବା ଫୋଟନ୍ ଗୁଡ଼ିକର ସର୍ବନିମ୍ନ ତରଙ୍ଗ ଦୈର୍ଘ୍ୟହେବ :

**Options :**

70819156337.  $10^{-1}$  nm

70819156338.  $10^{-2}$  nm

70819156339.  $10^{-3}$  nm

70819156340.  $10^{-4}$  nm

**Question Number : 16 Question Id : 70819117059 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The de Broglie wavelength of a proton and  $\alpha$ -particle are equal. The ratio of their velocities is :

**Options :**

70819156341. 4 : 1

70819156342. 4 : 2

70819156343. 4 : 3

70819156344. 1 : 4

**Question Number : 16 Question Id : 70819117059 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଗୋଟିଏ ପ୍ରୋଟନ୍ ଏବଂ  $\alpha$ -କଣିକାର ଡି-ବୋଗଲି ତରଙ୍ଗ ଦୈର୍ଘ୍ୟ ସମାନ ଅଟେ । ସେମାନଙ୍କର ପରିବେଗର ଅନୁପାତ ହେଉଛି :

**Options :**

70819156341. 4 : 1

70819156342. 4 : 2

70819156343. 4 : 3

70819156344. 1 : 4

**Question Number : 17 Question Id : 70819117060 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

According to Bohr atom model, in which of the following transitions will the frequency be maximum ?

**Options :**

70819156345.  $n=2$  to  $n=1$

70819156346.  $n=3$  to  $n=2$

70819156347.  $n=4$  to  $n=3$



70819156348.  $n=5$  to  $n=4$

**Question Number : 17 Question Id : 70819117060 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ବୋହରଙ୍କ ପାରମାଣବିକ ମଡେଲ ଅନୁସାରେ ନିମ୍ନ ପ୍ରଦତ୍ତ କେଉଁ ଅବସ୍ଥାରେ (ଟ୍ରାଞ୍ଜିସନ)ରେ ଆବୃତ୍ତି ସର୍ବାଧିକ ହେବ ?

**Options :**

70819156345.  $n=2$  ରୁ  $n=1$

70819156346.  $n=3$  ରୁ  $n=2$

70819156347.  $n=4$  ରୁ  $n=3$

70819156348.  $n=5$  ରୁ  $n=4$

**Question Number : 18 Question Id : 70819117061 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Zener breakdown occurs in a  $p-n$  junction having  $p$  and  $n$  both :

**Options :**

70819156349. lightly doped and have narrow depletion layer.

70819156350. lightly doped and have wide depletion layer.

70819156351. heavily doped and have narrow depletion layer.

70819156352. heavily doped and have wide depletion layer.

**Question Number : 18 Question Id : 70819117061 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଗୋଟିଏ  $p-n$  ଜଙ୍କସନ୍‌ରେ ଜିନ୍‌ର ବ୍ରେକ୍‌ଡାଉନ୍ ହୋଇଥାଏ ଯେତେବେଳେ ଉଭୟ  $p$  ଏବଂ  $n$  :

**Options :**

70819156349. ଲଘୁ ଅବଲେପନ (ଡ୍ରପିଙ୍ଗ) ହୋଇଥାଏ ଏବଂ ଅବକ୍ଷୟ ସ୍ତର (ଡିପ୍ଲିସନ୍ ଲେୟାର) ଅଣଓସାରିଆ ରହିଥାଏ ।

70819156350. ଲଘୁଅବଲେପନ ହୋଇଥାଏ ଏବଂ ଅବକ୍ଷୟ ସ୍ତର ଓସାରିଆ ରହିଥାଏ ।

70819156351. ଗୁରୁ ଅବଲେପନ ହୋଇଥାଏ ଏବଂ ଅବକ୍ଷୟ ସ୍ତର ଅଣଓସାରିଆ ରହିଥାଏ ।

70819156352. ଗୁରୁ ଅବଲେପନ ହୋଇଥାଏ ଏବଂ ଅବକ୍ଷୟ ସ୍ତର ଓସାରିଆ ରହିଥାଏ ।

**Question Number : 19 Question Id : 70819117062 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Given below are two statements :

**Statement I :** PN junction diodes can be used to function as transistor, simply by connecting two diodes, back to back, which acts as the base terminal.

**Statement II :** In the study of transistor, the amplification factor  $\beta$  indicates ratio of the collector current to the base current.

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

**Options :**

70819156353. Both Statement I and Statement II are true

70819156354. Both Statement I and Statement II are false

70819156355. Statement I is true but Statement II is false

70819156356. Statement I is false but Statement II is true

**Question Number : 19 Question Id : 70819117062 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ନିମ୍ନରେ ଦୁଇଟି ଉକ୍ତି ଦିଆଯାଇଛି :

ଉକ୍ତି I : ଦୁଇଟି ଭାୟଡୋକୁ ପଛକୁ ପଛ ସଂଯୋଗ କରି, ଯାହା ବେସ୍ ଚର୍ମିନାଲ୍ ଭଳି କାମ କରିଥାଏ, PN ଜଙ୍କସନ୍ ତାୟୋଡ୍ ଗୁଡ଼ିକୁ ଗୋଟିଏ ଟ୍ରାଞ୍ଜିଷ୍ଟର ଭଳି କାର୍ଯ୍ୟକରିବା ପାଇଁ ବ୍ୟବହାର କରାଯାଇ ପାରିବ ।

ଉକ୍ତି II : ଟ୍ରାଞ୍ଜିଷ୍ଟର ପଠନରେ, ପ୍ରବର୍ତ୍ତନକାରକ ( $\beta$ ) ସଂଗ୍ରାହୀ ବିଦ୍ୟୁତ୍ ସ୍ରୋତ ସହ ବେସ୍ ବିଦ୍ୟୁତ୍ ସ୍ରୋତର ଅନୁପାତକୁ ସୂଚିତ କରେ ।

ଉପରୋକ୍ତ ଉକ୍ତିଗୁଡ଼ିକ ଅନୁସାରେ, ନିମ୍ନରେ ଦତ୍ତ ବିକଳ୍ପ ଗୁଡ଼ିକ ମଧ୍ୟରୁ ଠିକ୍ ଉତ୍ତରଟି ଚୟନ କର ।

**Options :**

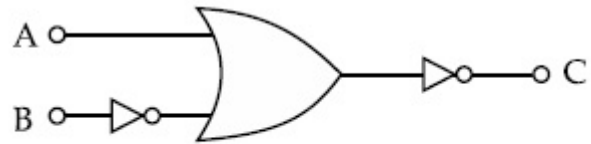
70819156353. ଉଭୟ ଉକ୍ତି I ଏବଂ ଉକ୍ତି II ସତ୍ୟ ଅଟେ ।

70819156354. ଉଭୟ ଉକ୍ତି I ଏବଂ ଉକ୍ତି II ମିଥ୍ୟା ଅଟେ ।

70819156355. ଉକ୍ତି I ଠିକ୍ ଅଟେ କିନ୍ତୁ ଉକ୍ତି II ଠିକ୍ ମିଥ୍ୟା ଅଟେ ।

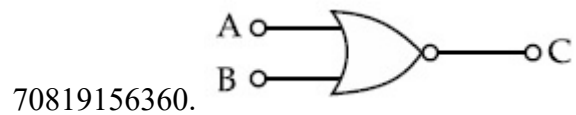
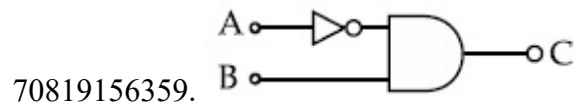
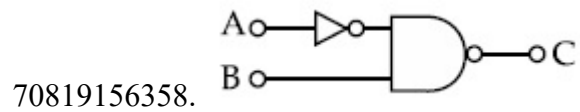
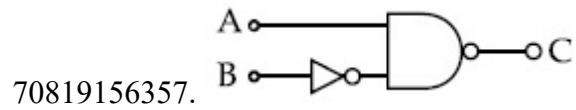
70819156356. ଉକ୍ତି I ଠିକ୍ ଭୁଲ୍ କିନ୍ତୁ ଉକ୍ତି II ଠିକ୍ ସତ୍ୟ ଅଟେ ।

**Question Number : 20 Question Id : 70819117063 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**



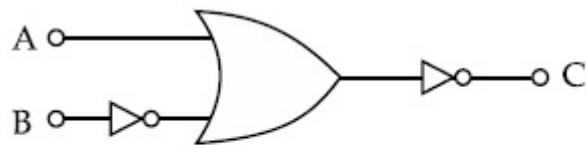
The logic circuit shown above is equivalent to :

Options :



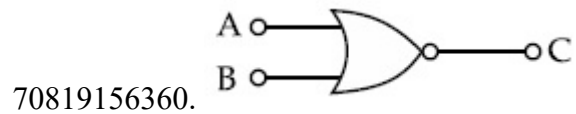
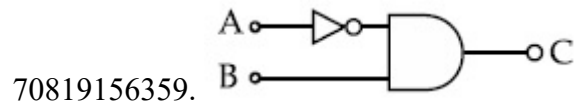
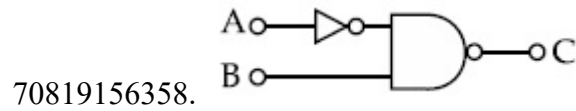
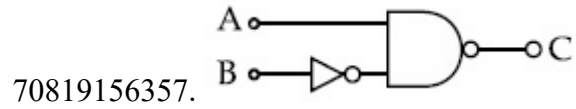
Question Number : 20 Question Id : 70819117063 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



ଉପରେ ଦର୍ଶାଯାଇଥିବା ଲଜିକ୍ ପରିପଥଟିର ସମତୁଲ ହେଉଛି --

Options :



## Physics Section B

<b>Section Id :</b>	708191677
<b>Section Number :</b>	2
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	10
<b>Number of Questions to be attempted :</b>	5
<b>Section Marks :</b>	20
<b>Mark As Answered Required? :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	708191957
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 21 Question Id : 70819117064 Question Type : SA**

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

Two solids A and B of mass 1 kg and 2 kg respectively are moving with equal linear momentum. The ratio of their kinetic energies  $(K.E.)_A : (K.E.)_B$  will be  $\frac{A}{1}$ , so the value of A will be \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 21 **Question Id :** 70819117064 **Question Type :** SA

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

ସମାନ ରୈଖିକ ସଂବେଗ ସହ ଯଥାକ୍ରମେ 1 kg ଏବଂ 2 kg ବସ୍ତୁ ବିଶିଷ୍ଟ ଦୁଇଟି କଠିନ ପଦାର୍ଥ A ଏବଂ B ଗତି କରୁଛନ୍ତି ।

ଯଦି ସେମାନଙ୍କର ଗତିକ ଶକ୍ତିର ଅନୁପାତ  $(K.E.)_A : (K.E.)_B = \frac{A}{1}$ , ତେବେ A ର ମୂଲ୍ୟ ହେବ \_\_\_\_\_ ।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 22 **Question Id :** 70819117065 **Question Type :** SA

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

A uniform metallic wire is elongated by 0.04 m when subjected to a linear force F. The elongation, if its length and diameter is doubled and subjected to the same force will be \_\_\_\_\_ cm.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 22 **Question Id :** 70819117065 **Question Type :** SA

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

ଗୋଟିଏ ସମ ଧାତବ ତାରରେ ଯେତେବେଳେ ଏକ ଅନୁଦୈର୍ଘ୍ୟ ବଳ  $F$  ପ୍ରୟୋଗ, ଏହା  $0.04\text{ m}$  ପ୍ରସାରିତ ହୋଇଥାଏ । ଯଦି ଏହାର ଲମ୍ବ ଓ ବ୍ୟାସକୁ ଦୁଇଗୁଣା କରି ସେହି ଏକା ବଳ ପ୍ରୟୋଗ କରାଯାଏ, ତେବେ ଏହାର ପ୍ରସାରିତ ଦୈର୍ଘ୍ୟ ହେବ \_\_\_\_\_ cm ।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 23 **Question Id :** 70819117066 **Question Type :** SA

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

A uniform thin bar of mass  $6\text{ kg}$  and length  $2.4\text{ meter}$  is bent to make an equilateral hexagon. The moment of inertia about an axis passing through the centre of mass and perpendicular to the plane of hexagon is \_\_\_\_\_  $\times 10^{-1}\text{ kg m}^2$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 23 Question Id : 70819117066 Question Type : SA**

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

6 kg ବସ୍ତୁ ଓ 2.4 ମିଟର ଦୈର୍ଘ୍ୟ ବିଶିଷ୍ଟ ଗୋଟିଏ ପତଳା ସମଦଣ୍ଡକୁ ଏକ ସମ ଷଡ଼ଭୁଜରେ ପରିଣତ କରିବା ପାଇଁ ବଳ ଗଠା । ଷଡ଼ଭୁଜର ସମତଳକୁ ଲମ୍ବ ଭାବରେ ଏହାର ବସ୍ତୁ କେନ୍ଦ୍ର ଦେଇ ଯାଇଥିବା ଏକ ଅକ୍ଷର ଚାରିପଟେ ଆନୁଷ୍ଠି ଜଡ଼ତ୍ୱ ହେଉଛି \_\_\_\_\_  $\times 10^{-1} \text{ kg m}^2$  ।

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 24 Question Id : 70819117067 Question Type : SA**

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

The root mean square speed of molecules of a given mass of a gas at 27°C and 1 atmosphere pressure is  $200 \text{ ms}^{-1}$ . The root mean square speed of molecules of the gas at 127°C and

2 atmosphere pressure is  $\frac{x}{\sqrt{3}} \text{ ms}^{-1}$ . The value of  $x$  will be \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001



**Question Number : 24 Question Id : 70819117067 Question Type : SA**

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

27°C ତାପମାତ୍ରା ଏବଂ 1 ବାୟୁମଣ୍ଡଳୀୟ ଚାପରେ ଥିବା ଦଉ ବସ୍ତୁର ବିଶିଷ୍ଟ ଏକ ଗ୍ୟାସ୍ ଅଣୁର ମାଧ୍ୟ-ବର୍ଗ ବର୍ଗମୂଳ ବେଗ  $200 \text{ ms}^{-1}$  ଅଟେ । 127°C ତାପମାତ୍ରା ଏବଂ 2 ବାୟୁମଣ୍ଡଳୀୟ ଚାପରେ ଉକ୍ତ ଗ୍ୟାସ୍ ଅଣୁର ମାଧ୍ୟ-ବର୍ଗ ବର୍ଗମୂଳ ବେଗ

$\frac{x}{\sqrt{3}} \text{ ms}^{-1}$  ଅଟେ ।  $x$  ମୂଲ୍ୟ ହେବ \_\_\_\_\_ ।

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 25 Question Id : 70819117068 Question Type : SA**

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

Two cars are approaching each other at an equal speed of 7.2 km/hr. When they see each other, both blow horns having frequency of 676 Hz. The beat frequency heard by each driver will be \_\_\_\_\_ Hz. [Velocity of sound in air is 340 m/s.]

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 25 Question Id : 70819117068 Question Type : SA**

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

ଦୁଇଟି କାର ସମାନ ବେଗ  $7.2 \text{ km/hr}$  ରେ ପରସ୍ପର ଆଡ଼କୁ ଗତି କରୁଛନ୍ତି । ଯେତେବେଳେ ସେମାନେ ପରସ୍ପରକୁ ଦେଖିଲେ, ଉଭୟ  $676 \text{ Hz}$  ଆବୃତ୍ତି ସମ୍ପର୍କ ହର୍ଷ୍ଟ୍ ବଜାଇଲେ । ଉଭୟ ଦ୍ରାଘତର ଶୁଣୁଥିବା ବିଚ୍-ଆବୃତ୍ତି ହେବ \_\_\_\_\_  $\text{Hz}$  ।  
(ବାୟୁରେ ଶବ୍ଦର ବେଗ  $340 \text{ m/s}$  ଅଟେ)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

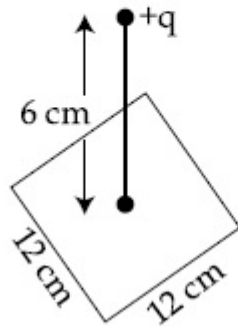
**Possible Answers :**

5 to 5.001

**Question Number :** 26 **Question Id :** 70819117069 **Question Type :** SA

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

A point charge of  $+12 \mu\text{C}$  is at a distance  $6 \text{ cm}$  vertically above the centre of a square of side  $12 \text{ cm}$  as shown in figure. The magnitude of the electric flux through the square will be \_\_\_\_\_  $\times 10^3 \text{ Nm}^2/\text{C}$ .



**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

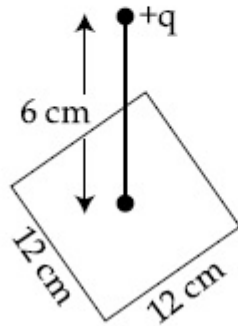
**Possible Answers :**

5 to 5.001

Question Number : 26 Question Id : 70819117069 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଚିତ୍ରରେ ଦର୍ଶାଯାଇଥିବା ଅନୁସାରେ, ଗୋଟିଏ 12 cm ପାର୍ଶ୍ୱ ଥିବା ଏକ ବର୍ଗାକାର କ୍ଷେତ୍ରର କେନ୍ଦ୍ରଠାରୁ ଭୂଲମ୍ବୀୟ ଭାବେ 6 cm ଦୂରତାରେ  $+12 \mu\text{C}$  ଚାର୍ଜ ବିଶିଷ୍ଟ ଏକ ଚାର୍ଜ କଣିକା ରହିଛି । ବର୍ଗାକାର କ୍ଷେତ୍ର ମଧ୍ୟ ଦେଇ ଯାଉଥିବା ବୈଦ୍ୟୁତିକ ଫ୍ଲକ୍ସ ହେବ \_\_\_\_\_  $\times 10^3 \text{ Nm}^2/\text{C}$  ।



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 27 Question Id : 70819117070 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A cylindrical wire of radius 0.5 mm and conductivity  $5 \times 10^7 \text{ S/m}$  is subjected to an electric field of 10 mV/m. The expected value of current in the wire will be  $x^3\pi$  mA. The value of  $x$  is \_\_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 27 **Question Id :** 70819117070 **Question Type :** SA

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

0.5 mm ବ୍ୟାସାର୍ଦ୍ଧ ଓ  $5 \times 10^7$  S/m ପରିବାହିତା ଥିବା ଏକ ସମବର୍ତ୍ତୁଳାକାର ତାରକୁ 10 mV/m ବିଶିଷ୍ଟ ଏକ ବୈଦ୍ୟୁତିକ କ୍ଷେତ୍ରରେ ପ୍ରବେଶ କରାଗଲା । ତାରଟିର ବୈଦ୍ୟୁତିକ ସ୍ରୋତର ଆଶାଜନକ ମୂଲ୍ୟ ହେବ  $x^3\pi$  mA ।  $x$  ର ମୂଲ୍ୟ ହେଉଛି \_\_\_\_\_ ।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 28 **Question Id :** 70819117071 **Question Type :** SA

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

A series LCR circuit is designed to resonate at an angular frequency  $\omega_0 = 10^5$  rad/s. The circuit draws 16 W power from 120 V source at resonance. The value of resistance 'R' in the circuit is \_\_\_\_\_  $\Omega$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 28 Question Id : 70819117071 Question Type : SA**

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

କୌଣସି ଆବୃତ୍ତି  $\omega_0 = 10^5 \text{ rad/s}$  ରେ ଅନୁନାଦ ହେବା ପାଇଁ ଏକ ଶ୍ରେଣୀରେ ସଂଯୁକ୍ତ LCR ପରିପଥ ପ୍ରସ୍ତୁତ କରାଗଲା । ଅନୁନାଦ(ରିଜୋନାନ୍ସ) ସମୟରେ ପରିପଥଟି 120 V ଭୋଲ୍ଟ, ଉତ୍ସରୁ 16 ଓହ୍ଲାଇ ପାଞ୍ଚାରି ଗଣିଥାଏ । ପରିପଥଟିରେ 'R' ର ମୂଲ୍ୟହେବ \_\_\_\_\_  $\Omega$  ।

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 29 Question Id : 70819117072 Question Type : SA**

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

An electromagnetic wave of frequency 3 GHz enters a dielectric medium of relative electric permittivity 2.25 from vacuum. The wavelength of this wave in that medium will be \_\_\_\_\_  $\times 10^{-2}$  cm.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 29 Question Id : 70819117072 Question Type : SA**

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

3 GHz ଆବୃତ୍ତି ବିଶିଷ୍ଟ ଏକ ବିଦ୍ୟୁତ୍-ଚୁମ୍ବକୀୟ ତରଙ୍ଗ ଶୂନ୍ୟସ୍ଥାନରୁ ଆପେକ୍ଷିକ ବିଦ୍ୟୁତ୍-ଶୀଳତା 2.25 ବିଶିଷ୍ଟ ଏକ ପରାବୈଦ୍ୟୁତିକ ମାଧ୍ୟମକୁ ପ୍ରବେଶ କରୁଛି । ସେହି ମାଧ୍ୟମଟିରେ ଏହି ତରଙ୍ଗଟିର ତରଙ୍ଗ ଦୈର୍ଘ୍ୟ ହେବ  $\text{_____} \times 10^{-2} \text{ cm}$  ।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 30 **Question Id :** 70819117073 **Question Type :** SA

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

A signal of 0.1 kW is transmitted in a cable. The attenuation of cable is  $-5 \text{ dB}$  per km and cable length is 20 km. The power received at receiver is  $10^{-x} \text{ W}$ . The value of  $x$  is \_\_\_\_\_.

$$\left[ \text{Gain in dB} = 10 \log_{10} \left( \frac{P_o}{P_i} \right) \right]$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 30 **Question Id :** 70819117073 **Question Type :** SA

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

ଗୋଟିଏ କେବୁଲରେ 0.1 କିଲୋଓ୍ଵାର୍ ବିଶିଷ୍ଟ ଏକ ସଂକେତ(ସିଗ୍ନାଲ) ସଞ୍ଚାରଣ କରାଯାଉଛି । କେବୁଲଟିର କ୍ଷୀଣନ (ଆଟେନୁଏସନ୍) କିଲୋମିଟର ପିଛା  $-5$  dB ଏବଂ କେବୁଲର ଦୈର୍ଘ୍ୟ 20 km ଅଟେ । ଅଭିଗ୍ରାହୀ ଠାରେ ଗ୍ରହଣ କରୁଥିବା ପାଓ୍ଵାର୍ ହେବ  $10^{-x}$  ଓ୍ଵାର୍ ।  $x$  ର ମୂଲ୍ୟ ଅଟେ \_\_\_\_\_ ।

$$[\text{dB ରେ ବୃଦ୍ଧି} = 10 \log_{10} \left( \frac{P_o}{P_i} \right)]$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

## Chemistry Section A

<b>Section Id :</b>	708191678
<b>Section Number :</b>	3
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	20
<b>Number of Questions to be attempted :</b>	20
<b>Section Marks :</b>	80
<b>Mark As Answered Required? :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	708191958
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 31 Question Id : 70819117074 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

According to Bohr's atomic theory :

- (A) Kinetic energy of electron is  $\propto \frac{Z^2}{n^2}$ .
- (B) The product of velocity (v) of electron and principal quantum number (n), 'vn'  $\propto Z^2$ .
- (C) Frequency of revolution of electron in an orbit is  $\propto \frac{Z^3}{n^3}$ .
- (D) Coulombic force of attraction on the electron is  $\propto \frac{Z^3}{n^4}$ .

Choose the most appropriate answer from the options given below :

**Options :**

70819156371. (A), (C) and (D) only

70819156372. (A) and (D) only

70819156373. (C) only

70819156374. (A) only

**Question Number : 31 Question Id : 70819117074 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**



ବୋହରଙ୍କ ପରମାଣବିକ ସିଦ୍ଧାନ୍ତ ଅନୁସାରେ :

(A) ଇଲେକ୍ଟ୍ରନ୍‌ର ଗତିଜ ଶକ୍ତି  $\propto \frac{Z^2}{n^2}$ .

(B) ଇଲେକ୍ଟ୍ରନ୍‌ର ପରିବେଗ ଏବଂ ମୁଖ୍ୟ କ୍ୱାଣ୍ଟମ୍ ସଂଖ୍ୟାର ଗୁଣଫଳ 'vn'  $\propto Z^2$ .

(C) ଏକ କକ୍ଷରେ ଇଲେକ୍ଟ୍ରନ୍‌ର ପରିକ୍ରମଣର ଆବୃତ୍ତି  $\propto \frac{Z^3}{n^3}$ .

(D) ଇଲେକ୍ଟ୍ରନ୍‌ରେ କୁଲୋମ୍ବିକ ଆକର୍ଷଣ ବଳ  $\propto \frac{Z^3}{n^4}$ .

ସର୍ବୋତ୍ତମ ଉପଯୁକ୍ତ ଉତ୍ତରଟି ନିମ୍ନ ବିକଳ୍ପରୁ ବାଛି :

**Options :**

70819156371. (A), (C) ଏବଂ (D) କେବଳ

70819156372. (A) ଏବଂ (D) କେବଳ

70819156373. (C) କେବଳ

70819156374. (A) କେବଳ

**Question Number : 32 Question Id : 70819117075 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The correct shape and I–I–I bond angles respectively in  $I_3^-$  ion are :

**Options :**

70819156375. Linear;  $180^\circ$

70819156376. Distorted trigonal planar;  $135^\circ$  and  $90^\circ$

70819156377. T-shaped;  $180^\circ$  and  $90^\circ$

70819156378. Trigonal planar;  $120^\circ$

**Question Number : 32 Question Id : 70819117075 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

$I_3^-$  ଆୟନରେ ଥିବା ସଠିକ୍ ଆକାର ଏବଂ I-I-I ବନ୍ଧକୋଣ ଯଥାକ୍ରମେ :

**Options :**

70819156375. ରୈଖିକ;  $180^\circ$

70819156376. ବିକୃତ ତ୍ରାଭଗୋନାଲ ପ୍ଲାନାର;  $135^\circ$  ଏବଂ  $90^\circ$

70819156377. T- ଆକାର;  $180^\circ$  ଏବଂ  $90^\circ$

70819156378. ତ୍ରାଭଗୋନାଲ ପ୍ଲାନାର;  $120^\circ$

**Question Number : 33 Question Id : 70819117076 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Most suitable salt which can be used for efficient clotting of blood will be :

**Options :**

70819156379.  $NaHCO_3$

70819156380.  $Mg(HCO_3)_2$

70819156381.  $\text{FeCl}_3$

70819156382.  $\text{FeSO}_4$

**Question Number : 33 Question Id : 70819117076 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଫଳପ୍ରଦ ରକ୍ତ ଜନାତ୍ମକ ପାଇଁ ବ୍ୟବହାର ହେଉଥିବା ସର୍ବୋତ୍କୃଷ୍ଟ ଉପଯୋଗୀ ଲବଣ :

**Options :**

70819156379.  $\text{NaHCO}_3$

70819156380.  $\text{Mg}(\text{HCO}_3)_2$

70819156381.  $\text{FeCl}_3$

70819156382.  $\text{FeSO}_4$

**Question Number : 34 Question Id : 70819117077 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The correct set from the following in which both pairs are in correct order of melting point is :

**Options :**

70819156383.  $\text{LiCl} > \text{LiF} ; \text{MgO} > \text{NaCl}$

70819156384.  $\text{LiF} > \text{LiCl} ; \text{MgO} > \text{NaCl}$

70819156385.  $\text{LiCl} > \text{LiF} ; \text{NaCl} > \text{MgO}$

70819156386.  $\text{LiF} > \text{LiCl} ; \text{NaCl} > \text{MgO}$

**Question Number : 34 Question Id : 70819117077 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ନିମ୍ନୋକ୍ତ ମଧ୍ୟରୁ ସଠିକ୍ ସେଟ୍ ଯେଉଁଥିରେ ଉଭୟ ଯୋଡ଼ାର ଗଳନାଙ୍କ ସଠିକ୍ କ୍ରମରେ ଅଛି, ହେଉଛି :

**Options :**

70819156383.  $\text{LiCl} > \text{LiF} ; \text{MgO} > \text{NaCl}$

70819156384.  $\text{LiF} > \text{LiCl} ; \text{MgO} > \text{NaCl}$

70819156385.  $\text{LiCl} > \text{LiF} ; \text{NaCl} > \text{MgO}$

70819156386.  $\text{LiF} > \text{LiCl} ; \text{NaCl} > \text{MgO}$

**Question Number : 35 Question Id : 70819117078 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Match List - I with List - II.

List - I (Metal)	List - II (Ores)
(a) Aluminium	(i) Siderite
(b) Iron	(ii) Calamine
(c) Copper	(iii) Kaolinite
(d) Zinc	(iv) Malachite

Choose the correct answer from the options given below :

**Options :**

70819156387. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

70819156388. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819156389. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819156390. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

**Question Number : 35 Question Id : 70819117078 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ତାଲିକା- I ସହ ତାଲିକା- II ମିଳାଅ :

ତାଲିକା - I (Metal)	ତାଲିକା - II (Ores)
(a) ଆଲୁମିନିୟମ୍	(i) ସାଇତେରାଇଟ୍
(b) ଆଇରନ୍	(ii) କାଲମାଇଟ୍
(c) କପର	(iii) କାଓଲିନାଇଟ୍
(d) ଜିଙ୍କ୍	(iv) ମାଲକାଇଟ୍

ନିମ୍ନୋକ୍ତ ବିକଳ୍ପ ମଧ୍ୟରୁ ସଠିକ୍ ଉତ୍ତରଟିକୁ ବାଛ :

**Options :**

70819156387. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

70819156388. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819156389. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819156390. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

**Question Number : 36 Question Id : 70819117079 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

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

**Assertion A :** Hydrogen is the most abundant element in the Universe, but it is not the most abundant gas in the troposphere.

**Reason R :** Hydrogen is the lightest element.

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

**Options :**

70819156391. Both **A** and **R** are true and **R** is the correct explanation of **A**

70819156392. Both **A** and **R** are true but **R** is NOT the correct explanation of **A**

70819156393. **A** is true but **R** is false

70819156394. **A** is false but **R** is true

**Question Number : 36 Question Id : 70819117079 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ନିମ୍ନରେ ଦୁଇଟି ଉକ୍ତି ଦିଆଯାଇଛି । ଗୋଟିକୁ ଘୋଷଣା **A** ଏବଂ ଆଉଟି କାରଣ **R** ଭାବେ ଚିହ୍ନିତ କରାଯାଇଛି :

**ଘୋଷଣା A :** ହାଇଡ୍ରୋଜେନ୍ ବିଶ୍ୱରେ ସର୍ବାଧିକ ମିଳୁଥିବା ମୌଳିକ କିନ୍ତୁ ଏହା ତ୍ରୟୋକ୍ଷିୟରରେ ସର୍ବାଧିକ ମିଳୁଥିବା ଗ୍ୟାସ୍ ନୁହେଁ ।

**କାରଣ R :** ହାଇଡ୍ରୋଜେନ୍ ସବୁଠୁ ହାଲୁକା ମୌଳିକ ।

ଉପରୋକ୍ତ ବିବୃତି ଅନୁସାରେ ନିମ୍ନ ବିକଳ୍ପ ମଧ୍ୟରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛି :

**Options :**

70819156391. A ଏବଂ R ଉଭୟ ସତ୍ୟ ଏବଂ A ର ସଠିକ୍ ବ୍ୟାଖ୍ୟା R

70819156392. A ଏବଂ R ଉଭୟ ସତ୍ୟ କିନ୍ତୁ A ର ସଠିକ୍ ବ୍ୟାଖ୍ୟା R ନୁହେଁ

70819156393. A ସତ୍ୟ କିନ୍ତୁ R ଅସତ୍ୟ

70819156394. A ଅସତ୍ୟ କିନ୍ତୁ R ସତ୍ୟ

**Question Number : 37 Question Id : 70819117080 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	
(Salt)		(Flame colour wavelength)	
(a)	LiCl	(i)	455.5 nm
(b)	NaCl	(ii)	670.8 nm
(c)	RbCl	(iii)	780.0 nm
(d)	CsCl	(iv)	589.2 nm

Choose the correct answer from the options given below :

**Options :**

70819156395. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

70819156396. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

70819156397. (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)

70819156398. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

**Question Number : 37 Question Id : 70819117080 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ତାଲିକା - I ସହିତ ତାଲିକା - II ମିଳାଅ :

ତାଲିକା - I (ଲବଣ)	ତାଲିକା - II (ଶିଖା ରଙ୍ଗ ତରଙ୍ଗ ଦୈର୍ଘ୍ୟ)
(a) LiCl	(i) 455.5 nm
(b) NaCl	(ii) 670.8 nm
(c) RbCl	(iii) 780.0 nm
(d) CsCl	(iv) 589.2 nm

ନିମ୍ନ ପ୍ରଦତ୍ତ ବିକଳ୍ପରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛି :

**Options :**

70819156395. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

70819156396. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

70819156397. (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)

70819156398. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

**Question Number : 38 Question Id : 70819117081 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The incorrect statement among the following is :

**Options :**

70819156399.  $\text{VO}_2$  is a reducing agent



70819156400.  $\text{RuO}_4$  is an oxidizing agent

70819156401.  $\text{Cr}_2\text{O}_3$  is an amphoteric oxide

70819156402. Red colour of ruby is due to the presence of  $\text{Co}^{3+}$

**Question Number : 38 Question Id : 70819117081 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ନିମ୍ନୋକ୍ତ ମଧ୍ୟରୁ ଭୁଲ୍ ବିବୃତିଟି ହେଉଛି :

**Options :**

70819156399.  $\text{VO}_2$  ଗୋଟିଏ ବିଜାରକ

70819156400.  $\text{RuO}_4$  ଗୋଟିଏ ଜାରକ

70819156401.  $\text{Cr}_2\text{O}_3$  ଉତ୍ତମପର୍ମା ଅକ୍ସାଇଡ୍

70819156402.  $\text{Co}^{3+}$  ଉପସ୍ଥିତିରେ ରୁବିର ରଙ୍ଗ ଲାଲ୍

**Question Number : 39 Question Id : 70819117082 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

What is the correct order of the following elements with respect to their density ?

**Options :**

70819156403.  $\text{Cr} < \text{Fe} < \text{Co} < \text{Cu} < \text{Zn}$

70819156404.  $\text{Zn} < \text{Cr} < \text{Fe} < \text{Co} < \text{Cu}$

70819156405.  $Zn < Cu < Co < Fe < Cr$

70819156406.  $Cr < Zn < Co < Cu < Fe$

**Question Number : 39 Question Id : 70819117082 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ନିମ୍ନ ପ୍ରଦତ୍ତ ମୌଳିକ ଗୁଡ଼ିକର ସଠିକ୍ କ୍ରମଟି ସେମାନଙ୍କର ସାନ୍ଦ୍ରତା ଅନୁସାରେ କଣ ?

**Options :**

70819156403.  $Cr < Fe < Co < Cu < Zn$

70819156404.  $Zn < Cr < Fe < Co < Cu$

70819156405.  $Zn < Cu < Co < Fe < Cr$

70819156406.  $Cr < Zn < Co < Cu < Fe$

**Question Number : 40 Question Id : 70819117083 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The calculated magnetic moments (spin only value) for species  $[FeCl_4]^{2-}$ ,  $[Co(C_2O_4)_3]^{3-}$  and  $MnO_4^{2-}$  respectively are :

**Options :**

70819156407. 4.90, 0 and 1.73 BM

70819156408. 5.92, 4.90 and 0 BM

70819156409. 5.82, 0 and 0 BM

70819156410. 4.90, 0 and 2.83 BM

**Question Number : 40 Question Id : 70819117083 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

$[\text{FeCl}_4]^{2-}$ ,  $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$  ଏବଂ  $\text{MnO}_4^{2-}$  ପ୍ରଜାତିର ହିସାବ କରାଯାଇଥିବା ରୁମ୍‌କାନ୍ଦ ଆୟୁର୍ଣ୍ଣ (ଝିନ୍ ମାତ୍ର ମୂଲ୍ୟ) ଯଥାକ୍ରମେ ହେଉଛି :

**Options :**

70819156407. 4.90, 0 ଏବଂ 1.73 BM

70819156408. 5.92, 4.90 ଏବଂ 0 BM

70819156409. 5.82, 0 ଏବଂ 0 BM

70819156410. 4.90, 0 ଏବଂ 2.83 BM

**Question Number : 41 Question Id : 70819117084 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Given below are two statements :

**Statement I :** The value of the parameter “Biochemical Oxygen Demand (BOD)” is important for survival of aquatic life.

**Statement II :** The optimum value of BOD is 6.5 ppm.

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

**Options :**

70819156411. Both Statement I and Statement II are true

70819156412. Both Statement I and Statement II are false

70819156413. Statement I is true but Statement II is false

70819156414. Statement I is false but Statement II is true

**Question Number : 41 Question Id : 70819117084 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ତଳେ ଦୁଇଟି ବିବୃତ୍ତି ଦିଆଯାଇଛି :

ବିବୃତ୍ତି I : ଜଳଜୀବ ମାନଙ୍କର ଜୀବନ ଧାରଣ କରିବା ପାଇଁ (BOD) ପାରାମିଟରର ମୂଲ୍ୟ ମହତ୍ତ୍ୱପୂର୍ଣ୍ଣ

ବିବୃତ୍ତି II : BOD ର ସର୍ବୋଚ୍ଚ ମୂଲ୍ୟ 6.5 ppm.

ଉପରୋକ୍ତ ବିବୃତ୍ତି ଅନୁସାରେ ନିମ୍ନୋକ୍ତ ମଧ୍ୟରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛି :

**Options :**

70819156411. ବିବୃତ୍ତି I ଏବଂ ବିବୃତ୍ତି II ଉଭୟ ସତ୍ୟ

70819156412. ବିବୃତ୍ତି I ଏବଂ ବିବୃତ୍ତି II ଉଭୟ ଅସତ୍ୟ

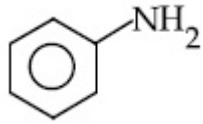
70819156413. ବିବୃତ୍ତି I ସତ୍ୟ କିନ୍ତୁ ବିବୃତ୍ତି II ଅସତ୍ୟ

70819156414. ବିବୃତ୍ତି I ଅସତ୍ୟ କିନ୍ତୁ ବିବୃତ୍ତି II ସତ୍ୟ

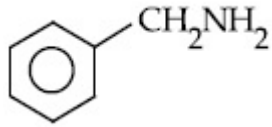
**Question Number : 42 Question Id : 70819117085 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The diazonium salt of which of the following compounds will form a coloured dye on reaction with  $\beta$ -Naphthol in NaOH ?

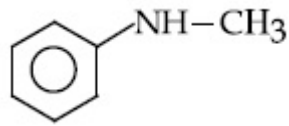
Options :



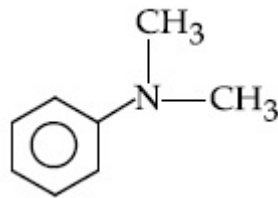
70819156415.



70819156416.



70819156417.



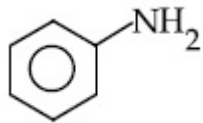
70819156418.

Question Number : 42 Question Id : 70819117085 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

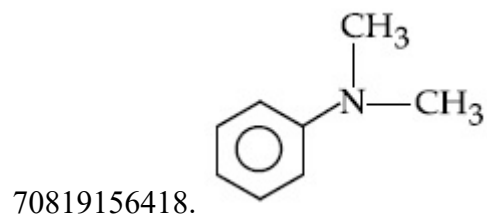
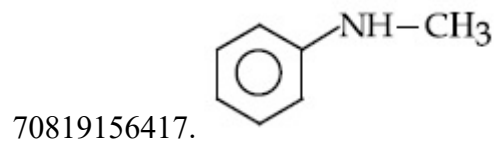
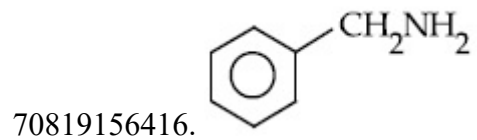
Correct Marks : 4 Wrong Marks : 1

ନିମ୍ନଲିଖିତ ମଧ୍ୟରୁ କେଉଁ ଯୌଗିକ ଗୁଡ଼ିକର ଡାଇଲୋନେସନ୍ ଲବଣ NaOH ରେ ଥିବା ବିଟା ନାଫଥଲ୍ ସହିତ ପ୍ରତିକ୍ରିୟା କରି ରଙ୍ଗୀନ ରଞ୍ଜକ ଗଠନ କରେ ?

Options :



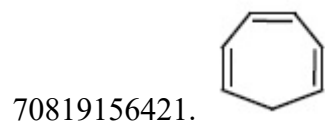
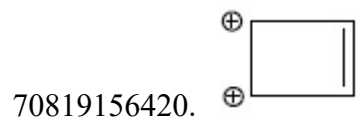
70819156415.

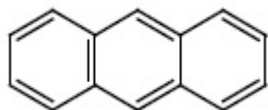


**Question Number : 43 Question Id : 70819117086 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Which one of the following compounds is non-aromatic ?

**Options :**





70819156422.

**Question Number : 43 Question Id : 70819117086 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ନିମ୍ନଲିଖିତ ମଧ୍ୟରୁ କେଉଁଟି ନନ୍ ଆରୋମାଟିକ୍ ?

**Options :**



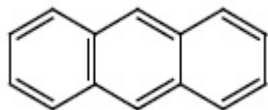
70819156419.



70819156420.



70819156421.

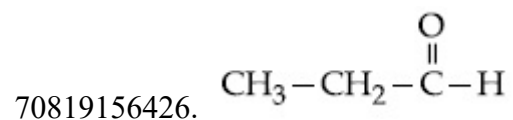
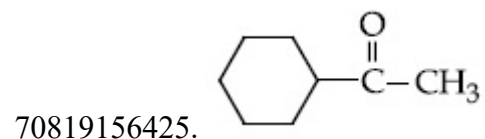
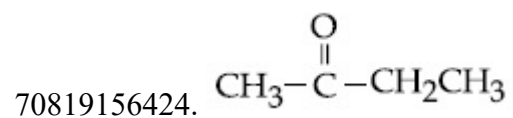
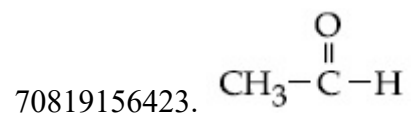


70819156422.

**Question Number : 44 Question Id : 70819117087 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Which one of the following carbonyl compounds cannot be prepared by addition of water on an alkyne in the presence of  $\text{HgSO}_4$  and  $\text{H}_2\text{SO}_4$  ?

**Options :**

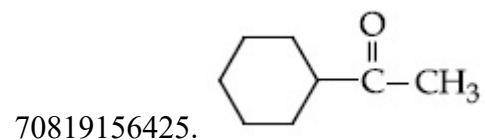
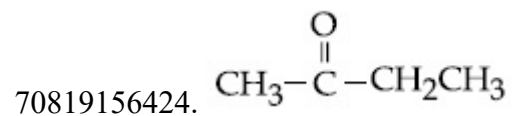
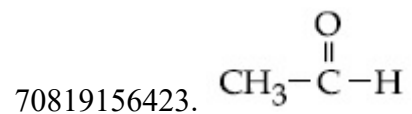


**Question Number : 44 Question Id : 70819117087 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

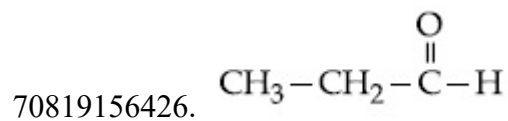
**Correct Marks : 4 Wrong Marks : 1**

$\text{HgSO}_4$  ଏବଂ  $\text{H}_2\text{SO}_4$  ଉପସ୍ଥିତିରେ ଆଲ୍‌କାଇଲ୍‌ରେ ଜଳ ମିଶାଇବା ଦ୍ୱାରା କେଉଁ କାର୍ବୋନିଲ୍ ଯୌଗିକ ପ୍ରସ୍ତୁତ କରି ହେବ ନାହିଁ ?

**Options :**

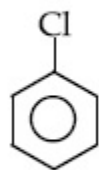




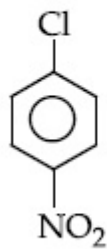


**Question Number : 45 Question Id : 70819117088 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

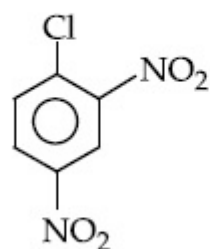
The correct order of the following compounds showing increasing tendency towards nucleophilic substitution reaction is :



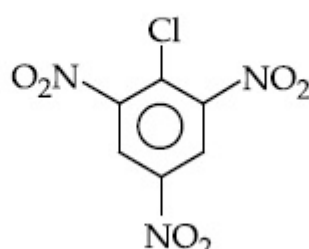
(i)



(ii)



(iii)



(iv)

**Options :**

70819156427. (iv) < (iii) < (ii) < (i)

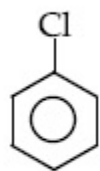
70819156428. (iv) < (i) < (iii) < (ii)

70819156429. (i) < (ii) < (iii) < (iv)

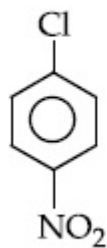
70819156430. (iv) < (i) < (ii) < (iii)

**Question Number : 45 Question Id : 70819117088 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

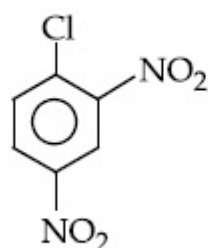
ନିମ୍ନଲିଖିତ ଯୌଗିକଗୁଡ଼ିକର ନିଉକ୍ଲିଓଫିଲିକ୍ ପ୍ରତିକ୍ରିୟା ପ୍ରତିକ୍ରିୟାରେ ବର୍ଦ୍ଧିତ ପ୍ରବୃତ୍ତି ଦେଖାଉଥିବା ସଠିକ୍ କ୍ରମଟି ହେଉଛି :



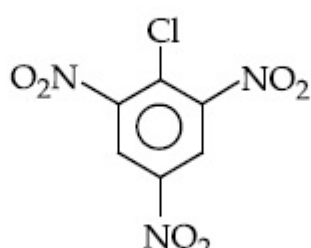
(i)



(ii)



(iii)



(iv)

Options :

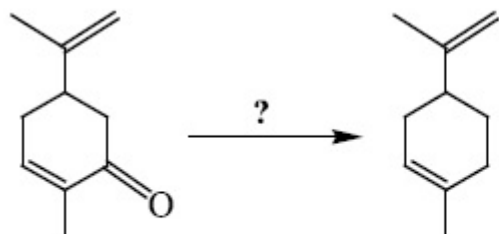
70819156427. (iv) < (iii) < (ii) < (i)

70819156428. (iv) < (i) < (iii) < (ii)

70819156429. (i) < (ii) < (iii) < (iv)

70819156430. (iv) < (i) < (ii) < (iii)

Question Number : 46 Question Id : 70819117089 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1



Which of the following reagent is suitable for the preparation of the product in the above reaction ?

Options :

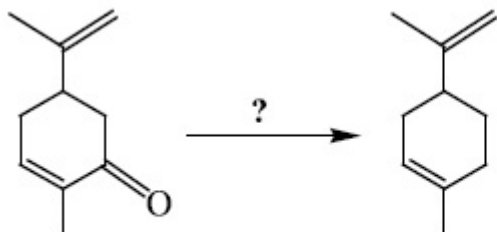
70819156431.  $\text{NaBH}_4$

70819156432.  $\text{NH}_2-\text{NH}_2/\text{C}_2\text{H}_5\text{O}^\ominus\text{Na}^\oplus$

70819156433.  $\text{Ni}/\text{H}_2$

70819156434.  $\text{Red P} + \text{Cl}_2$

**Question Number : 46 Question Id : 70819117089 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**



ଉପରୋକ୍ତ ଉତ୍ପାଦ ପ୍ରସ୍ତୁତ କରିବା ପାଇଁ ନିମ୍ନପ୍ରଦତ୍ତ କେଉଁ ଅଭିକର୍ମକ ଉପଯୋଗୀ ?

**Options :**

70819156431.  $\text{NaBH}_4$

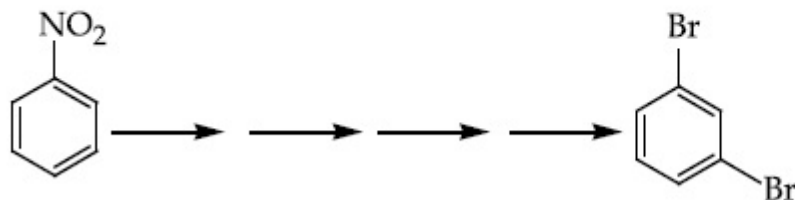
70819156432.  $\text{NH}_2-\text{NH}_2/\text{C}_2\text{H}_5\text{O}^\ominus\text{Na}^\oplus$

70819156433.  $\text{Ni}/\text{H}_2$

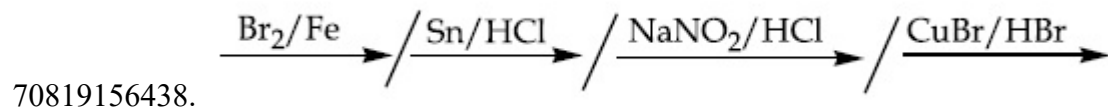
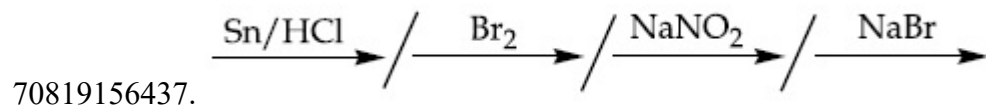
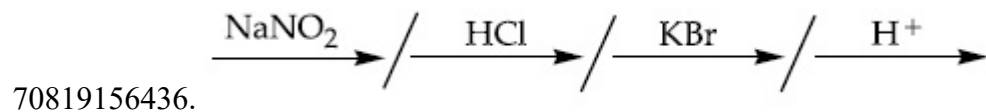
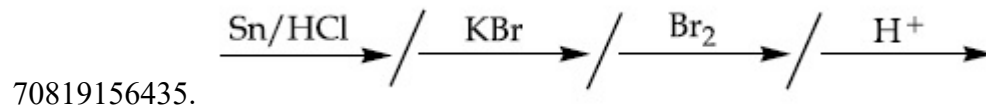
70819156434.  $\text{Red P} + \text{Cl}_2$

Question Number : 47 Question Id : 70819117090 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

What is the correct sequence of reagents used for converting nitrobenzene into *m*-dibromobenzene ?

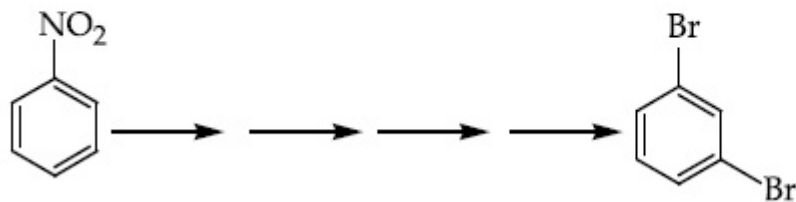


Options :

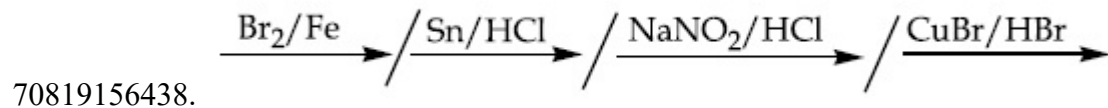
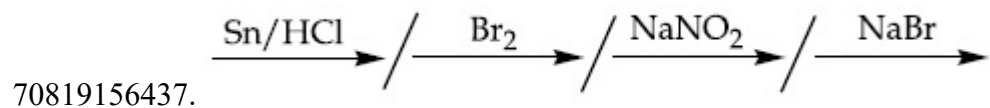
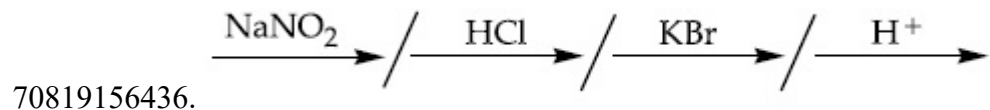
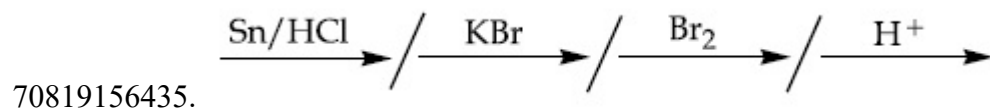


Question Number : 47 Question Id : 70819117090 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

ନାଇଟ୍ରୋବେଞ୍ଜିନ୍‌କୁ ମେଟାଡାଇବ୍ରୋମୋବେଞ୍ଜିନ୍‌ରେ ପରିଣତ କରିବା ପାଇଁ ବ୍ୟବହୃତ ହେଉଥିବା ଅଭିକାରକ ମାନଙ୍କର ଅନୁକ୍ରମଟି କଣ ?



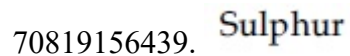
Options :



Question Number : 48 Question Id : 70819117091 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

In polymer Buna-S : 'S' stands for :

Options :



70819156440. Strength

70819156441. Styrene

70819156442. Sulphonation

**Question Number : 48 Question Id : 70819117091 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1**

ପଲିମର Buna-S ରେ 'S'ର ମାନେ :

**Options :**

70819156439. ସଲଫର୍

70819156440. ଶକ୍ତି

70819156441. ସ୍ଵାଇରଲ୍

70819156442. ସଲଫୋନେସନ୍

**Question Number : 49 Question Id : 70819117092 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1**

**Match List - I and List - II.**

**List - I**

- (a) Valium
- (b) Morphine
- (c) Norethindrone
- (d) Vitamin B<sub>12</sub>

**List - II**

- (i) Antifertility drug
- (ii) Pernicious anaemia
- (iii) Analgesic
- (iv) Tranquilizer

**Options :**

70819156443. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

70819156444. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819156445. (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

70819156446. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

**Question Number : 49 Question Id : 70819117092 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ତାଲିକା - I କୁ ତାଲିକା - II ସହିତ ମିଳାଅ :

ତାଲିକା - I

(a) ଭାଲିୟମ୍

(b) ମରଫିନ୍

(c) ନରଥ୍‌କ୍ସୋନ୍

(d) ଭିଟାମିନ୍ B<sub>12</sub>

ତାଲିକା - II

(i) ଉତ୍ପାଦିକା ଶକ୍ତି ହ୍ରାସ ଔଷଧି

(ii) କ୍ଷତିକାରକ ରକ୍ତହୀନତା

(iii) ଏନାଲ୍‌ଜେସିକ୍

(iv) ଟ୍ରାକ୍ୟୁଲାଇଜର

**Options :**

70819156443. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

70819156444. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819156445. (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

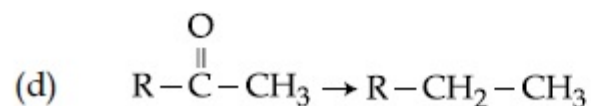
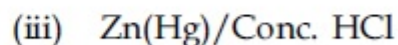
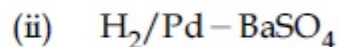
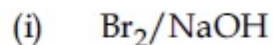
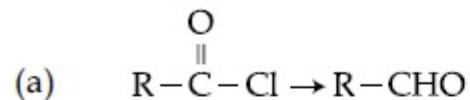
70819156446. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

Question Number : 50 Question Id : 70819117093 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

Match List - I and List - II.

List - I

List - II



Choose the correct answer from the options given below :

Options :

70819156447. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

70819156448. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

70819156449. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

70819156450. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

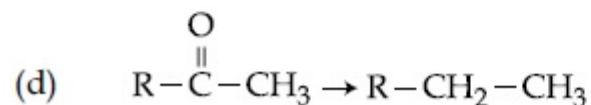
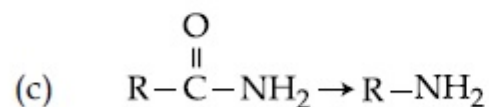
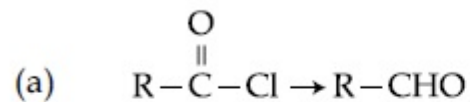
Question Number : 50 Question Id : 70819117093 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No



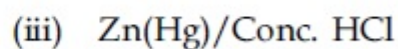
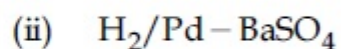
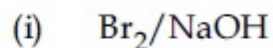
Correct Marks : 4 Wrong Marks : 1

ତାଲିକା - I କୁ ତାଲିକା - II ସହିତ ମିଳାଅ :

ତାଲିକା - I



ତାଲିକା - II



ନିମ୍ନଲିଖିତ ବିକଳ୍ପ ମଧ୍ୟରୁ ସଠିକ୍ ଉତ୍ତରଟି ବାଛି :

Options :

70819156447. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

70819156448. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

70819156449. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

70819156450. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

## Chemistry Section B

Section Id :	708191679
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 :	708191959
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 70819117094 Question Type : SA  
Correct Marks : 4 Wrong Marks : 0

The formula of a gaseous hydrocarbon which requires 6 times of its own volume of  $O_2$  for complete oxidation and produces 4 times its own volume of  $CO_2$  is  $C_xH_y$ . The value of  $y$  is \_\_\_\_\_.

Response Type : Numeric  
Evaluation Required For SA : Yes  
Show Word Count : Yes  
Answers Type : Range  
Text Areas : PlainText  
Possible Answers :  
5 to 5.001

Question Number : 51 Question Id : 70819117094 Question Type : SA  
Correct Marks : 4 Wrong Marks : 0

ପୂର୍ଣ୍ଣ ଜାରଣ ପାଇଁ ସ୍ୱ ଆୟତନର ଛଅ ଗୁଣ ଅକ୍ସିଜେନ ଆବଶ୍ୟକ କରି ନିଜ ଆୟତନର ଚାରିଗୁଣ କାର୍ବନ୍ ଡାଇଅକ୍ସାଇଡ୍ ଉତ୍ପନ୍ନ କରୁଥିବା ହାଇଡ୍ରୋକାର୍ବନ୍ ଗ୍ୟାସ୍‌ର ସଂକେତଟି ହେଉଛି  $C_xH_y$  ।  $y$  ର ମୂଲ୍ୟ ହେଉଛି \_\_\_\_\_ ।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 52 **Question Id :** 70819117095 **Question Type :** SA

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

The volume occupied by 4.75 g of acetylene gas at 50°C and 740 mmHg pressure is \_\_\_\_\_ L. (Rounded off to the nearest integer)

[Given  $R = 0.0826 \text{ L atm K}^{-1} \text{ mol}^{-1}$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 52 **Question Id :** 70819117095 **Question Type :** SA

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

4.75 ଗ୍ରାମ୍ ଏସିଟିଲିନ୍ 50 ଡିଗ୍ରୀ ସେଣ୍ଟିଗ୍ରେଡ୍ ତାପମାତ୍ରାରେ ଏବଂ ସାତ ଶହ ଚାଲିଶ ମିଲିମିଟର ତାପରେ ଅଧିକାର କରୁଥିବା ଆୟତନ ଲିଟରରେ ହେଉଛି \_\_\_\_\_ । (ନିକଟତମ ପୂର୍ଣ୍ଣ ସଂଖ୍ୟାରେ ପରିଣତ କର)

[ପ୍ରଦତ୍ତ:  $R = 0.0826 \text{ L atm K}^{-1} \text{ mol}^{-1}$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

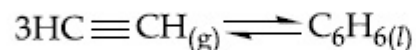
**Possible Answers :**

5 to 5.001

**Question Number : 53 Question Id : 70819117096 Question Type : SA**

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

Assuming ideal behaviour, the magnitude of  $\log K$  for the following reaction at  $25^\circ\text{C}$  is  $x \times 10^{-1}$ . The value of  $x$  is \_\_\_\_\_. (Integer answer)



[Given :  $\Delta_f G^\circ(\text{HC}\equiv\text{CH}) = -2.04 \times 10^5 \text{ J mol}^{-1}$  ;  $\Delta_f G^\circ(\text{C}_6\text{H}_6) = -1.24 \times 10^5 \text{ J mol}^{-1}$  ;  $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$ ]

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

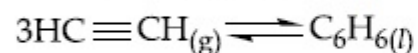
**Possible Answers :**

5 to 5.001

**Question Number : 53 Question Id : 70819117096 Question Type : SA**

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

ଆଦର୍ଶ ବ୍ୟବହାରକୁ ଗ୍ରହଣ କରି  $25^\circ\text{C}$  ରେ ନିମ୍ନ ପ୍ରତିକ୍ରିୟାରେ  $\log K$ ର ପରିମାଣ ହେଉଛି  $x \times 10^{-1}$  ।  $x$  ର ମୂଲ୍ୟ ହେଉଛି \_\_\_\_\_ । (ପୂର୍ଣ୍ଣସଂଖ୍ୟା ଉତ୍ତର)



[ପ୍ରଦତ୍ତ:  $\Delta_f G^\circ(\text{HC}\equiv\text{CH}) = -2.04 \times 10^5 \text{ J mol}^{-1}$  ;  $\Delta_f G^\circ(\text{C}_6\text{H}_6) = -1.24 \times 10^5 \text{ J mol}^{-1}$  ;  $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$ ]

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 54 Question Id : 70819117097 Question Type : SA**

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

$C_6H_6$  freezes at  $5.5^\circ C$ . The temperature at which a solution of 10 g of  $C_4H_{10}$  in 200 g of  $C_6H_6$  freeze is \_\_\_\_\_  $^\circ C$ . (The molal freezing point depression constant of  $C_6H_6$  is  $5.12^\circ C/m$ .)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 54 Question Id : 70819117097 Question Type : SA**

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

ବେଞ୍ଜିନ୍  $5.5^\circ$  ସେଣ୍ଟିଗ୍ରେଡ୍ରେ ହିମାକରଣ ହୁଏ । 200 ଗ୍ରାମ୍ ବେଞ୍ଜିନ୍ରେ 10 ଗ୍ରାମ୍ ବ୍ୟୁଟେନ୍ ଥିବା ଦ୍ରବଣ ହିମାକରଣ ହେବ \_\_\_\_\_  $^\circ C$  । (ବେଞ୍ଜିନ୍ର ମୋଲାଲ୍ ଫ୍ରିଜିଙ୍ଗ୍ ପଏଣ୍ଟ ଡିପ୍ରେସନ୍ ଛିରାଙ୍କ  $5.12^\circ C/m$ )

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 55 Question Id : 70819117098 Question Type : SA**

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

The solubility product of  $\text{PbI}_2$  is  $8.0 \times 10^{-9}$ . The solubility of lead iodide in 0.1 molar solution of lead nitrate is  $x \times 10^{-6}$  mol/L. The value of  $x$  is \_\_\_\_\_. (Rounded off to the nearest integer)

[Given  $\sqrt{2} = 1.41$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 55 **Question Id :** 70819117098 **Question Type :** SA

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

$\text{PbI}_2$  ର ଦ୍ରବଣୀୟତା ଗୁଣଫଳ  $8.0 \times 10^{-9}$  । 0.1 ମୋଲାର ଲେଡ୍ ନାଇଟ୍ରେଟ୍ ଦ୍ରବଣରେ ଲେଡ୍ ଆଲଡାଇଡ୍ ଦ୍ରବଣୀୟତା ହେଉଛି  $x \times 10^{-6}$  mol/L ।  $x$  ର ମୂଲ୍ୟ ହେଉଛି \_\_\_\_\_ । (ନିକଟତମ ପୂର୍ଣ୍ଣ ସଂଖ୍ୟାରେ ପରିଣତ କର)

[ପ୍ରଦତ୍ତ:  $\sqrt{2} = 1.41$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 56 **Question Id :** 70819117099 **Question Type :** SA

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

The magnitude of the change in oxidising power of the  $\text{MnO}_4^-/\text{Mn}^{2+}$  couple is  $x \times 10^{-4}$  V, if the  $\text{H}^+$  concentration is decreased from 1 M to  $10^{-4}$  M at  $25^\circ\text{C}$ . (Assume concentration of  $\text{MnO}_4^-$  and  $\text{Mn}^{2+}$  to be same on change in  $\text{H}^+$  concentration). The value of  $x$  is \_\_\_\_\_. (Rounded off to the nearest integer)

$$\left[ \text{Given : } \frac{2.303 RT}{F} = 0.059 \right]$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 56 **Question Id :** 70819117099 **Question Type :** SA

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

$\text{MnO}_4^-/\text{Mn}^{2+}$  ଦ୍ଵୟର ଜାରଣ କ୍ଷମତା ପରିବର୍ତ୍ତନର ପରିମାଣ ହେଉଛି  $x \times 10^{-4}$  V । ଯଦି  $25^\circ$  ସେଣ୍ଟିଗ୍ରେଡ୍ରେ ହାଇଡ୍ରୋଜେନ୍ ଗାତତା 1 M ରୁ  $10^{-4}$  Mକୁ କମିଯାଏ  $x$ ର ମୂଲ୍ୟ ହେଉଛି \_\_\_\_\_ । (ନିକଟତମ ପୂର୍ଣ୍ଣସଂଖ୍ୟାରେ ପରିଣତ କର)

(ହାଇଡ୍ରୋଜେନ୍ ଆୟନ ଗାତତା ପରିବର୍ତ୍ତନରେ  $\text{MnO}_4^-$  ଏବଂ  $\text{Mn}^{2+}$  ର ଗାତତା ସମାନ ଗ୍ରହଣ କର)

$$\left[ \text{ପ୍ରଦତ୍ତ : } \frac{2.303 RT}{F} = 0.059 \right]$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 57 Question Id : 70819117100 Question Type : SA**

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

Sucrose hydrolyses in acid solution into glucose and fructose following first order rate law with a half-life of 3.33 h at 25°C. After 9 h, the fraction of sucrose remaining is  $f$ . The value

of  $\log_{10}\left(\frac{1}{f}\right)$  is \_\_\_\_\_  $\times 10^{-2}$ . (Rounded off to the nearest integer)

[Assume :  $\ln 10 = 2.303$ ,  $\ln 2 = 0.693$ ]

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 57 Question Id : 70819117100 Question Type : SA**

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

ଶୁକ୍ରୋଜ୍ ଅମ୍ଳୀୟ ଦ୍ରବଣରେ 25°C ରେ ପ୍ରଥମ କ୍ରମହାର ନିୟମ ଅନୁସରଣ କରି ଜଳ ଅପଘଟନ କରି ଗ୍ଲୁକୋଜ୍ ଏବଂ

ଫ୍ରୁକ୍ଟୋଜ୍‌କୁ ବିଘଟିତ ହୁଏ ଅର୍ଦ୍ଧାୟୁ 3.33 h ସହିତ । 9 ଘଣ୍ଟା ପରେ ଅବଶିଷ୍ଟ ଶୁକ୍ରୋଜ୍‌ର ଭଗ୍ନାଂଶ ହେଉଛି  $f$  ।  $\log_{10}\left(\frac{1}{f}\right)$  ର

ମୂଲ୍ୟ \_\_\_\_\_  $\times 10^{-2}$  (ନିକଟତମ ପୂର୍ଣ୍ଣ ସଂଖ୍ୟା)

[ଗ୍ରହଣ କର  $\ln 10 = 2.303$ ,  $\ln 2 = 0.693$ ]

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**



**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 58 Question Id : 70819117101 Question Type : SA**

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

Among the following allotropic forms of sulphur, the number of allotropic forms, which will show paramagnetism is \_\_\_\_\_.

(A)  $\alpha$ -sulphur (B)  $\beta$ -sulphur (C)  $S_2$ -form

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 58 Question Id : 70819117101 Question Type : SA**

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

ନିମ୍ନରେ ଥିବା ସଲ୍‌ଫରର ଅପର ରୂପ ମଧ୍ୟରୁ ଅନୁରୂପକାୟ ଗୁଣ ଦେଖାଇଥିବା ଅପର ରୂପର ସଂଖ୍ୟା ହେଉଛି \_\_\_\_\_।

(A)  $\alpha$ -ସଲ୍‌ଫର (B)  $\beta$ -ସଲ୍‌ଫର (C)  $S_2$ -form

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

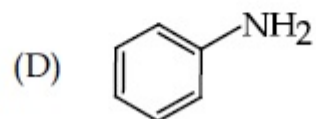
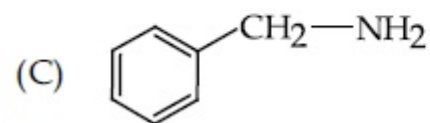
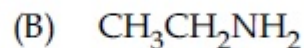
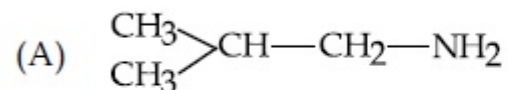
**Possible Answers :**

5 to 5.001

Question Number : 59 Question Id : 70819117102 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The total number of amines among the following which can be synthesized by Gabriel synthesis is \_\_\_\_\_.



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

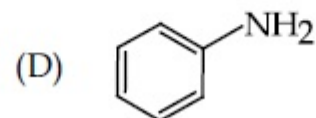
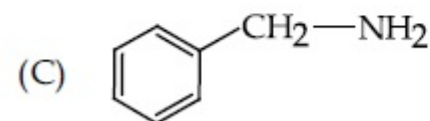
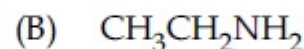
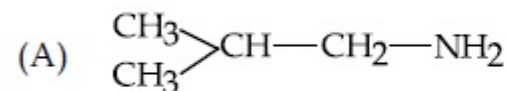
Possible Answers :

5 to 5.001

Question Number : 59 Question Id : 70819117102 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ନିମ୍ନଲିଖିତ ଯୌଗିକ ଗୁଡ଼ିକରୁ ଗାବ୍ରିଏଲ୍ ସଂଶ୍ଳେଷଣ ଦ୍ୱାରା ଉତ୍ପନ୍ନ ହେଉଥିବା ଆମିନ୍‌ଙ୍କ ସମୁଦାୟ ସଂଖ୍ୟା ହେଉଛି \_\_\_\_\_।



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 60 Question Id : 70819117103 Question Type : SA**

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

1.86 g of aniline completely reacts to form acetanilide. 10% of the product is lost during purification. Amount of acetanilide obtained after purification (in g) is \_\_\_\_\_  $\times 10^{-2}$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 60 Question Id : 70819117103 Question Type : SA**

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

1.86 ଗ୍ରାମ୍ ଆନିଲିନ୍ ପୂର୍ଣ୍ଣ ପ୍ରତିକ୍ରିୟା କରି ଏସିଟାନିଲାଇଡ୍ ଗଠନ କରେ । ପ୍ରଡକ୍ଟ ବିଶୁଦ୍ଧ କରିବାରେ ଦଶ ଶତକଡ଼ା ନଷ୍ଟ ହୋଇଥାଏ । ବିଶୁଦ୍ଧ ପରେ ମିଳିଥିବା ଏସିଟାନିଲାଇଡ୍‌ର ପରିମାଣ (ଗ୍ରାମରେ) ହେଉଛି \_\_\_\_\_  $\times 10^{-2}$  ।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

## Mathematics Section A

Section Id :	708191680
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 :	708191960
Question Shuffling Allowed :	Yes

Question Number : 61 Question Id : 70819117104 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

Let  $a, b \in \mathbb{R}$ . If the mirror image of the point  $P(a, 6, 9)$  with respect to the line

$$\frac{x-3}{7} = \frac{y-2}{5} = \frac{z-1}{-9} \text{ is } (20, b, -a-9), \text{ then } |a+b| \text{ is equal to :}$$

Options :

70819156461. 84

70819156462. 86

70819156463. 88

70819156464. 90

Question Number : 61 Question Id : 70819117104 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

ମନେକର  $a, b \in \mathbf{R}$  (ବାସ୍ତବ ସଂଖ୍ୟା)। ଯଦି  $P(a, 6, 9)$  ବିନ୍ଦୁର  $\frac{x-3}{7} = \frac{y-2}{5} = \frac{z-1}{-9}$  ରେଖା ମଧ୍ୟ ଦେଇ

ପ୍ରତିବିନ୍ଦୁ  $(20, b, -a-9)$  ଅଟେ, ତେବେ  $|a+b|$  ସମାନ :

**Options :**

70819156461. 84

70819156462. 86

70819156463. 88

70819156464. 90

**Question Number : 62 Question Id : 70819117105 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Let  $a, b, c$  be in arithmetic progression. Let the centroid of the triangle with vertices

$(a, c), (2, b)$  and  $(a, b)$  be  $\left(\frac{10}{3}, \frac{7}{3}\right)$ . If  $\alpha, \beta$  are the roots of the equation  $ax^2 + bx + 1 = 0$ , then

the value of  $\alpha^2 + \beta^2 - \alpha\beta$  is :

**Options :**

70819156465.  $-\frac{69}{256}$

70819156466.  $-\frac{71}{256}$

70819156467.  $\frac{69}{256}$

70819156468.  $\frac{71}{256}$

**Question Number : 62 Question Id : 70819117105 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ମନେକର  $a, b, c$  ଏକ ସମାନ୍ତର (ପ୍ରଗତି) ଶ୍ରେଣୀରେ ରୁହନ୍ତି । ପୁନଶ୍ଚ  $\left(\frac{10}{3}, \frac{7}{3}\right)$  ବିନ୍ଦୁଟି, ଏକ ତ୍ରିଭୁଜ ଯାହାର ଶୀର୍ଷ ବିନ୍ଦୁ  $(a, c), (2, b)$  ଏବଂ  $(a, b)$  ତାର ଭରକେନ୍ଦ୍ର (ସେଣ୍ଟ୍ରାଏଡ) । ଯଦି  $\alpha, \beta$ , ଦ୍ଵିଘାତ ସମୀକରଣ  $ax^2 + bx + 1 = 0$  ର ଦୁଇଟି ବାଜ(ମୂଳ) ହୁଅନ୍ତି, ତେବେ  $\alpha^2 + \beta^2 - \alpha\beta$  ର ମୂଲ୍ୟ ଅଟେ :

**Options :**

70819156465.  $-\frac{69}{256}$

70819156466.  $-\frac{71}{256}$

70819156467.  $\frac{69}{256}$

70819156468.  $\frac{71}{256}$

**Question Number : 63 Question Id : 70819117106 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

If P is a point on the parabola  $y=x^2+4$  which is closest to the straight line  $y=4x-1$ , then the co-ordinates of P are :

**Options :**

70819156469. (3, 13)

70819156470. (2, 8)

70819156471. (-2, 8)

70819156472. (1, 5)

**Question Number : 63 Question Id : 70819117106 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଯଦି ପାରାବୋଲା  $y=x^2+4$  ଉପରେ P ଏକ ବିନ୍ଦୁ ହୁଏ ଯାହାକି ସରଳରେଖା,  $y=4x-1$  ର ସମ୍ପର୍କରେ, ତେବେ P ବିନ୍ଦୁର ସ୍ଥାନାଙ୍କ :

**Options :**

70819156469. (3, 13)

70819156470. (2, 8)

70819156471. (-2, 8)

70819156472. (1, 5)

**Question Number : 64 Question Id : 70819117107 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

For which of the following curves, the line  $x + \sqrt{3}y = 2\sqrt{3}$  is the tangent at the point

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

**Options :**

70819156473.  $x^2 + y^2 = 7$

70819156474.  $x^2 + 9y^2 = 9$

70819156475.  $y^2 = \frac{1}{6\sqrt{3}}x$

70819156476.  $2x^2 - 18y^2 = 9$

**Question Number : 64 Question Id : 70819117107 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ନିମ୍ନଲିଖିତ କେଉଁ ବକ୍ରରେଖା ପାଇଁ,  $\left(\frac{3\sqrt{3}}{2}, \frac{1}{2}\right)$  ବିନ୍ଦୁରେ, ସରଳ ରେଖା  $x + \sqrt{3}y = 2\sqrt{3}$  ସର୍ତ୍ତକ ଅଟେ ?

**Options :**

70819156473.  $x^2 + y^2 = 7$

70819156474.  $x^2 + 9y^2 = 9$

70819156475.  $y^2 = \frac{1}{6\sqrt{3}}x$



70819156476.  $2x^2 - 18y^2 = 9$

**Question Number : 65 Question Id : 70819117108 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The value of the integral,  $\int_1^3 [x^2 - 2x - 2] dx$ , where  $[x]$  denotes the greatest integer less than or equal to  $x$ , is :

**Options :**

70819156477.  $-5$

70819156478.  $-4$

70819156479.  $-\sqrt{2} - \sqrt{3} - 1$

70819156480.  $-\sqrt{2} - \sqrt{3} + 1$

**Question Number : 65 Question Id : 70819117108 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

$\int_1^3 [x^2 - 2x - 2] dx$  ର ମୂଲ୍ୟ ଅଟେ :

( $[x]$  ର ଅର୍ଥ  $x$  ଏକ ପୂର୍ଣ୍ଣସଂଖ୍ୟା ଯାହା  $x$  ଠାରୁ ସାନ ବା  $x$  ସହ ସମାନ )

**Options :**

70819156477.  $-5$

70819156478.  $-4$

70819156479.  $-\sqrt{2} - \sqrt{3} - 1$

70819156480.  $-\sqrt{2} - \sqrt{3} + 1$

**Question Number : 66 Question Id : 70819117109 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The negation of the statement

$\sim p \wedge (p \vee q)$  is :

**Options :**

70819156481.  $\sim p \vee q$

70819156482.  $\sim p \wedge q$

70819156483.  $p \wedge \sim q$

70819156484.  $p \vee \sim q$

**Question Number : 66 Question Id : 70819117109 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

$\sim p \wedge (p \vee q)$ , ଉକ୍ତିଟିର ନାସ୍ତିସୂଚକ ଉକ୍ତିଟି ଅଟେ :

**Options :**

70819156481.  $\sim p \vee q$

70819156482.  $\sim p \wedge q$

70819156483.  $P \sim Q$

70819156484.  $P \sim Q$

**Question Number : 67 Question Id : 70819117110 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Let A and B be  $3 \times 3$  real matrices such that A is symmetric matrix and B is skew-symmetric matrix. Then the system of linear equations  $(A^2B^2 - B^2A^2)X = O$ , where X is a  $3 \times 1$  column matrix of unknown variables and O is a  $3 \times 1$  null matrix, has :

**Options :**

70819156485. no solution

70819156486. a unique solution

70819156487. exactly two solutions

70819156488. infinitely many solutions

**Question Number : 67 Question Id : 70819117110 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ମନେକର A ଓ B ଦୁଇଟି  $3 \times 3$  ମାଟ୍ରିକ୍ସ ଯେଉଁଠିକି A ଏକ ସମମିତ ମାଟ୍ରିକ୍ସ ଓ B ଏକ ବିଷମ ସମମିତ ମାଟ୍ରିକ୍ସ ଅଟେ ।  
ତେବେ  $(A^2B^2 - B^2A^2)X = O$ , ଏକସ୍ଥାତ ସହ ସମୀକରଣ ସମୂହର :  
(X ଅଜଣା ରାଶିମାନଙ୍କର ଏକ  $3 \times 1$  ସ୍ତମ୍ଭ ମାଟ୍ରିକ୍ସ ଓ O ଏକ  $(3 \times 1)$  ଶୂନ୍ୟ ମାଟ୍ରିକ୍ସ)

**Options :**

70819156485. କୌଣସି ସମାଧାନ ନାହିଁ

70819156486. ମାତ୍ର ଗୋଟିଏ ସମାଧାନ ଅଛି

70819156487. ଠିକ୍ ଦୁଇଟି ସମାଧାନ ଅଛି

70819156488. ଅସୀମ ସମାଧାନ ଅଛି

**Question Number : 68 Question Id : 70819117111 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Let  $f(x)$  be a differentiable function defined on  $[0, 2]$  such that  $f'(x) = f'(2-x)$  for all  $x \in (0, 2)$ ,  $f(0) = 1$  and  $f(2) = e^2$ . Then the value of  $\int_0^2 f(x) dx$  is :

**Options :**

70819156489.  $1 - e^2$

70819156490.  $1 + e^2$

70819156491.  $2(1 + e^2)$

70819156492.  $2(1 - e^2)$

**Question Number : 68 Question Id : 70819117111 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ମନେକର  $[0, 2]$  ଅନ୍ତରାଳରେ,  $f(x)$  ଫଳନଟି ଅବକଳନୀୟ, ଯେପରିକି  $f'(x) = f'(2-x)$ ,  $x \in (0, 2)$ ,  $f(0) = 1$ ,

$f(2) = e^2$  ଡେଇଁ  $\int_0^2 f(x) dx$  ର ମୂଲ୍ୟ ଅଟେ :

**Options :**

70819156489.  $1 - e^2$

70819156490.  $1 + e^2$

70819156491.  $2(1 + e^2)$

70819156492.  $2(1 - e^2)$

**Question Number : 69 Question Id : 70819117112 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Let  $f$  be a twice differentiable function defined on  $\mathbb{R}$  such that  $f(0) = 1$ ,  $f'(0) = 2$  and

$f'(x) \neq 0$  for all  $x \in \mathbb{R}$ . If  $\begin{vmatrix} f(x) & f'(x) \\ f'(x) & f''(x) \end{vmatrix} = 0$ , for all  $x \in \mathbb{R}$ , then the value of  $f(1)$  lies in the

interval :

**Options :**

70819156493.  $(0, 3)$

70819156494.  $(3, 6)$

70819156495.  $(6, 9)$

70819156496. (9, 12)

**Question Number : 69 Question Id : 70819117112 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ବାସ୍ତବ ସଂଖ୍ୟା ସେଟ୍  $\mathbf{R}$  ଉପରେ  $f$  ଫଳନଟି ଦୁଇଥର ଅବକଳନୀୟ, ଯେପରିକି  $f(0)=1, f'(0)=2$  ଏବଂ  $f'(x) \neq 0,$

$x \in \mathbf{R}$ . । ଯଦି  $\begin{vmatrix} f(x) & f'(x) \\ f'(x) & f''(x) \end{vmatrix} = 0,$  ( $x$  ର ସମସ୍ତ ବାସ୍ତବ ମୂଲ୍ୟ ପାଇଁ) ତେବେ  $f(1)$  ର ମୂଲ୍ୟ ରହୁଥିବା ଅନ୍ତରାଳଟି :

**Options :**

70819156493. (0, 3)

70819156494. (3, 6)

70819156495. (6, 9)

70819156496. (9, 12)

**Question Number : 70 Question Id : 70819117113 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

If the curve  $y = ax^2 + bx + c, x \in \mathbf{R}$ , passes through the point (1, 2) and the tangent line to this curve at origin is  $y = x$ , then the possible values of a, b, c are :

**Options :**

70819156497.  $a=1, b=1, c=0$

70819156498.  $a=1, b=0, c=1$

70819156499.  $a = -1, b = 1, c = 1$

70819156500.  $a = \frac{1}{2}, b = \frac{1}{2}, c = 1$

**Question Number : 70 Question Id : 70819117113 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଯଦି  $y = ax^2 + bx + c, x \in \mathbf{R}$  ବକ୍ରରେଖାଟି  $(1, 2)$  ବିନ୍ଦୁ ମଧ୍ୟବେଳ ଗତିକରେ ଏବଂ ଏହି ବକ୍ରରେଖା ପ୍ରତି ମୂଳ ବିନ୍ଦୁରେ ସ୍ପର୍ଶକର ସମୀକରଣ  $y = x$  ହୁଏ, ତେବେ  $a, b, c$  ର ସମ୍ଭବ ମୂଲ୍ୟମାନେ :

**Options :**

70819156497.  $a = 1, b = 1, c = 0$

70819156498.  $a = 1, b = 0, c = 1$

70819156499.  $a = -1, b = 1, c = 1$

70819156500.  $a = \frac{1}{2}, b = \frac{1}{2}, c = 1$

**Question Number : 71 Question Id : 70819117114 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

If  $n \geq 2$  is a positive integer, then the sum of the series

${}^{n+1}C_2 + 2({}^2C_2 + {}^3C_2 + {}^4C_2 + \dots + {}^nC_2)$  is :

**Options :**

70819156501.  $\frac{n(n-1)(2n+1)}{6}$

70819156502.  $\frac{n(n+1)(2n+1)}{6}$

70819156503.  $\frac{n(2n+1)(3n+1)}{6}$

70819156504.  $\frac{n(n+1)^2(n+2)}{12}$

**Question Number : 71 Question Id : 70819117114 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଯଦି  $n \geq 2$  ଏକ ଯୁକ୍ତାତ୍ମକ ସଂଖ୍ୟା ହୁଏ, ତେବେ ଉକ୍ତ ଶ୍ରେଣୀ  ${}^{n+1}C_2 + 2({}^2C_2 + {}^3C_2 + {}^4C_2 + \dots + {}^nC_2)$  ର ମିଶାଣ ଫଳ ଅଟେ :

**Options :**

70819156501.  $\frac{n(n-1)(2n+1)}{6}$

70819156502.  $\frac{n(n+1)(2n+1)}{6}$

70819156503.  $\frac{n(2n+1)(3n+1)}{6}$

70819156504.  $\frac{n(n+1)^2(n+2)}{12}$



**Question Number : 72 Question Id : 70819117115 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

For the system of linear equations :

$$x - 2y = 1, x - y + kz = -2, ky + 4z = 6, k \in \mathbb{R},$$

consider the following statements :

- (A) The system has unique solution if  $k \neq 2, k \neq -2$ .
- (B) The system has unique solution if  $k = -2$ .
- (C) The system has unique solution if  $k = 2$ .
- (D) The system has no-solution if  $k = 2$ .
- (E) The system has infinite number of solutions if  $k \neq -2$ .

Which of the following statements are correct ?

**Options :**

70819156505. (A) and (D) only

70819156506. (A) and (E) only

70819156507. (C) and (D) only

70819156508. (B) and (E) only

**Question Number : 72 Question Id : 70819117115 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

$x - 2y = 1$ ,  $x - y + kz = -2$ ,  $ky + 4z = 6$ ,  $k \in \mathbf{R}$ , ଏକତାତ ସମୀକରଣ ସମୂହ ପାଇଁ ନିମ୍ନଲିଖିତ ଉଚ୍ଚିଗୁଡ଼ିକୁ ବିଚାର କର ।

- (A) ସମୀକରଣ ଗୁଡ଼ିକର ଏକମାତ୍ର ସମାଧାନ ଅଛି ଯଦି  $k \neq 2$ ,  $k \neq -2$   
(B) ସମୀକରଣ ଗୁଡ଼ିକର ଏକମାତ୍ର ସମାଧାନ ଅଛି ଯଦି  $k = -2$   
(C) ସମୀକରଣ ଗୁଡ଼ିକର ଏକମାତ୍ର ସମାଧାନ ଅଛି ଯଦି  $k = 2$   
(D) ସମୀକରଣ ଗୁଡ଼ିକର ଏକମାତ୍ର ସମାଧାନ ନାହିଁ ଯଦି  $k = 2$   
(E) ସମୀକରଣ ଗୁଡ଼ିକର ଅସୀମ ସଂଖ୍ୟକ ସମାଧାନ ଅଛି ଯଦି  $k \neq -2$   
ନିମ୍ନଲିଖିତ କେଉଁ ଉଚ୍ଚିଗୁଡ଼ିକ ସତ ଅଟେ ?

**Options :**

70819156505. (A) ଏବଂ କେବଳ (D)

70819156506. (A) ଏବଂ କେବଳ (E)

70819156507. (C) ଏବଂ କେବଳ (D)

70819156508. (B) ଏବଂ କେବଳ (E)

**Question Number : 73 Question Id : 70819117116 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Let  $f: \mathbf{R} \rightarrow \mathbf{R}$  be defined as

$$f(x) = \begin{cases} -55x, & \text{if } x < -5 \\ 2x^3 - 3x^2 - 120x, & \text{if } -5 \leq x \leq 4 \\ 2x^3 - 3x^2 - 36x - 336, & \text{if } x > 4, \end{cases}$$

Let  $A = \{x \in \mathbf{R} : f \text{ is increasing}\}$ . Then  $A$  is equal to :

**Options :**

70819156509.  $(-\infty, -5) \cup (4, \infty)$

70819156510.  $(-5, -4) \cup (4, \infty)$

70819156511.  $(-\infty, -5) \cup (-4, \infty)$

70819156512.  $(-5, \infty)$

**Question Number : 73 Question Id : 70819117116 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଯନେକର  $f: \mathbb{R} \rightarrow \mathbb{R}$  ଫଳନଟିକୁ

$$f(x) = \begin{cases} -55x, & \text{ଯଦି } x < -5 \\ 2x^3 - 3x^2 - 120x, & \text{ଯଦି } -5 \leq x \leq 4 \text{ ରୁପେ ପ୍ରକାଶ କରାଯାଇଛି ।} \\ 2x^3 - 3x^2 - 36x - 336, & \text{ଯଦି } x > 4. \end{cases}$$

ଧରାଯାଉ ସେତେ  $A = \{x \in \mathbb{R} : f \text{ ଏକ ଉର୍ଦ୍ଧ୍ୱମୁଖୀ ଫଳନ}\}$  । ତେବେ ସେତେ  $A$  ସମାନ :

**Options :**

70819156509.  $(-\infty, -5) \cup (4, \infty)$

70819156510.  $(-5, -4) \cup (4, \infty)$

70819156511.  $(-\infty, -5) \cup (-4, \infty)$

70819156512.  $(-5, \infty)$

Question Number : 74 Question Id : 70819117117 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

A possible value of  $\tan\left(\frac{1}{4}\sin^{-1}\frac{\sqrt{63}}{8}\right)$  is :

Options :

70819156513.  $\frac{1}{\sqrt{7}}$

70819156514.  $\frac{1}{2\sqrt{2}}$

70819156515.  $\sqrt{7} - 1$

70819156516.  $2\sqrt{2} - 1$

Question Number : 74 Question Id : 70819117117 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

$\tan\left(\frac{1}{4}\sin^{-1}\frac{\sqrt{63}}{8}\right)$  ର ଏକ ସମ୍ଭାବ୍ୟ ମୂଲ୍ୟ ଅଟେ :

Options :

70819156513.  $\frac{1}{\sqrt{7}}$

70819156514.  $\frac{1}{2\sqrt{2}}$

70819156515.  $\sqrt{7} - 1$

70819156516.  $2\sqrt{2} - 1$

**Question Number : 75 Question Id : 70819117118 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The angle of elevation of a jet plane from a point A on the ground is  $60^\circ$ . After a flight of 20 seconds at the speed of 432 km/hour, the angle of elevation changes to  $30^\circ$ . If the jet plane is flying at a constant height, then its height is :

**Options :**

70819156517.  $3600\sqrt{3}$  m

70819156518.  $2400\sqrt{3}$  m

70819156519.  $1800\sqrt{3}$  m

70819156520.  $1200\sqrt{3}$  m

**Question Number : 75 Question Id : 70819117118 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଭୂପୃଷ୍ଠରୁ ଏକ ଜେଟ୍ ବିମାନର A ବିନ୍ଦୁରେ ଉତ୍ତୋଳନ କୋଣ  $60^\circ$  । 432 କି.ମି / ଘଣ୍ଟା ପ୍ରତି ବେଗରେ, 20 ସେକେଣ୍ଡ ଉଡ଼ାଣ ପରେ, ଉତ୍ତୋଳନ କୋଣର ପରିମାଣ  $30^\circ$  କୁ ବଦଳିଯାଏ । ଯଦି ଜେଟ୍ ବିମାନଟି ଏକ ନିର୍ଦ୍ଦିଷ୍ଟ ସ୍ଥିର ଉଚ୍ଚତାରେ ଉଡ଼ୁଥାଏ, ତେବେ ତାହାର ଭୂପୃଷ୍ଠରୁ ଉଚ୍ଚତା ଅଟେ :

**Options :**

70819156517.  $3600\sqrt{3}$  ମି

70819156518.  $2400\sqrt{3}$  मि

70819156519.  $1800\sqrt{3}$  मि

70819156520.  $1200\sqrt{3}$  मि

**Question Number : 76 Question Id : 70819117119 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The vector equation of the plane passing through the intersection of the planes

$\vec{r} \cdot (\hat{i} + \hat{j} + \hat{k}) = 1$  and  $\vec{r} \cdot (\hat{i} - 2\hat{j}) = -2$ , and the point (1, 0, 2) is :

**Options :**

70819156521.  $\vec{r} \cdot (3\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819156522.  $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819156523.  $\vec{r} \cdot (\hat{i} - 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

70819156524.  $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

**Question Number : 76 Question Id : 70819117119 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ସମତଳ  $\vec{r} \cdot (\hat{i} + \hat{j} + \hat{k}) = 1$  ଏବଂ  $\vec{r} \cdot (\hat{i} - 2\hat{j}) = -2$  ଦ୍ଵାରା ଛେଦ ଓ ବିନ୍ଦୁ  $(1, 0, 2)$  ମଧ୍ୟଦେଇ ଗଠିତ କରୁଥିବା ସମତଳଟିର ସଦିଶ ସମୀକରଣଟି ଅଟେ :

**Options :**

70819156521.  $\vec{r} \cdot (3\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819156522.  $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819156523.  $\vec{r} \cdot (\hat{i} - 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

70819156524.  $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

**Question Number : 77 Question Id : 70819117120 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

For the statements p and q, consider the following compound statements :

(a)  $(\sim q \wedge (p \rightarrow q)) \rightarrow \sim p$

(b)  $((p \vee q) \wedge \sim p) \rightarrow q$

Then which of the following statements is correct ?

**Options :**

70819156525. (a) is a tautology but not (b).

70819156526. (b) is a tautology but not (a).

70819156527. (a) and (b) both are tautologies.

70819156528. (a) and (b) both are not tautologies.

**Question Number : 77 Question Id : 70819117120 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଉକ୍ତି p ଓ q ପାଇଁ ନିମ୍ନ ଯୌଗିକ ଉକ୍ତିଟିକୁ ବିଚାର କର :

(a)  $(\sim q \wedge (p \rightarrow q)) \rightarrow \sim p$

(b)  $((p \vee q) \wedge \sim p) \rightarrow q$

ତେବେ ନିମ୍ନରେ ଥିବା କେଉଁ ଉକ୍ତି / ଉକ୍ତିମାନେ ଠିକ୍ ?

**Options :**

70819156525. (a) ଏକ ପୁନରୁକ୍ତି (ଟାଟୋଲୋଜି) କିନ୍ତୁ (b) ନୁହେଁ

70819156526. (b) ଏକ ପୁନରୁକ୍ତି (ଟାଟୋଲୋଜି) କିନ୍ତୁ (a) ନୁହେଁ

70819156527. (a) ଓ (b) ଉଭୟ ପୁନରୁକ୍ତି

70819156528. (a) ଓ (b) ଉଭୟ ପୁନରୁକ୍ତି ନୁହଁନ୍ତି

**Question Number : 78 Question Id : 70819117121 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

If a curve  $y=f(x)$  passes through the point (1, 2) and satisfies  $x \frac{dy}{dx} + y = bx^4$ , then for

what value of b,  $\int_1^2 f(x)dx = \frac{62}{5}$  ?

**Options :**



70819156529. 10

70819156530.  $\frac{31}{5}$

70819156531. 5

70819156532.  $\frac{62}{5}$

**Question Number : 78 Question Id : 70819117121 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ଯଦି ଗୋଟିଏ ବକ୍ରରେଖା  $y=f(x)$ ,  $(1, 2)$  ବିନ୍ଦୁ ମଧ୍ୟଦେଇ ଗତିକରେ ଏବଂ  $x \frac{dy}{dx} + y = bx^4$  ସମୀକରଣଟିକୁ ସିଦ୍ଧ

କରେ, ତେବେ  $b$  ର କେଉଁ ମୂଲ୍ୟ ପାଇଁ  $\int_1^2 f(x) dx = \frac{62}{5}$  :

**Options :**

70819156529. 10

70819156530.  $\frac{31}{5}$

70819156531. 5

70819156532.  $\frac{62}{5}$

**Question Number : 79 Question Id : 70819117122 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The probability that two randomly selected subsets of the set  $\{1, 2, 3, 4, 5\}$  have exactly two elements in their intersection, is :

**Options :**

70819156533.  $\frac{65}{2^7}$

70819156534.  $\frac{65}{2^8}$

70819156535.  $\frac{135}{2^9}$

70819156536.  $\frac{35}{2^7}$

**Question Number : 79 Question Id : 70819117122 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ସେଟ୍  $\{1, 2, 3, 4, 5\}$  ରୁ ଠିକ୍ ଦୁଇଟି ସାଧାରଣ ଉପାଦାନ ଥିବା ଦୁଇଟି ଉପସେଟ୍‌କୁ ମନଇଚ୍ଛା ବାଛିବାର ସମ୍ଭାବ୍ୟତା ଅଟେ :

**Options :**

70819156533.  $\frac{65}{2^7}$

70819156534.  $\frac{65}{2^8}$

70819156535.  $\frac{135}{2^9}$

70819156536.  $\frac{35}{2^7}$

**Question Number : 80 Question Id : 70819117123 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

The area of the region :  $R = \{(x, y) : 5x^2 \leq y \leq 2x^2 + 9\}$  is :

**Options :**

70819156537.  $6\sqrt{3}$  square units

70819156538.  $9\sqrt{3}$  square units

70819156539.  $11\sqrt{3}$  square units

70819156540.  $12\sqrt{3}$  square units

**Question Number : 80 Question Id : 70819117123 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

$R = \{(x, y) : 5x^2 \leq y \leq 2x^2 + 9\}$  ଆବଳ କ୍ଷେତ୍ରର କ୍ଷେତ୍ରଫଳ ଅଟେ :

**Options :**

70819156537.  $6\sqrt{3}$  ବର୍ଗ ଏକକ

70819156538.  $9\sqrt{3}$  ବର୍ଗ ଏକକ

70819156539.  $11\sqrt{3}$  ବର୍ଗ ଏକକ

70819156540.  $12\sqrt{3}$  ବର୍ଗ ଏକକ

## Mathematics Section B

Section Id :	708191681
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 :	708191961
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 70819117124 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the variance of 10 natural numbers 1, 1, 1, ..., 1,  $k$  is less than 10, then the maximum possible value of  $k$  is \_\_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 81 Question Id : 70819117124 Question Type : SA**

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

ଯଦି 10 ଗୋଟି ଗଣନ ସଂଖ୍ୟା  $1, 1, 1, \dots, 1, k$  ର ଭାରିଆନସ୍ (ପ୍ରସରଣ) 10 ଠାରୁ ସାନ, ତେବେ  $k$  ର ସର୍ବାଧିକ ସମ୍ଭାବ୍ୟ ମୂଲ୍ୟ ଅଟେ \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 82 Question Id : 70819117125 Question Type : SA**

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

Let a point P be such that its distance from the point (5, 0) is thrice the distance of P from the point (-5, 0). If the locus of the point P is a circle of radius r, then  $4r^2$  is equal to \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 82 Question Id : 70819117125 Question Type : SA**

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

ମନେକର  $P$  ଏକ ଏପରି ବିନ୍ଦୁ, ଯେପରିକି ବିନ୍ଦୁ  $(5, 0)$  ଠାରୁ  $P$  ର ଦୂରତା, ବିନ୍ଦୁ  $(-5, 0)$  ଠାରୁ  $P$  ଦୂରତାର 3 ଗୁଣ । ଯଦି  $P$  ବିନ୍ଦୁର ସଂଚାର ପଥ (ଲୋକସ)  $r$  ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ ଏକ ବୃତ୍ତ ହୁଏ, ତେବେ  $4r^2$  ର ମୂଲ୍ୟ ଅଟେ \_\_\_\_\_।

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 83 Question Id : 70819117126 Question Type : SA**

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

If the area of the triangle formed by the positive  $x$ -axis, the normal and the tangent to the circle  $(x-2)^2 + (y-3)^2 = 25$  at the point  $(5, 7)$  is  $A$ , then  $24A$  is equal to \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 83 Question Id : 70819117126 Question Type : SA**

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

ଯଦି  $(x-2)^2 + (y-3)^2 = 25$  ବୃତ୍ତ ଉପରିସ୍ଥ ବିନ୍ଦୁ  $(5, 7)$  ଠାରେ ଅଙ୍କିତ ଲମ୍ବ ଓ ସ୍ପର୍ଶକ ଏବଂ ଯୁକ୍ତାନ୍ତ (ଧନାନ୍ତ)  $x$  - ଅକ୍ଷ ଦ୍ୱାରା ଆବଦ୍ଧ ତ୍ରିଭୁଜର କ୍ଷେତ୍ରଫଳ  $A$  ହୁଏ, ତେବେ  $24A$  ସମାନ \_\_\_\_\_।

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 84 Question Id : 70819117127 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let  $i = \sqrt{-1}$ . If  $\frac{(-1 + i\sqrt{3})^{21}}{(1 - i)^{24}} + \frac{(1 + i\sqrt{3})^{21}}{(1 + i)^{24}} = k$ , and  $n = [|k|]$  be the greatest integral part

of  $|k|$ . Then  $\sum_{j=0}^{n+5} (j + 5)^2 - \sum_{j=0}^{n+5} (j + 5)$  is equal to \_\_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 84 Question Id : 70819117127 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ଉଦାହରଣ  $\frac{(-1 + i\sqrt{3})^{21}}{(1 - i)^{24}} + \frac{(1 + i\sqrt{3})^{21}}{(1 + i)^{24}} = k$  ହୁଏ, ( $i = \sqrt{-1}$ ) ଏବଂ  $n = [|k|]$ , ( $|k|$  ର ପୂର୍ଣ୍ଣ ସଂଖ୍ୟା ମୂଲ୍ୟ  $n$

ହୁଏ) ତେବେ,  $\sum_{j=0}^{n+5} (j + 5)^2 - \sum_{j=0}^{n+5} (j + 5)$  ର ମୂଲ୍ୟ ସମ୍ପର୍କ ଅଟେ \_\_\_\_\_।

Response Type : Numeric

Evaluation Required For SA : Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 85 Question Id : 70819117128 Question Type : SA**

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

The students  $S_1, S_2, \dots, S_{10}$  are to be divided into 3 groups A, B and C such that each group has at least one student and the group C has at most 3 students. Then the total number of possibilities of forming such groups is \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 85 Question Id : 70819117128 Question Type : SA**

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

ଦଶଜଣ ଛାତ୍ର  $S_1, S_2, \dots, S_{10}$  କୁ A, B ଓ C ଭାବେ 3 ଗୋଟି ଦଳ (ଗୁପ୍)ରେ ଭାଗ କରିଦିଆଗଲା ଯେପରିକି ପ୍ରତ୍ୟେକ ଦଳରେ ଅତିକମ୍ରେ ଜଣେ ଛାତ୍ର ରହିବ ଓ ଦଳ (ଗୁପ୍) C ରେ ଅତିବେଶିରେ 3 ଜଣ ଛାତ୍ର ରହିବେ । ତେବେ ଏପରି ଦଳ ତିଆରି କରିବାର ସର୍ବମୋଟ ସମ୍ଭବ ସଂଖ୍ୟା ଅଟେ \_\_\_\_\_ ।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001



Question Number : 86 Question Id : 70819117129 Question Type : SA  
Correct Marks : 4 Wrong Marks : 0

For integers  $n$  and  $r$ , let  $\binom{n}{r} = \begin{cases} {}^n C_r, & \text{if } n \geq r \geq 0 \\ 0, & \text{otherwise} \end{cases}$

The maximum value of  $k$  for which the sum

$\sum_{i=0}^k \binom{10}{i} \binom{15}{k-i} + \sum_{i=0}^{k+1} \binom{12}{i} \binom{13}{k+1-i}$  exists, is equal to \_\_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 86 Question Id : 70819117129 Question Type : SA  
Correct Marks : 4 Wrong Marks : 0

ଦୁଇଟି ପୂର୍ଣ୍ଣ ସଂଖ୍ୟା  $n$  ଓ  $r$  ପାଇଁ ମନେକର  $\binom{n}{r} = \begin{cases} {}^n C_r, & \text{ଯଦି } n \geq r \geq 0 \\ 0, & \text{ଅନ୍ୟକ୍ଷେତ୍ରରେ,} \end{cases}$

$k$  ର ସର୍ବାଧିକ ମୂଲ୍ୟ \_\_\_\_\_ ପାଇଁ  $\sum_{i=0}^k \binom{10}{i} \binom{15}{k-i} + \sum_{i=0}^{k+1} \binom{12}{i} \binom{13}{k+1-i}$  ର ମିଶାଣ ଫଳଟି ଚିତ୍ତ୍ୱିତ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 87 Question Id : 70819117130 Question Type : SA**

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

If  $a + \alpha = 1$ ,  $b + \beta = 2$  and  $af(x) + \alpha f\left(\frac{1}{x}\right) = bx + \frac{\beta}{x}$ ,  $x \neq 0$ , then the value of the expression

$$\frac{f(x) + f\left(\frac{1}{x}\right)}{x + \frac{1}{x}} \text{ is } \underline{\hspace{2cm}}.$$

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 87 Question Id : 70819117130 Question Type : SA**

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

ଯଦି  $a + \alpha = 1$ ,  $b + \beta = 2$  ଏବଂ  $af(x) + \alpha f\left(\frac{1}{x}\right) = bx + \frac{\beta}{x}$ ,  $x \neq 0$ , ତେବେ  $\frac{f(x) + f\left(\frac{1}{x}\right)}{x + \frac{1}{x}}$  ର ମୂଲ୍ୟ ଅଟେ

\_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 88 Question Id : 70819117131 Question Type : SA**

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

Let  $\lambda$  be an integer. If the shortest distance between the lines  $x - \lambda = 2y - 1 = -2z$  and

$x = y + 2\lambda = z - \lambda$  is  $\frac{\sqrt{7}}{2\sqrt{2}}$ , then the value of  $|\lambda|$  is \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 88 Question Id : 70819117131 Question Type : SA**

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

ମନେକର  $\lambda$  ଏକ ପୂର୍ଣ୍ଣସଂଖ୍ୟା । ଯଦି  $x - \lambda = 2y - 1 = -2z$  ଓ  $x = y + 2\lambda = z - \lambda$  ରେଖାଦ୍ୱୟ ମଧ୍ୟରେ ସର୍ବନିମ୍ନ

ଦୂରତ୍ୱ  $\frac{\sqrt{7}}{2\sqrt{2}}$  ହୁଏ, ତେବେ  $|\lambda|$  ର ମୂଲ୍ୟ ଅଟେ \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 89 Question Id : 70819117132 Question Type : SA**

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

The sum of first four terms of a geometric progression (G.P.) is  $\frac{65}{12}$  and the sum of their respective reciprocals is  $\frac{65}{18}$ . If the product of first three terms of the G.P. is 1, and the third term is  $\alpha$ , then  $2\alpha$  is \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 89 Question Id : 70819117132 Question Type : SA**

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

ଗୋଟିଏ ଗୁଣୋତ୍ତର ପ୍ରଗତୀ (ଶ୍ରେଣୀ) ର ପ୍ରଥମ ଚାରିଗୋଟି ପଦର ସମଷ୍ଟି  $\frac{65}{12}$ , ଏବଂ ସେହି ପଦଗୁଡ଼ିକର ପ୍ରତିଲୋମୀ ପଦମାନଙ୍କର ସମଷ୍ଟି  $\frac{65}{18}$  ଅଟେ । ଯଦି ଉକ୍ତ ଗୁଣୋତ୍ତର ପ୍ରଗତୀର ପ୍ରଥମ ତିନିଗୋଟି ପଦର ଗୁଣଫଳ 1 ଅଟେ ଏବଂ ତୃତୀୟ ପଦଟି  $\alpha$  ହୁଏ, ତେବେ  $2\alpha$  ଅଟେ \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 90 Question Id : 70819117133 Question Type : SA**

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

The number of the real roots of the equation  $(x+1)^2 + |x-5| = \frac{27}{4}$  is \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 90 Question Id : 70819117133 Question Type : SA**

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

ସମୀକରଣ  $(x+1)^2 + |x-5| = \frac{27}{4}$  ର ବାସ୍ତବ ବୀଜମାନଙ୍କର ସଂଖ୍ୟା ଅଟେ \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001