

# National Testing Agency

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## B TECH EA

<b>Group Number :</b>	1
<b>Group Id :</b>	708191177
<b>Group Maximum Duration :</b>	0
<b>Group Minimum Duration :</b>	180
<b>Show Attended Group? :</b>	No
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<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>	708191640
<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 :	708191920
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 70819116504 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 :

70819154661. 1.33%

70819154662. 1.03%

70819154663. 1.13%

70819154664. 1.30%

Question Number : 1 Question Id : 70819116504 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

সৰলদোলক এটাৰ দোলনৰ পৰ্যায়কাল  $T = 2\pi\sqrt{\frac{L}{g}}$ । নিম্নতম বিভাজন 1 mm থকা এডাল মিটাৰ স্কেল অনুসৰি 'L' ৰ মান 1.0 m আৰু 0.01 s পৰ্য্যন্ত বিভেদ কৰিব পৰা এটা ষ্টপৱাছ (stopwatch) অনুসৰি এক সম্পূৰ্ণ দোলনৰ সময় 1.95 s। 'g' ৰ নিৰ্দ্ধাৰণৰ ক্ষেত্ৰত শতকৰা ত্ৰুটি হ'ব \_\_\_\_\_।

**Options :**

70819154661. 1.33%

70819154662. 1.03%

70819154663. 1.13%

70819154664. 1.30%

**Question Number : 2 Question Id : 70819116505 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 :**

70819154665.  $\left(\frac{2v_0^2}{3\alpha}\right)^{\frac{1}{2}}$

70819154666.  $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{2}}$

70819154667.  $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{3}}$

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

70819154668.

**Question Number : 2 Question Id : 70819116505 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

x-অক্ষৰ দিশত এটা কণাক  $v_0$  বেগৰ সৈতে প্ৰক্ষেপ কৰা হৈছে। মূল বিন্দুৰ পৰা দূৰত্বৰ বৰ্গৰ সমানুপাতিক এক অৱমণ্ডন বলে 'damping force', i.e.  $ma = -\alpha x^2$ , কণাটোৰ ওপৰত ক্ৰিয়া কৰি আছে। কণাটো স্থিৰ হোৱা দূৰত্ব হ'ব :

**Options :**

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

70819154665.

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

70819154666.

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

70819154667.

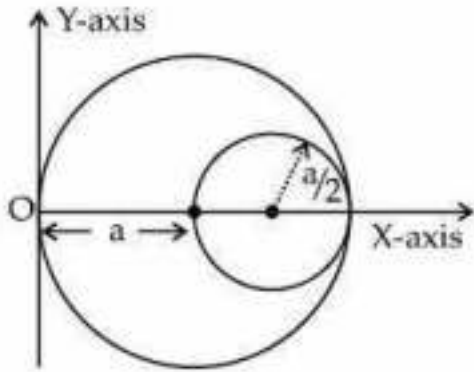
$$\left(\frac{2v_0}{3\alpha}\right)^{\frac{1}{3}}$$

70819154668.

**Question Number : 3 Question Id : 70819116506 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 :

70819154669.  $\frac{1}{6}a$

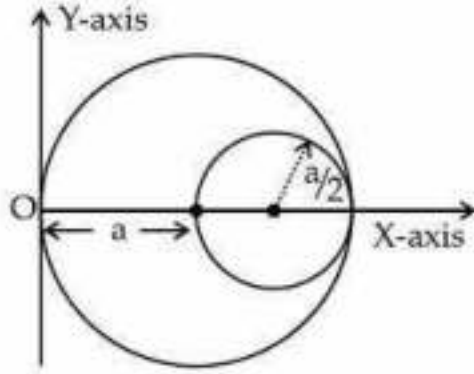
70819154670.  $\frac{5}{6}a$

70819154671.  $\frac{2}{3}a$

70819154672.  $\frac{10}{11}a$

Question Number : 3 Question Id : 70819116506 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

চিত্ৰত দেখুওৱা ধৰণে, এখন 'a' ব্যাসাৰ্ধৰ বৃত্তাকাৰ খালত  $\left(\frac{a}{2}\right)$  ব্যাসাৰ্ধৰ এটা বৃত্তাকাৰ ছিদ্র কাটি উলিওৱা হৈছে। বাকী থকা বৃত্তাকাৰ অংশটোৰ বিন্দু 'O' সাপেক্ষে 'centroid' হ'ব :



Options :

70819154669.  $\frac{1}{6}a$

70819154670.  $\frac{5}{6}a$

70819154671.  $\frac{2}{3}a$

70819154672.  $\frac{10}{11}a$

Question Number : 4 Question Id : 70819116507 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 :

70819154673. 49.17 N

70819154674. 49 N

70819154675. 48.83 N

70819154676. 49.83 N

Question Number : 4 Question Id : 70819116507 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

উত্তৰ মেৰুত এখন স্প্ৰিং তুলাচনীত এটা বস্তুৰ ওজন 49 N। বিষুৱৰেখাত একেখন তুলাচনীত ইয়াৰ ওজন কিমান পোৱা

যাব ? [ $g = \frac{GM}{R^2} = 9.8 \text{ ms}^{-2}$  আৰু পৃথিৱীৰ ব্যাসাৰ্ধ,  $R = 6400 \text{ km}$ ]

Options :

70819154673. 49.17 N

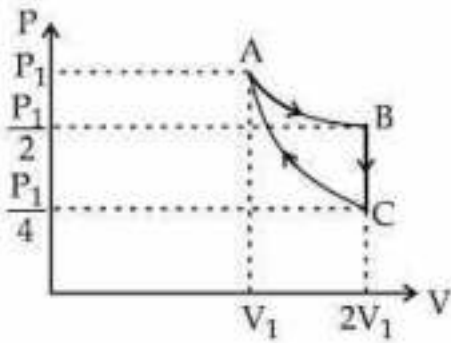
70819154674. 49 N

70819154675. 48.83 N

70819154676. 49.83 N

Question Number : 5 Question Id : 70819116508 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 :

70819154677.  $RT \left( \ln 2 - \frac{1}{2(\gamma - 1)} \right)$

70819154678.  $-\frac{RT}{2(\gamma - 1)}$

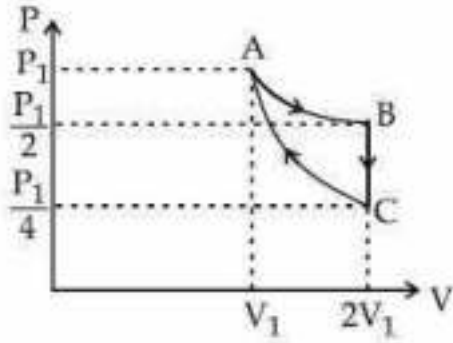
70819154679.  $RT \ln 2$

70819154680.  $0$



Question Number : 5 Question Id : 70819116508 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

( $P_1, V_1$ ) ত থকা এটা আদৰ্শ গেছৰ 1 ম'ল পৰিমাণক পৰাবৰ্তনীয়ভাৱে আৰু সমোষ্ণীভাৱে (A ব পৰা B লৈ) প্ৰসাৰিত হ'বলৈ দিয়া হৈছে। ইয়াৰ চাপ প্ৰাৰম্ভিক চাপৰ আধালৈ হ্রাস পায়। ইয়াৰ পাছত সমায়তনী প্ৰক্ৰিয়াৰে ইয়াক শীতলীকৃত কৰা হৈছে যাতে ইয়াৰ চাপ প্ৰাৰম্ভিক চাপৰ এক চতুৰ্থাংশলৈ হ্রাস পায়, (B  $\rightarrow$  C)। তাৰপাছত ইয়াক পুনৰ পৰাবৰ্তনীয় তাপবোধী সংকোচন প্ৰক্ৰিয়াৰে প্ৰাৰম্ভিক অৱস্থালৈ (C ব পৰা A) লৈ যোৱা হৈছে। গেছটোৰ দ্বাৰা সম্পাদিত সমুদায় কাৰ্যৰ পৰিমাণ \_\_\_\_\_।



Options :

70819154677.  $RT \left( \ln 2 - \frac{1}{2(\gamma-1)} \right)$

70819154678.  $-\frac{RT}{2(\gamma-1)}$

70819154679.  $RT \ln 2$

70819154680. 0

Question Number : 6 Question Id : 70819116509 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 :**

70819154681. continuously lose their energy till it reaches wall.
70819154682. continuously stick to the walls of container.
70819154683. are attracted by the walls of container.
70819154684. suffer change in momentum when impinge on the walls of container.

**Question Number : 6 Question Id : 70819116509 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

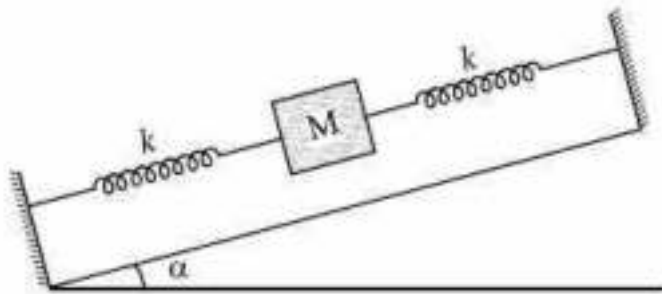
গেছৰ গতিবাদ তত্ত্ব অনুসৰি, গেছে চাপ প্ৰয়োগ কৰে কাৰণ ইয়াৰ অণুসমূহে :

**Options :**

70819154681. অবিবামভাৱে সিহঁতৰ শক্তি হেৰুৱায়, যেতিয়ালৈকে পাত্ৰৰ পৃষ্ঠ স্পৰ্শ নকৰে।
70819154682. অবিবামভাৱে পাত্ৰৰ পৃষ্ঠত লাগি থাকে।
70819154683. পাত্ৰৰ পৃষ্ঠৰ দ্বাৰা আকৰ্ষিত হয়।
70819154684. পাত্ৰৰ পৃষ্ঠত ঠেকা খোৱাৰ বাবে ভৰবেগৰ সলনি হয়।

**Question Number : 7 Question Id : 70819116510 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 :

70819154685.  $\frac{1}{2\pi} \sqrt{\frac{k}{Mg \sin\alpha}}$

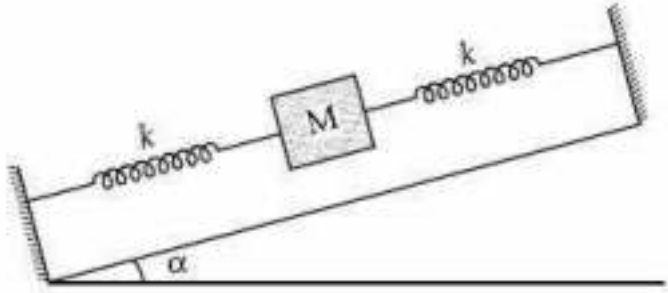
70819154686.  $\frac{1}{2\pi} \sqrt{\frac{2k}{Mg \sin\alpha}}$

70819154687.  $\frac{1}{2\pi} \sqrt{\frac{2k}{M}}$

70819154688.  $\frac{1}{2\pi} \sqrt{\frac{k}{2M}}$

Question Number : 7 Question Id : 70819116510 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

চিত্রত দেখুওৱা ধৰণে,  $M$  ভৰৰ এটা বস্তুক দুডাল ভৰহীন স্প্ৰিংৰ মাজত বান্ধি, এখন মসৃণ হেলনীয়া তলত ৰখা হৈছে। স্প্ৰিং দুডালৰ মুক্ত প্ৰান্ত দুটা দৃঢ় আলমত বান্ধি ৰখা হৈছে। যদি প্ৰতিডাল স্প্ৰিংৰ স্প্ৰিং ধ্ৰুৱক  $k$  হয়, তেন্তে বস্তুটোৰ দোলনৰ কম্পনাংক হ'ব :



Options :

70819154685.  $\frac{1}{2\pi} \sqrt{\frac{k}{Mg \sin \alpha}}$

70819154686.  $\frac{1}{2\pi} \sqrt{\frac{2k}{Mg \sin \alpha}}$

70819154687.  $\frac{1}{2\pi} \sqrt{\frac{2k}{M}}$

70819154688.  $\frac{1}{2\pi} \sqrt{\frac{k}{2M}}$

Question Number : 8 Question Id : 70819116511 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 :

70819154689. circular

70819154690. elliptical

70819154691. parabolic

70819154692. straight line

Question Number : 8 Question Id : 70819116511 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

যেতিয়া এটা কণাই সৰল পৰ্যাবৃত্ত গতিত গতি কৰে, সৰলৰ ফলন ৰূপে বেগৰ লেখচিত্ৰৰ প্ৰকৃতি হ'ব :

Options :

70819154689. বৃত্তাকাৰ

70819154690. উপবৃত্তাকাৰ

70819154691. অধিবৃত্তাকাৰ

70819154692. সৰলৰৈখিক

Question Number : 9 Question Id : 70819116512 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 :**

70819154693.  $y = Ae^{x^2} \cos(\omega t - \theta)$

70819154694.  $y = Ae^{-x^2} (vt + \theta)$

70819154695.  $y = A \sin(15x - 2t)$

70819154696.  $y = A \sin x \cos \omega t$

**Question Number : 9 Question Id : 70819116512 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

তলৰ কোনটো সমীকৰণে গতিশীল তৰংগক সূচায় ?

**Options :**

70819154693.  $y = Ae^{x^2} \cos(\omega t - \theta)$

70819154694.  $y = Ae^{-x^2} (vt + \theta)$

70819154695.  $y = A \sin(15x - 2t)$

70819154696.  $y = A \sin x \cos \omega t$

**Question Number : 10 Question Id : 70819116513 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 :

70819154697.  $\left( \frac{q^2}{2\pi\epsilon_0 md^3} \right)^{\frac{1}{2}}$

70819154698.  $\left( \frac{2q^2}{\pi\epsilon_0 md^3} \right)^{\frac{1}{2}}$

70819154699.  $\left( \frac{\pi\epsilon_0 md^3}{2q^2} \right)^{\frac{1}{2}}$

70819154700.  $\left( \frac{2\pi\epsilon_0 md^3}{q^2} \right)^{\frac{1}{2}}$

Question Number : 10 Question Id : 70819116513 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

দুটা ইলেকট্রনৰ প্রতিটোকেই  $2d$  দূৰত্বত বান্ধি ৰখা হৈছে। তৃতীয়টো আধান-এটা প্ৰ'ট'নক দুয়োৰে মধ্যবিন্দুত ৰখা হৈছে আৰু দুয়োটা ইলেকট্ৰনক সংযোগ কৰি ৰখা বেখাৰ উলম্ব দিশত  $x$  ( $x \ll d$ ) দূৰত্বৰে এক সামান্য বিস্থাপিত (displaced) কৰা হৈছে। প্ৰ'ট'নটোৱে যিটো কৌণিক কম্পনাংকৰ সৈতে সৰল পৰ্যাবৃত্ত গতিত গতি কৰিব, সেইটো হ'ল : ( $m$  = আধান কণাৰ ভৰ)

Options :

70819154697.  $\left(\frac{q^2}{2\pi\epsilon_0 md^3}\right)^{\frac{1}{2}}$

70819154698.  $\left(\frac{2q^2}{\pi\epsilon_0 md^3}\right)^{\frac{1}{2}}$

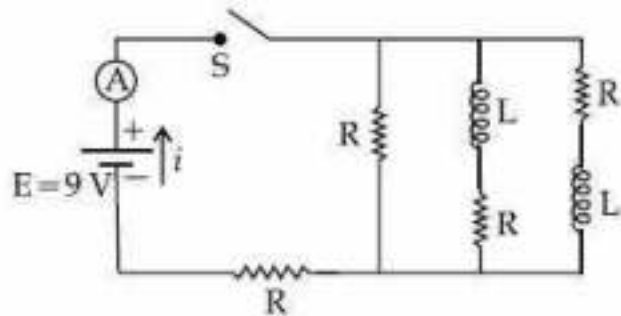
70819154699.  $\left(\frac{\pi\epsilon_0 md^3}{2q^2}\right)^{\frac{1}{2}}$

70819154700.  $\left(\frac{2\pi\epsilon_0 md^3}{q^2}\right)^{\frac{1}{2}}$

Question Number : 11 Question Id : 70819116514 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 :

70819154701. 2.25 A

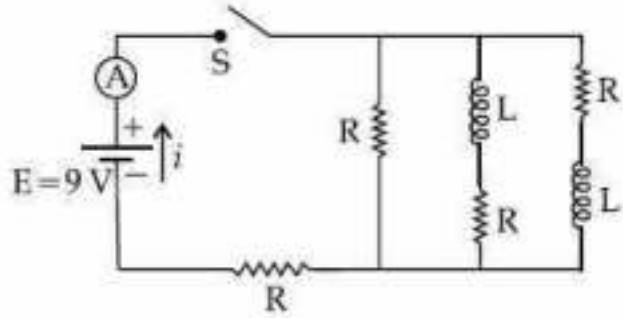
70819154702. 3.0 A

70819154703. 3.37 A

70819154704. 9 A

Question Number : 11 Question Id : 70819116514 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

চিত্রত দেখুওৱা বৰ্তনীটোত, চাৰিটা সাইলাখ একেই  $R=2.0\ \Omega$  বোধকৰ বোধ, দুটা একেই  $L=2.0\ \text{mH}$  মানৰ আৱেশক আৰু  $E=9\ \text{V}$  মানৰ বিদ্যুৎ চালক বলৰ এটা আদৰ্শ বেট্ৰী সংযোজিত আছে। চুইচ 'S' বন্ধ কৰাৰ লগে লগে প্ৰৱাহিত বিদ্যুৎ 'i' ৰ মান হ'ব \_\_\_\_\_।



Options :

70819154701. 2.25 A

70819154702. 3.0 A

70819154703. 3.37 A

70819154704. 9 A

Question Number : 12 Question Id : 70819116515 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 :

70819154705. increase in size but no change in orientation.

70819154706. decrease in size and changes orientation.

70819154707. may increase or decrease in size and change its orientation.

70819154708. have no relation with external magnetic field.

**Question Number : 12 Question Id : 70819116515 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

এখন বহিঃ কৌণিক ক্ষেত্ৰত এটা কোমল লৌহ চুম্বকীয় পদাৰ্থক ৰখা হৈছে। কৌণিক ডমেইন (domain) সমূহৰ,

**Options :**

70819154705. আকাৰৰ বৃদ্ধি হয় কিন্তু কৌণিক অৱস্থান (orientation) ৰ সলনি নহয়।

70819154706. আকাৰ হ্রাস পায় আৰু কৌণিক অৱস্থানৰ সলনি হয়।

70819154707. আকাৰ হ্রাস বা বৃদ্ধি হ'ব পাৰে আৰু ইয়াৰ কৌণিক অৱস্থানৰ সলনি হয়।

70819154708. বহিঃ চুম্বক ক্ষেত্ৰৰ সৈতে কোনো সম্পৰ্ক নাই।

**Question Number : 13 Question Id : 70819116516 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 :

70819154709. (a)-(vi), (b)-(v), (c)-(i), (d)-(iv)

70819154710. (a)-(vi), (b)-(iv), (c)-(i), (d)-(v)

70819154711. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819154712. (a)-(ii), (b)-(iv), (c)-(vi), (d)-(iii)

Question Number : 13 Question Id : 70819116516 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

তালিকা - I ব সৈতে তালিকা - II মিলোৱা।

তালিকা - I	তালিকা - II
(a) মাইক্রোৱেভ কম্পনাংকৰ উৎস	(i) নিউক্লিয়াছৰ তেজস্ক্ৰিয় বিঘটন
(b) অৱলোহিত কম্পনাংকৰ উৎস	(ii) মেগনেট্ৰন
(c) গামা বশ্মিৰ উৎস	(iii) অন্তঃকক্ষৰ ইলেকট্ৰন
(d) বৰ্জন বশ্মি উৎস	(iv) অণু-পৰমাণুৰ কম্পন
	(v) লেজাৰ (LASER)
	(vi) RC বৰ্তনী

তলৰ বিকল্পৰ পৰা শুদ্ধ উত্তৰ বাচনি কৰা।

Options :

70819154709. (a)-(vi), (b)-(v), (c)-(i), (d)-(iv)

70819154710. (a)-(vi), (b)-(iv), (c)-(i), (d)-(v)

70819154711. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819154712. (a)-(ii), (b)-(iv), (c)-(vi), (d)-(iii)

Question Number : 14 Question Id : 70819116517 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 :

70819154713. the fringes will become brighter.

70819154714. consecutive fringe lines will come closer.

70819154715. the intensity of minima will increase.

70819154716. the central bright fringe will become a dark fringe.

**Question Number : 14 Question Id : 70819116517 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

যদিহে ইয়ংৰ দ্বি-ছিদ্র পৰীক্ষাত ব্যৱহৃত পোহৰৰ উৎস বগুৰা পৰা বেঙুনীয়া লৈ সলনি কৰা হয় :

**Options :**

70819154713. পটिसমূহ আৰু উজ্জ্বল হৈ পৰিব।

70819154714. ক্ৰমিক পটিবোৰা সমূহ ওচৰ চাপি আহিব।

70819154715. সৰ্বনিম্ন তীব্ৰতা (minima) ৰ তীব্ৰতা বাঢ়ি যাব।

70819154716. কেন্দ্ৰীয় উজ্জ্বল পটিকটো এটা অন্ধকাৰ পটিলৈ ৰূপান্তৰ হ'ব।

**Question Number : 15 Question Id : 70819116518 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 :**

70819154717.  $10^{-1}$  nm

70819154718.  $10^{-2}$  nm

70819154719.  $10^{-3}$  nm

70819154720.  $10^{-4}$  nm

**Question Number : 15 Question Id : 70819116518 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

1.24 মিলিয়ন ভল্টত এটা এক্সৰে নলীক কাম কৰোৱা হৈছে। উপৰত হোৱা ফ'ট'নৰ নিম্নতম তৰংগদৈৰ্ঘ্য হ'ব :

**Options :**

70819154717.  $10^{-1}$  nm

70819154718.  $10^{-2}$  nm

70819154719.  $10^{-3}$  nm

70819154720.  $10^{-4}$  nm

**Question Number : 16 Question Id : 70819116519 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 :**

70819154721. 4 : 1

70819154722. 4 : 2

70819154723. 4 : 3

70819154724. 1 : 4

**Question Number : 16 Question Id : 70819116519 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

এটি প্র'ট'ন আৰু  $\alpha$ -কণাৰ ভা-দ্রুৱৰ তৰংগদৈৰ্ঘ্য সমান। সিহঁতৰ বেগৰ অনুপাত হ'ব :

**Options :**

70819154721. 4 : 1

70819154722. 4 : 2

70819154723. 4 : 3

70819154724. 1 : 4

**Question Number : 17 Question Id : 70819116520 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 :**

70819154725.  $n=2$  to  $n=1$

70819154726.  $n=3$  to  $n=2$

70819154727.  $n=4$  to  $n=3$

70819154728.  $n=5$  to  $n=4$



**Question Number : 17 Question Id : 70819116520 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ব'বৰ পৰমাণু আৰ্হি অনুসৰি, তলৰ কোনটো সংক্ৰমণৰ (transition) বাবে কম্পনাংক সৰ্ব্বোচ্চ হ'ব ?

**Options :**

70819154725.  $n=2$  to  $n=1$

70819154726.  $n=3$  to  $n=2$

70819154727.  $n=4$  to  $n=3$

70819154728.  $n=5$  to  $n=4$

**Question Number : 18 Question Id : 70819116521 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 :**

70819154729. lightly doped and have narrow depletion layer.

70819154730. lightly doped and have wide depletion layer.

70819154731. heavily doped and have narrow depletion layer.

70819154732. heavily doped and have wide depletion layer.

**Question Number : 18 Question Id : 70819116521 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

এটা  $p-n$  জাংছন ডায়'ডত জেনাব ব্ৰেকডাউন হ'ব যেতিয়া  $p$  আৰু  $n$  দুয়োটা অঞ্চল :

**Options :**

70819154729. পাতলভাৱে ডোপিং কৰা হ'ব আৰু শূন্য বা বিস্তৃত অঞ্চল (depletion region) ঠেক হ'ব।

70819154730. পাতলভাৱে ডোপিং কৰা হ'ব আৰু বিস্তৃত অঞ্চল বহল হ'ব।

70819154731. মাত্ৰাধিক ভাৱে (heavily) ডোপিং কৰা আৰু বিস্তৃত অঞ্চল ঠেক হ'ব।

70819154732. মাত্ৰাধিক ভাৱে ডোপিং কৰা আৰু বিস্তৃত অঞ্চল বহল হ'ব।

**Question Number : 19 Question Id : 70819116522 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 :**

70819154733. Both Statement I and Statement II are true

70819154734. Both Statement I and Statement II are false

70819154735. Statement I is true but Statement II is false

70819154736. Statement I is false but Statement II is true

Question Number : 19 Question Id : 70819116522 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

তলত দুটা উক্তি দিয়া আছে :

উক্তি I : দুটা একেধৰণৰ PN জাংচন ডায়'ডক এটাৰ পিছত আনটো সংলগ্ন কৰি, যিটোৱে ভূমি (Base) প্রান্ত (terminal) ৰূপে কাম কৰে, ট্ৰেঞ্জিষ্টৰ হিচাপে কাম কৰিবৰ বাবে ব্যৱহাৰ কৰিব পাৰি।

উক্তি II : ট্ৰেঞ্জিষ্টৰৰ অধ্যয়নত, পৰিবৰ্ধন গুণাংক  $\beta$  য়ে সংগ্ৰাহক প্ৰবাহ আৰু ভূমি প্ৰবাহৰ অনুপাতক সূচায়।

উপৰোক্ত দুই উক্তিৰ সহায়ত, শুদ্ধ উত্তৰ তলৰ বিকল্পৰ পৰা চয়ন কৰা।

Options :

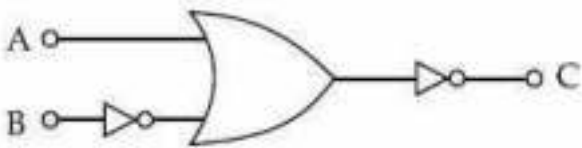
70819154733. উক্তি I আৰু উক্তি II দুয়োটাই সঁচা।

70819154734. উক্তি I আৰু উক্তি II দুয়োটাই মিছা।

70819154735. উক্তি I সঁচা কিন্তু উক্তি II মিছা।

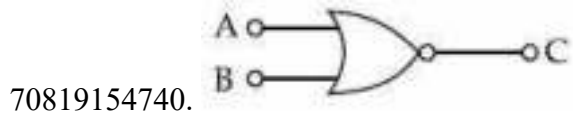
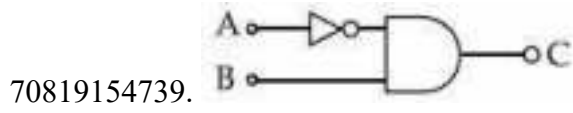
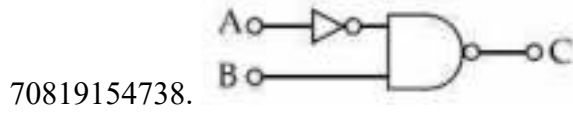
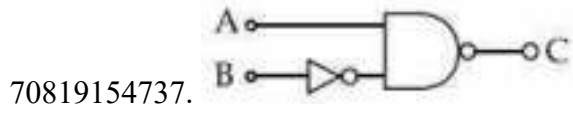
70819154736. উক্তি I মিছা কিন্তু উক্তি II সঁচা।

Question Number : 20 Question Id : 70819116523 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

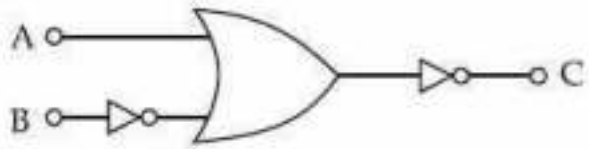


The logic circuit shown above is equivalent to :

Options :

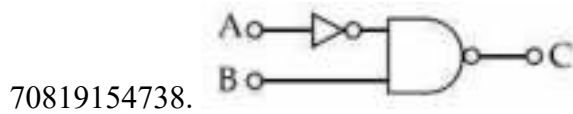
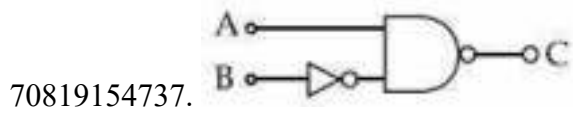


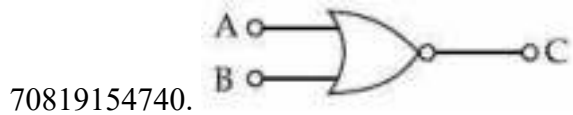
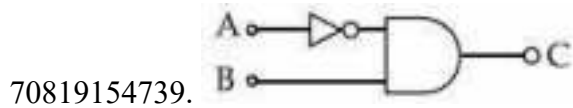
**Question Number : 20 Question Id : 70819116523 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**



ওপৰোক্ত জড়িত বৰ্তনী তলৰ কোনটোৰ সমতুল্য হ'ব :

**Options :**





## Physics Section B

Section Id :	708191641
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	708191921
Question Shuffling Allowed :	Yes

Question Number : 21 Question Id : 70819116524 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 : 70819116524 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

1 kg আৰু 2 kg ভৰৰ দুটা গোটা বস্তু A আৰু B য়ে সমান বৈখিক ভবেগৰ সৈতে গতি কৰি আছে। সিহঁতৰ গতি

শক্তিৰ অনুপাত  $(K.E.)_A : (K.E.)_B$  হ'ব  $\frac{A}{1}$  । গতিকে A ৰ মান হ'ব \_\_\_\_\_ ।

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 : 70819116525 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 : 70819116525 Question Type : SA**

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

এটা বৈখিক বল  $F$  ৰ ক্ৰিয়াৰ ফলত এডাল ধাতুৰ সুখম তাঁৰ  $0.04 \text{ m}$  দীঘল হয়। যদিহে তাঁৰডালৰ ব্যাস দুগুণ কৰা হয় আৰু একেই বলৰ প্ৰয়োগ কৰা হয়, তেতিয়া তাঁৰডালৰ দৈৰ্ঘ্যৰ পৰিবৰ্তন হ'ব \_\_\_\_\_  $\text{cm}$ ।

**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 : 23 Question Id : 70819116526 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 : 70819116526 Question Type : SA**

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

ভৰ  $6 \text{ kg}$  আৰু দৈৰ্ঘ্য  $2.4 \text{ m}$  ৰ এডাল সুখম পাতল দণ্ডক বেঁকা কৰি এটা সমতুল্যকৃতিৰ ষড়ভূজ বনোৱা হ'ল। ষড়ভূজৰ তলত লম্বভাৱে থকা আৰু ইয়াৰ ভৰকেন্দ্ৰৰ মাজেদি যোৱা এডাল অক্ষ সাপেক্ষে ইয়াৰ জড় ভ্ৰামক হ'ব \_\_\_\_\_  $\times 10^{-1} \text{ kg m}^2$ ।

**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 :** 70819116527 **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 :** 70819116527 **Question Type :** SA

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

27°C উষ্ণতাত 1 বায়ুমণ্ডলীয় চাপত থকা এটা গেছৰ, এক নিৰ্দিষ্ট ভৰৰ অণুসমূহৰ গড় বৰ্গমূল (r.m.s.) দ্রুতি হ'ল  $200 \text{ ms}^{-1}$ । 127°C উষ্ণতা আৰু 2 বায়ুমণ্ডলীয় চাপত গেছটোৰ অণুসমূহৰ গড় বৰ্গমূল দ্রুতি  $\frac{x}{\sqrt{3}} \text{ ms}^{-1}$ ।  $x$  ৰ মান হ'ব \_\_\_\_\_।

**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 : 70819116528 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 : 70819116528 Question Type : SA**

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

7.2 km/hr দ্রুতিত দুখন গাড়ী ইখন সিখনৰ ফালে গতি কৰিছে। যেতিয়া ইখনে সিখনক দেখে, দুয়োখন গাড়ীয়ে 676 Hz কম্পনাংকৰ হৰ্ন বজায়। দুয়োখন গাড়ীৰ ড্ৰাইভাৰে শুনা পোৱা স্বৰকম্পৰ (beat) কম্পনাংকৰ মান হ'ব \_\_\_\_\_ Hz। [বায়ুত শব্দৰ বেগ 340 m/s।]

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

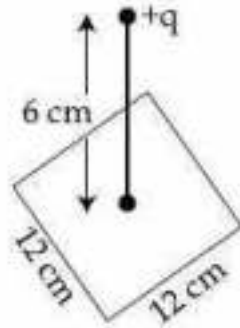
**Possible Answers :**

5 to 5.001

Question Number : 26 Question Id : 70819116529 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A point charge of  $+12 \mu\text{C}$  is at a distance 6 cm vertically above the centre of a square of side 12 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

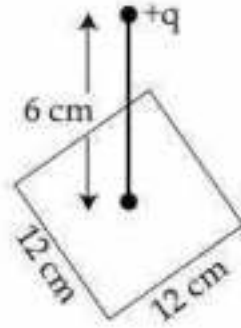
Possible Answers :

5 to 5.001

Question Number : 26 Question Id : 70819116529 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

চিত্রত দেখুওৱা ধৰণে, 12 cm বাহু বিশিষ্ট এটা বৰ্গৰ কেন্দ্ৰৰ পৰা 6 cm উচ্চতাত  $+12 \mu\text{C}$  মানৰ এটা বিন্দুসম আধান ৰখা হৈছে। বৰ্গটোৰ মাজেদি পাব হোৱা বৈদ্যুতিক অভিৱাহ (flux) ৰ পৰিমাণ হ'ব \_\_\_\_\_  $\times 10^3 \text{ Nm}^2/\text{C}$ ।



**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 :** 70819116530 **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  $x^3 \pi \text{ mA}$ . 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 : 70819116530 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

0.5 mm ব্যাসার্ধ আৰু পাৰিৱাহিতা (conductivity)  $5 \times 10^7$  S/m ৰ এডাল চূড়াকৃতিৰ তাঁৰ 10 mV/m ৰ এখন বৈদ্যুতিক ক্ষেত্ৰত বন্ধা হৈছে। তাঁৰ ডালত প্ৰৱাহিত বিদ্যুৎৰ প্ৰত্যাশিত (expected) মান হ'ব  $x^3\pi$  mA।  $x$ -ৰ মান \_\_\_\_\_।

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 : 70819116531 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 : 70819116531 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

কৌণিক কম্পনাংক  $\omega_0 = 10^5 \text{ rad/s}$  অনুবাদ হোৱাকৈ এটা শ্ৰেণীবদ্ধ LCR বৰ্তনী সজোৱা হৈছে। অনুবাদৰ সময়ত বৰ্তনীটোৱে 120 V ৰ এটা উৎসৰ পৰা 16 W ক্ষমতা লয়। বৰ্তনীটোত 'R' ৰ মান হ'ব \_\_\_\_\_  $\Omega$ ।

**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 :** 70819116532 **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 \_\_\_\_\_  $\times 10^{-2} \text{ cm}$ .

**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 :** 29 **Question Id :** 70819116532 **Question Type :** SA

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

শূন্য (vacuum) ৰ পৰা, 3 GHz কম্পনাংকৰ বিদ্যুৎ চুম্বকীয় তৰংগ এটাই, আপেক্ষিক বৈদ্যুতিক মাধ্যমাংক (Relative electric permittivity) 2.25 ৰ পৰাবৈদ্যুতিক মাধ্যম এটাত প্ৰৱেশ কৰিছে। এই তৰংগৰ উক্ত মাধ্যমত তৰংগদৈৰ্ঘ্য হ'ব \_\_\_\_\_  $\times 10^{-2} \text{ cm}$ ।

**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 : 70819116533 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  $-5$  dB per km and cable length is 20 km. The power received at receiver is  $10^{-x}$  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 : 70819116533 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

এডাল কেবল (cable) ত এটা 0.1 kW ৰ সংকেত সঞ্চাৰণ কৰা হৈছে। কেবলডালৰ দৈৰ্ঘ্য 20 km আৰু কেবলডালত হোৱা হ্রাসকৰণ (attenuation)  $-5$  dB/km। গ্ৰাহকযন্ত্ৰই (Receiver) প্ৰাপ্ত কৰা সংকেতৰ ক্ষমতা  $10^{-x}$  W।  $x$  ৰ মান হ'ব \_\_\_\_\_।

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

Response Type : Numeric

Evaluation Required For SA : Yes

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

## **Chemistry Section A**

<b>Section Id :</b>	708191642
<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>	708191922
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 31 Question Id : 70819116534 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 :

70819154751. (A), (C) and (D) only

70819154752. (A) and (D) only

70819154753. (C) only

70819154754. (A) only

Question Number : 31 Question Id : 70819116534 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1



ব'বৰ পাবমাণৱিক তত্ত্ব অনুসৰি :

(A) ইলেক্ট্ৰ'নৰ গতিশক্তি  $\propto \frac{Z^2}{n^2}$

(B) ইলেক্ট্ৰ'নৰ গতিবেগ আৰু মুখ্য কোৱাণ্টাম সংখ্যাৰ পূৰ্বফল 'vn'  $\propto Z^2$

(C) এটা কক্ষপথত ইলেক্ট্ৰ'নৰ পৰিভ্ৰমণৰ কম্পনাংক  $\propto \frac{Z^3}{n^3}$

(D) ইলেক্ট্ৰ'নৰ ওপৰত কুলম্বীয় আকৰ্ষণ বল  $\propto \frac{Z^3}{n^4}$

নিম্নোক্ত বিকল্পৰ পৰা অত্যন্ত উপযোগী উত্তৰ চয়ন কৰা :

**Options :**

70819154751. (A), (C) আৰু (D) মাত্ৰ

70819154752. (A) আৰু (D) মাত্ৰ

70819154753. (C) মাত্ৰ

70819154754. (A) মাত্ৰ

**Question Number : 32 Question Id : 70819116535 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 :**

70819154755. Linear;  $180^\circ$

70819154756. Distorted trigonal planar;  $135^\circ$  and  $90^\circ$

70819154757. T-shaped;  $180^\circ$  and  $90^\circ$

70819154758. Trigonal planar;  $120^\circ$

**Question Number : 32 Question Id : 70819116535 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

$I_3^-$  আয়নৰ শূন্য আকৃতি আৰু  $1-1-1$  কোণৰ মাপ যথাক্ৰমে :

**Options :**

70819154755. সবলবৈধিক;  $180^\circ$

70819154756. বিকৃত ত্ৰিভুজাকাৰ সমতলীয়;  $135^\circ$  আৰু  $90^\circ$

70819154757. T-আকৃতিৰ;  $180^\circ$  আৰু  $90^\circ$

70819154758. ত্ৰিভুজাকাৰ সমতলীয়;  $120^\circ$

**Question Number : 33 Question Id : 70819116536 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 :**

70819154759.  $NaHCO_3$

70819154760.  $Mg(HCO_3)_2$

70819154761.  $\text{FeCl}_3$

70819154762.  $\text{FeSO}_4$

**Question Number : 33 Question Id : 70819116536 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

তেজৰ কাৰ্য্যকৰীভাৱে চেকেঁচু বা বন্ধাত ব্যৱহাৰ হোৱা উপযুক্ততম লবণটো হ'ল :

**Options :**

70819154759.  $\text{NaHCO}_3$

70819154760.  $\text{Mg}(\text{HCO}_3)_2$

70819154761.  $\text{FeCl}_3$

70819154762.  $\text{FeSO}_4$

**Question Number : 34 Question Id : 70819116537 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 :**

70819154763.  $\text{LiCl} > \text{LiF} ; \text{MgO} > \text{NaCl}$

70819154764.  $\text{LiF} > \text{LiCl} ; \text{MgO} > \text{NaCl}$

70819154765.  $\text{LiCl} > \text{LiF} ; \text{NaCl} > \text{MgO}$

70819154766.  $\text{LiF} > \text{LiCl} ; \text{NaCl} > \text{MgO}$

**Question Number : 34 Question Id : 70819116537 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

নিম্নোক্তকৰ পৰা শুদ্ধ সমূহ চয়ন কৰা য'ত দুয়োটা যোৰ গলনাংকৰ শুদ্ধ ক্ৰমত আছে।

**Options :**

70819154763.  $\text{LiCl} > \text{LiF} ; \text{MgO} > \text{NaCl}$

70819154764.  $\text{LiF} > \text{LiCl} ; \text{MgO} > \text{NaCl}$

70819154765.  $\text{LiCl} > \text{LiF} ; \text{NaCl} > \text{MgO}$

70819154766.  $\text{LiF} > \text{LiCl} ; \text{NaCl} > \text{MgO}$

**Question Number : 35 Question Id : 70819116538 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 :**

70819154767. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

70819154768. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819154769. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819154770. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

**Question Number : 35 Question Id : 70819116538 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

তালিকা-II ব সৈতে তালিকা-I মিলোৱা :

তালিকা-I (শাত্ৰু)	তালিকা-II (আকৰ্ষিক)
(a) এলুমিনিয়াম	(i) ছিডেৰাইট
(b) লো	(ii) কেলামাইন
(c) অম	(iii) কেওলিনাইট
(d) জিংক	(iv) মেলেকাইট

নিম্নোক্ত বিকল্পৰ পৰা শুদ্ধ উত্তৰ চয়ন কৰা :

**Options :**

70819154767. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

70819154768. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819154769. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819154770. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

**Question Number : 36 Question Id : 70819116539 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 :**

70819154771. Both A and R are true and R is the correct explanation of A

70819154772. Both A and R are true but R is NOT the correct explanation of A

70819154773. A is true but R is false

70819154774. A is false but R is true

**Question Number : 36 Question Id : 70819116539 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

তলত দুটা উক্তি দিয়া আছে। এটোক নিশ্চয়োক্তি A আৰু আনটোক কাৰণ R হিচাপে চিহ্নিত কৰা হৈছে।

**নিশ্চয়োক্তি A :** বিশ্বব্ৰহ্মাণ্ডত আটাইতলৈ সমৃদ্ধ মৌল হাইড্ৰ'জেন, কিন্তু এইটো ট্ৰ'প'মণ্ডলত আটাইতলৈ সমৃদ্ধ  
গেছ নহয়।

**কাৰণ R :** হাইড্ৰ'জেন আটাইতলৈ পাতল মৌল।

ওপৰোক্ত উক্তিৰ আধাৰত, নিম্নোক্ত বিকল্পবোৰা শুদ্ধ উত্তৰ চান কৰা।

**Options :**

70819154771. A আৰু R দুয়োটা সত্য আৰু R হ'ল A ৰ শুদ্ধ ব্যাখ্যা।

70819154772. A আৰু R দুয়োটা সত্য কিন্তু R, A ৰ শুদ্ধ ব্যাখ্যা নহয়।

70819154773. A সত্য কিন্তু R অসত্য।

70819154774. A অসত্য কিন্তু R সত্য।

**Question Number : 37 Question Id : 70819116540 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 :**

70819154775. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

70819154776. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

70819154777. (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)

70819154778. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

Question Number : 37 Question Id : 70819116540 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

তালিকা-I ক তালিকা-II ৰ সৈতে মিলোৱা :

তালিকা-I (লবণ)	তালিকা-II (শিখাৰ বৰণৰ তৰংগদৈৰ্ঘ্য)
(a) LiCl	(i) 455.5 nm
(b) NaCl	(ii) 670.8 nm
(c) RbCl	(iii) 780.0 nm
(d) CsCl	(iv) 589.2 nm

নিম্নোক্ত বিকল্পৰ পৰা শুদ্ধ উত্তৰ চয়ন কৰা :

Options :

70819154775. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

70819154776. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

70819154777. (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)

70819154778. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

Question Number : 38 Question Id : 70819116541 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

The incorrect statement among the following is :

Options :

70819154779.  $\text{VO}_2$  is a reducing agent

70819154780.  $\text{RuO}_4$  is an oxidizing agent



70819154781.  $\text{Cr}_2\text{O}_3$  is an amphoteric oxide

70819154782. Red colour of ruby is due to the presence of  $\text{Co}^{3+}$

**Question Number : 38 Question Id : 70819116541 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

নিম্নোক্তব ভিতৰত অশুদ্ধ উক্তি যিটো :

**Options :**

70819154779.  $\text{VO}_2$  এটা বিজারণ কৰ্তা

70819154780.  $\text{RuO}_4$  এটা জারণ কৰ্তা

70819154781.  $\text{Cr}_2\text{O}_3$  এটা উভয়ধৰ্মী অক্সাইড

70819154782. পদ্মবাগ মণিৰ (ruby) বৰ্ণ কাৰণ  $\text{Co}^{3+}$  ৰ উপস্থিতি

**Question Number : 39 Question Id : 70819116542 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 :**

70819154783.  $\text{Cr} < \text{Fe} < \text{Co} < \text{Cu} < \text{Zn}$

70819154784.  $\text{Zn} < \text{Cr} < \text{Fe} < \text{Co} < \text{Cu}$

70819154785.  $\text{Zn} < \text{Cu} < \text{Co} < \text{Fe} < \text{Cr}$

70819154786.  $\text{Cr} < \text{Zn} < \text{Co} < \text{Cu} < \text{Fe}$

**Question Number : 39 Question Id : 70819116542 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ঘনত্বৰ সাপেক্ষে নিম্নোক্ত মৌলৰ শুদ্ধ ক্ৰম কি ?

**Options :**

70819154783.  $\text{Cr} < \text{Fe} < \text{Co} < \text{Cu} < \text{Zn}$

70819154784.  $\text{Zn} < \text{Cr} < \text{Fe} < \text{Co} < \text{Cu}$

70819154785.  $\text{Zn} < \text{Cu} < \text{Co} < \text{Fe} < \text{Cr}$

70819154786.  $\text{Cr} < \text{Zn} < \text{Co} < \text{Cu} < \text{Fe}$

**Question Number : 40 Question Id : 70819116543 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  $[\text{FeCl}_4]^{2-}$ ,  $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$  and  $\text{MnO}_4^{2-}$  respectively are :

**Options :**

70819154787. 4.90, 0 and 1.73 BM

70819154788. 5.92, 4.90 and 0 BM

70819154789. 5.82, 0 and 0 BM

70819154790. 4.90, 0 and 2.83 BM

**Question Number : 40 Question Id : 70819116543 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

$[\text{FeCl}_4]^{2-}$ ,  $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$  আৰু  $\text{MnO}_4^{2-}$  ৰ গণনা কৰা চুল্লীকীয় ভ্ৰামক (ঘূৰ্ণন মাত্ৰ)ৰ মান যথাক্ৰমে :

**Options :**

70819154787. 4.90, 0 আৰু 1.73 BM

70819154788. 5.92, 4.90 আৰু 0 BM

70819154789. 5.82, 0 আৰু 0 BM

70819154790. 4.90, 0 আৰু 2.83 BM

**Question Number : 41 Question Id : 70819116544 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 :**

70819154791. Both Statement I and Statement II are true

70819154792. Both Statement I and Statement II are false

70819154793. Statement I is true but Statement II is false

70819154794. Statement I is false but Statement II is true

**Question Number : 41 Question Id : 70819116544 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

তলত দুটা উক্তি দিয়া হৈছে :

উক্তি I : “জৈব বাসায়নিক অক্সিজেন চাহিদা (BOD)” পৰিমাণৰ মান জলচৰ জীৱৰ জীয়াই থকাৰ বাবে আৱশ্যক।

উক্তি II : BOD ৰ অনুকূলতম মান হ'ল 6.5 ppm।

ওপৰোক্ত উক্তিৰ আলমত, নিম্নোক্ত বিকল্পৰ পৰা শুদ্ধ উত্তৰ চয়ন কৰা।

**Options :**

70819154791. উক্তি I আৰু উক্তি II দুয়োটা সত্য।

70819154792. উক্তি I আৰু উক্তি II দুয়োটা অসত্য।

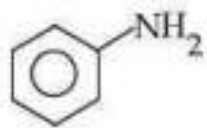
70819154793. উক্তি I শুদ্ধ কিন্তু উক্তি II অসত্য।

70819154794. উক্তি I অশুদ্ধ কিন্তু উক্তি II সত্য।

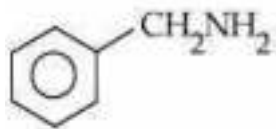
**Question Number : 42 Question Id : 70819116545 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

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

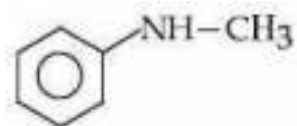
**Options :**



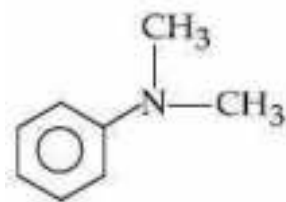
70819154795.



70819154796.



70819154797.

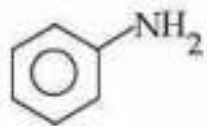


70819154798.

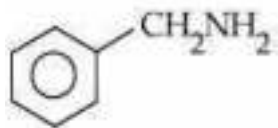
**Question Number : 42 Question Id : 70819116545 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

তলৰ যৌগসমূহৰ কোনটোৰ ডাইএম'নিয়াম লবণে NaOH ৰ উপস্থিতিত  $\beta$ -নেপ্থলৰ লগত বহুতিন বন্ধক উৎপন্ন কৰিব ?

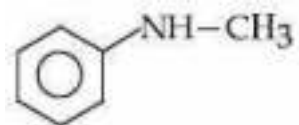
**Options :**



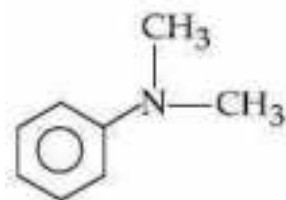
70819154795.



70819154796.



70819154797.



70819154798.

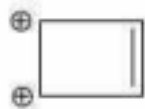
**Question Number : 43 Question Id : 70819116546 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Which one of the following compounds is non-aromatic ?

**Options :**



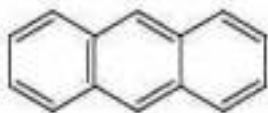
70819154799.



70819154800.



70819154801.



70819154802.

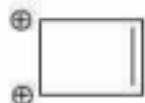
**Question Number : 43 Question Id : 70819116546 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

তলৰ কোনটো যৌগ অনা-এৰ'মেটিক ?

**Options :**



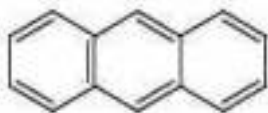
70819154799.



70819154800.



70819154801.

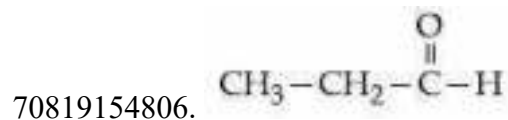
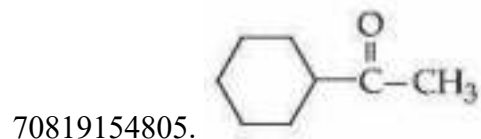
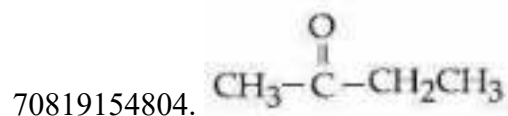
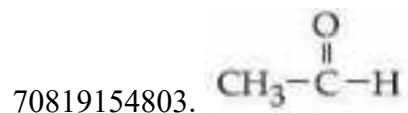


70819154802.

**Question Number : 44 Question Id : 70819116547 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 :**

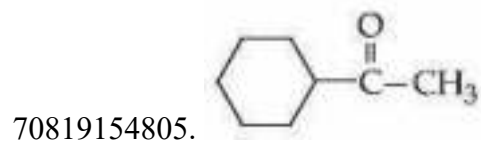
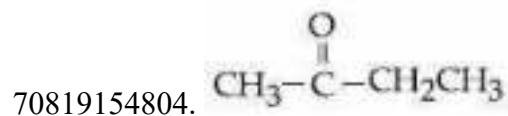
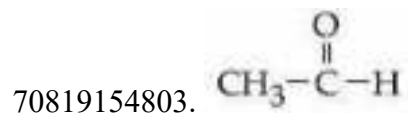


Question Number : 44 Question Id : 70819116547 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

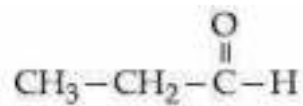
এলকাইনত  $\text{HgSO}_4$  আৰু  $\text{H}_2\text{SO}_4$  ৰ উপস্থিতিত পানী যোগ কৰি নিম্নোক্ত কোনটো কাৰ্বেনীল যৌগ প্ৰস্তুতি কৰিব নোৱাৰি ?

Options :





70819154806.



**Question Number : 45 Question Id : 70819116548 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

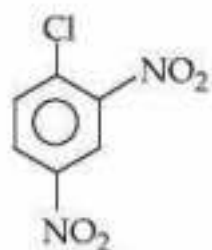
The correct order of the following compounds showing increasing tendency towards nucleophilic substitution reaction is :



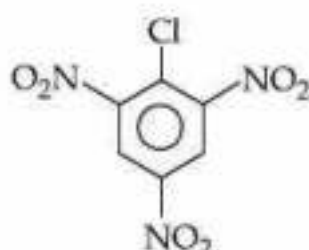
(i)



(ii)



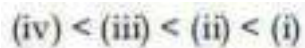
(iii)



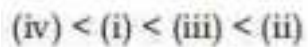
(iv)

**Options :**

70819154807.



70819154808.



70819154809.



70819154810.



**Question Number : 45 Question Id : 70819116548 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

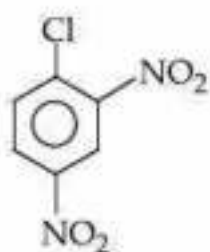
তলত দিয়া যৌগসমূহৰ নিউক্লিঅ'ফিলীয় প্রতিষ্ঠাপন বিক্রিয়াৰ প্ৰৱণতাৰ শুদ্ধ উৰ্দ্ধক্রমটো হ'ল -



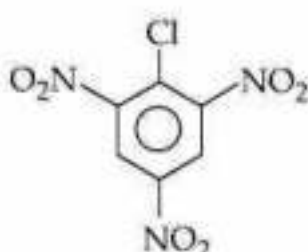
(i)



(ii)



(iii)



(iv)

Options :

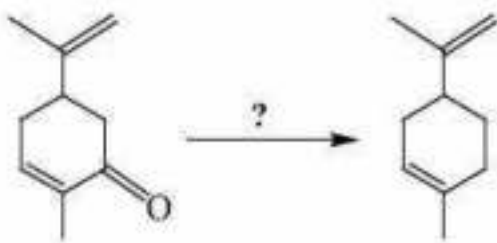
70819154807. (iv) < (iii) < (ii) < (i)

70819154808. (iv) < (i) < (iii) < (ii)

70819154809. (i) < (ii) < (iii) < (iv)

70819154810. (iv) < (i) < (ii) < (iii)

Question Number : 46 Question Id : 70819116549 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 :

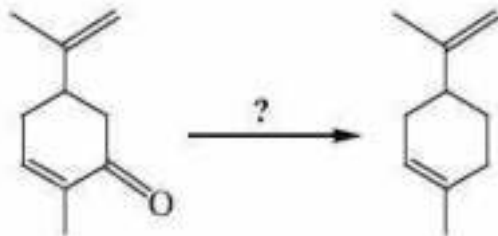
70819154811.  $\text{NaBH}_4$

70819154812.  $\text{NH}_2-\text{NH}_2/\text{C}_2\text{H}_5\overset{\ominus}{\text{O}}\overset{\oplus}{\text{Na}}$

70819154813.  $\text{Ni}/\text{H}_2$

70819154814. Red P +  $\text{Cl}_2$

Question Number : 46 Question Id : 70819116549 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1



উপৰোক্ত বিক্ৰিয়াৰ জাতদ্রব্য প্ৰস্তুতিৰ বাবে নিম্নোক্ত কোনটো বিকায়ক উপযুক্ত ?

Options :

70819154811.  $\text{NaBH}_4$

70819154812.  $\text{NH}_2-\text{NH}_2/\text{C}_2\text{H}_5\overset{\ominus}{\text{O}}\overset{\oplus}{\text{Na}}$

70819154813.  $\text{Ni}/\text{H}_2$

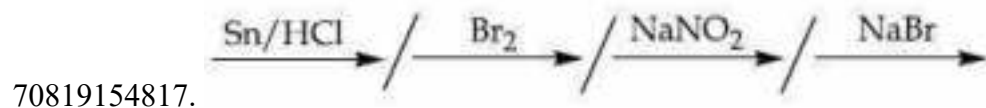
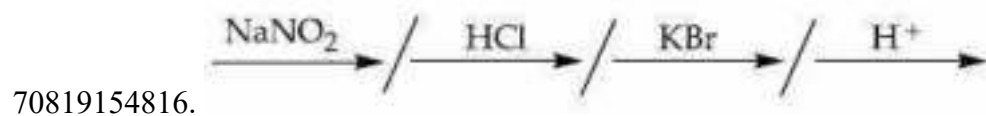
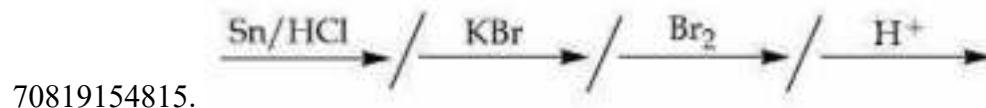
70819154814. বঙ্গ P +  $\text{Cl}_2$

Question Number : 47 Question Id : 70819116550 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 :

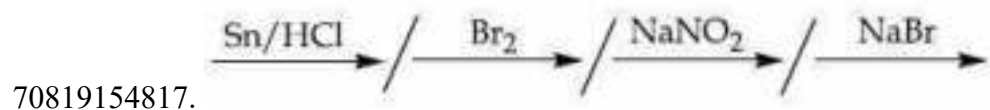
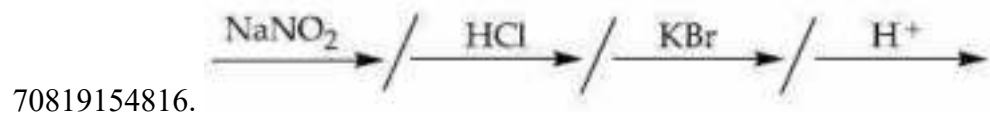
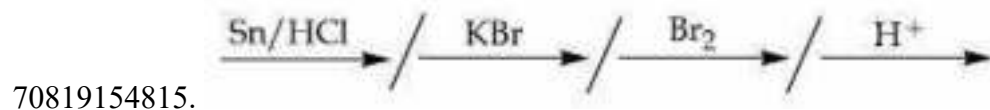


Question Number : 47 Question Id : 70819116550 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

নাইট্রোবেনজিনক III-ডাইব্র'ম'বেনজিনলৈ পৰিবৰ্তন কৰোতে ব্যৱহাৰ হোৱা বিকাৰকৰ শুদ্ধ ক্ৰম কি ?



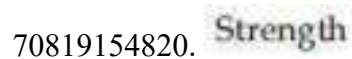
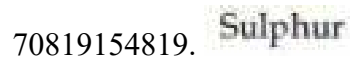
Options :



Question Number : 48 Question Id : 70819116551 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

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

Options :



70819154821. Styrene

70819154822. Sulphonation

**Question Number : 48 Question Id : 70819116551 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

বহুযোগী বৃদ্ধি- $S$  ত, ' $S$ ' এ-বৃদ্ধি

**Options :**

70819154819. ছালফার

70819154820. শক্তি (Strength)

70819154821. স্টাইরিন

70819154822. ছালফ'নেছন

**Question Number : 49 Question Id : 70819116552 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 :**

70819154823. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

70819154824. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819154825. (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

70819154826. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

**Question Number : 49 Question Id : 70819116552 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

তালিকা - I আৰু তালিকা - II মিলোৱা -

তালিকা - I

- (a) ভেলিয়াম
- (b) ম'ৰফিন
- (c) ন'ৰথিনডোন
- (d) ভিটামিন B<sub>12</sub>

তালিকা - II

- (i) গৰ্ভ নিৰোধক ঔষধ
- (ii) পানিচিয়াছ বক্তহীনতা
- (iii) বেদনাহৰী
- (iv) সুস্থিৰকাৰী

**Options :**

70819154823. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

70819154824. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819154825. (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

70819154826. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

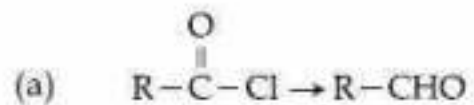
**Question Number : 50 Question Id : 70819116553 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

Correct Marks : 4 Wrong Marks : 1

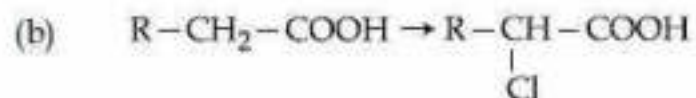
Match List - I and List - II.

List - I

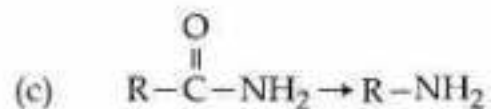
List - II



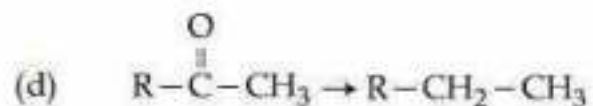
(i)  $\text{Br}_2/\text{NaOH}$



(ii)  $\text{H}_2/\text{Pd}-\text{BaSO}_4$



(iii)  $\text{Zn}(\text{Hg})/\text{Conc. HCl}$



(iv)  $\text{Cl}_2/\text{Red P, H}_2\text{O}$

Choose the correct answer from the options given below :

Options :

70819154827. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

70819154828. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

70819154829. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

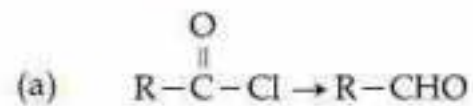
70819154830. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

Question Number : 50 Question Id : 70819116553 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

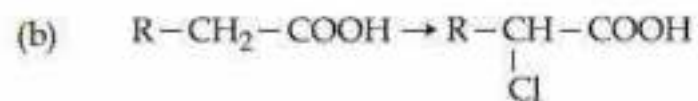


তালিকা - I আৰু তালিকা - II মিলোৱা -  
তালিকা - I

তালিকা - II



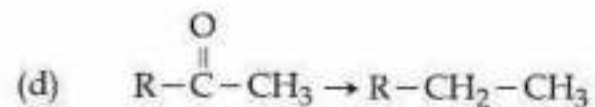
(i)  $\text{Br}_2/\text{NaOH}$



(ii)  $\text{H}_2/\text{Pd}-\text{BaSO}_4$



(iii)  $\text{Zn}(\text{Hg})/\text{গাঢ় HCl}$



(iv)  $\text{Cl}_2/\text{ৰঙা P, H}_2\text{O}$

নিম্নলিখিত বিকল্পবপৰা শুদ্ধ উত্তৰ চয়ন কৰা -

Options :

70819154827. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

70819154828. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

70819154829. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

70819154830. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

## Chemistry Section B

Section Id :

708191643

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 :	708191923
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 70819116554 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 : 70819116554 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

এটা গেছীয় হাইড্ৰকাৰ্বনৰ সূত্র, যাক সম্পূৰ্ণ জ্বৰণ হবলৈ নিজৰ আয়তনৰ 6 গুণ  $O_2$  দৰকাৰ হয় আৰু নিজৰ আয়তনৰ 4 গুণ  $CO_2$  উৎপন্ন কৰে, হ'ল  $C_xH_y$ ।  $y$  ৰ মান হ'ল \_\_\_\_\_।

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 : 70819116555 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 : 70819116555 Question Type : SA**

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

50°C আৰু 740 mmHg চাপত 4.75 g এছিটাইলিন গেছে অধিকাব কৰা আয়তন হ'ব \_\_\_\_\_ L। (নিকটতম অখণ্ড সংখ্যাত)

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

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

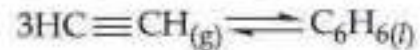
**Possible Answers :**

5 to 5.001

Question Number : 53 Question Id : 70819116556 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

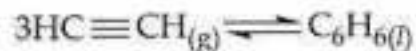
Possible Answers :

5 to 5.001

Question Number : 53 Question Id : 70819116556 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

আদর্শ আচরণ ধৰি লৈ,  $25^\circ\text{C}$  ত তলত দিয়া বিক্ৰিয়াটোৰ  $\log K$  ৰ মান হ'ল  $x \times 10^{-1}$ ।  $x$  ৰ মান হ'ল \_\_\_\_\_। (অখণ্ড সংখ্যাত উত্তৰ)



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

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 : 70819116557 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 : 70819116557 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$C_6H_6$  হিমায়িত হয়  $5.5^\circ C$  ত। নির্দিষ্ট উষ্ণতা, য'ত 200 g  $C_6H_6$  ত 10 g  $C_4H_{10}$  ব দ্রব এটা হিমায়িত হ'ব, সেইটো হ'ল \_\_\_\_\_  $^\circ C$ । ( $C_6H_6$  ব ম'লেল হিমাংক অরনমন গ্রন্থক হ'ল  $5.12^\circ C/m$ )।

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 : 70819116558 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  $x \times 10^{-6} \text{ mol/L}$ . 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 :** 70819116558 **Question Type :** SA

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

$\text{PbI}_2$  ৰ দ্রাব্যতা গুণফল হ'ল  $8.0 \times 10^{-9}$ । লেড নাইট্ৰেটৰ 0.1 ম'লাৰ দ্ৰৱ এটাত লেড আয়'ডাইডৰ দ্রাব্যতা হ'ল  $x \times 10^{-6} \text{ mol/L}$ ।  $x$  ৰ মান হ'ল \_\_\_\_\_। (নিকটতম অখণ্ড সংখ্যাত লিখা)

[দিয়া আছে  $\sqrt{2} = 1.41$ ]

**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 :** 70819116559 **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 :** 70819116559 **Question Type :** SA

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

যদি  $25^\circ\text{C}$  ত  $\text{H}^+$  আয়নৰ গাঢ়তা 1M ৰ পৰা  $10^{-4}$  M লৈ কম কৰা হয়  $\text{MnO}_4^-/\text{Mn}^{2+}$  যোৰ ৰ জাৰণ ক্ষমতাৰ মানৰ পৰিবৰ্তন হয়  $x \times 10^{-4}$ । (ধৰি লোৱা  $\text{H}^+$  ৰ গাঢ়তা সলনি কৰিলে  $\text{MnO}_4^-$  আৰু  $\text{Mn}^{2+}$  ৰ গাঢ়তা একে থাকে)  $x$  ৰ মান হ'ল \_\_\_\_\_। (নিকটতম অখণ্ড সংখ্যাত)

দিয়া হৈছে :,  $\left[ \frac{2.303 RT}{F} = 0.059 \right]$

**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 : 70819116560 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 : 70819116560 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

অম্ল দ্রবত 25°C ত প্রথম ক্রমৰ বিক্রিয়া মতে চুক্র'জ জলবিশ্লেষিত হৈ গ্লুক'জ আৰু ফ্রুক্ট'জ প্ৰস্তুত কৰে, য'ত

অৰ্দ্ধজীৱনকাল হ'ল 3.33 h। 9 h ৰ পাছত ফ্রুক্ট'জৰ অৱশিষ্ট অংশ হ'ল  $f$ ।  $\log_{10}\left(\frac{1}{f}\right)$  ৰ মান হ'ল

\_\_\_\_\_  $\times 10^{-2}$ । (নিকটতম অখণ্ড সংখ্যাত)

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

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 : 70819116561 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 : 70819116561 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ছালফাৰৰ নিম্ন প্ৰদত্ত অৱকৰণ সমূহৰ তিতৰত অনুসূচকৰ দেখুওৱা ছালফাৰৰ অৱকৰণৰ সংখ্যা হ'ল \_\_\_\_\_।

(A)  $\alpha$ -ছালফাৰ (B)  $\beta$ -ছালফাৰ (C)  $S_2$ -ৰূপ

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

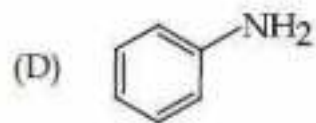
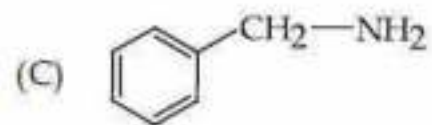
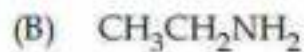
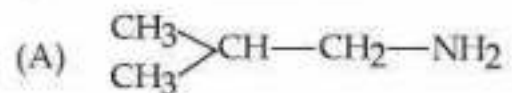
Possible Answers :

5 to 5.001

Question Number : 59 Question Id : 70819116562 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

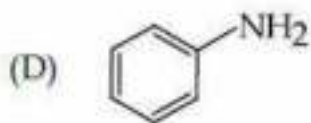
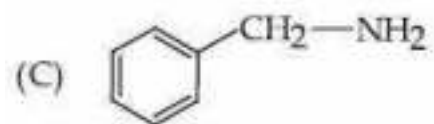
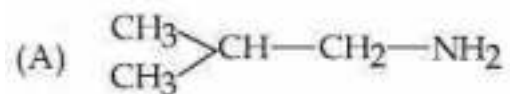
**Possible Answers :**

5 to 5.001

**Question Number :** 59 **Question Id :** 70819116562 **Question Type :** SA

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

তলত দিয়া বোৰৰ পৰা, গেব্ৰিয়েল সংশ্লেষণৰ দ্বাৰা প্ৰস্তুত কৰিব পৰা এমাইনৰ মুঠ সংখ্যা হ'ল \_\_\_\_\_।



**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 : 70819116563 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 : 70819116563 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

1.86 g এনিলিনে সম্পূর্ণ বিক্রিয়া কৰি এছিটেনাইড উৎপন্ন কৰে। শুদ্ধিকৰণৰ সময়ছোৱাত 10% বিক্রিয়াজাত পদার্থ কমি যায়। শুদ্ধিকৰণৰ পাছত প্ৰাপ্ত হোৱা এছিটেনাইডৰ পৰিমাণ (g ত) \_\_\_\_\_  $\times 10^{-2}$ ।

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 :

708191644

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 :	708191924
Question Shuffling Allowed :	Yes

Question Number : 61 Question Id : 70819116564 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 :

70819154841. 84

70819154842. 86

70819154843. 88

70819154844. 90

Question Number : 61 Question Id : 70819116564 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

ধৰা হ'ল  $a, b \in \mathbb{R}$ । যদি  $\frac{x-3}{7} = \frac{y-2}{5} = \frac{z-1}{-9}$  রেখাডাল সাপেক্ষে  $P(a, 6, 9)$  বিন্দুটোৰ দাপোন প্ৰতিবিন্দু

$(20, b, -a-9)$  হয়, তেন্তে  $|a+b|$  সমান হ'ব \_\_\_\_\_।

**Options :**

70819154841. 84

70819154842. 86

70819154843. 88

70819154844. 90

**Question Number : 62 Question Id : 70819116565 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 :**

70819154845.  $-\frac{69}{256}$

70819154846.  $-\frac{71}{256}$

70819154847.  $\frac{69}{256}$

70819154848.  $\frac{71}{256}$

Question Number : 62 Question Id : 70819116565 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

ধৰা হ'ল  $a, b, c$  সমান্তৰ প্রগতিত আছে। ধৰা হ'ল  $(a, c), (2, b)$  আৰু  $(a, b)$  শীৰ্ষবিন্দু বিশিষ্ট ত্ৰিভুজৰ ভৰকেন্দ্ৰৰ  
স্থানাংক  $\left(\frac{10}{3}, \frac{7}{3}\right)$ । যদি  $ax^2 + bx + 1 = 0$  সমীকৰণটোৰ মূল দুটা  $\alpha, \beta$  হয়, তেন্তে  $\alpha^2 + \beta^2 - \alpha\beta$  ৰ মান হ'ব :

Options :

70819154845.  $-\frac{69}{256}$

70819154846.  $-\frac{71}{256}$

70819154847.  $\frac{69}{256}$

70819154848.  $\frac{71}{256}$

Question Number : 63 Question Id : 70819116566 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 :

70819154849. (3, 13)

70819154850. (2, 8)

70819154851.  $(-2, 8)$

70819154852.  $(1, 5)$

**Question Number : 63 Question Id : 70819116566 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

যদি  $y = x^2 + 4$  অধিবৃত্তৰ ওপৰত থকা P বিন্দুটো,  $y = 4x - 1$  বেকাটোৰ নিকটতম হয়, তেন্তে P ৰ স্থানাংক হ'ব :

**Options :**

70819154849.  $(3, 13)$

70819154850.  $(2, 8)$

70819154851.  $(-2, 8)$

70819154852.  $(1, 5)$

**Question Number : 64 Question Id : 70819116567 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 :**

70819154853.  $x^2 + y^2 = 7$

70819154854.  $x^2 + 9y^2 = 9$

70819154855.  $y^2 = \frac{1}{6\sqrt{3}}x$

70819154856.  $2x^2 - 18y^2 = 9$

**Question Number : 64 Question Id : 70819116567 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

তলৰ কোনটো বক্ৰৰ বাবে  $\left(\frac{3\sqrt{3}}{2}, \frac{1}{2}\right)$  বিন্দুত টানা  $x + \sqrt{3}y = 2\sqrt{3}$  ৰেখাডাল এডাল স্পৰ্শক হ'ব ?

**Options :**

70819154853.  $x^2 + y^2 = 7$

70819154854.  $x^2 + 9y^2 = 9$

70819154855.  $y^2 = \frac{1}{6\sqrt{3}}x$

70819154856.  $2x^2 - 18y^2 = 9$

**Question Number : 65 Question Id : 70819116568 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 :

70819154857.  $-5$

70819154858.  $-4$

70819154859.  $-\sqrt{2} - \sqrt{3} - 1$

70819154860.  $-\sqrt{2} - \sqrt{3} + 1$

Question Number : 65 Question Id : 70819116568 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

যদি  $[x] =$  গরিষ্ঠ অখণ্ড সংখ্যা  $\leq x$  বুজায় তেন্তে  $\int_1^3 [x^2 - 2x - 2] dx$  অনুকলনটোৰ মান হ'ব :

Options :

70819154857.  $-5$

70819154858.  $-4$

70819154859.  $-\sqrt{2} - \sqrt{3} - 1$

70819154860.  $-\sqrt{2} - \sqrt{3} + 1$

Question Number : 66 Question Id : 70819116569 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 :

70819154861.  $\sim p \vee q$

70819154862.  $\sim p \wedge q$

70819154863.  $p \wedge \sim q$

70819154864.  $p \vee \sim q$

Question Number : 66 Question Id : 70819116569 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

$\sim p \wedge (p \vee q)$  উক্তিটোৰ নিষেধক উক্তিটো হ'ব :

Options :

70819154861.  $\sim p \vee q$

70819154862.  $\sim p \wedge q$

70819154863.  $p \wedge \sim q$

70819154864.  $p \vee \sim q$

Question Number : 67 Question Id : 70819116570 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 :**

70819154865. no solution

70819154866. a unique solution

70819154867. exactly two solutions

70819154868. infinitely many solutions

**Question Number : 67 Question Id : 70819116570 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

ধৰা হ'ল A আৰু B দুটা  $3 \times 3$  মাত্ৰাৰ বাস্তৱ মৌলিকক যাত A সমমিত আৰু B বিষম-সমমিত। তেন্তে  $(A^2B^2 - B^2A^2)X = O$ , য'ত, X এটা  $3 \times 1$  আকাৰৰ চলকৰ স্তম্ভ মৌলিকক আৰু O এটা  $3 \times 1$  আকাৰৰ শূন্য মৌলিকক, সমীকৰন প্ৰণালীটোৰ :

**Options :**

70819154865. সমাধান নাই

70819154866. এটা অধিকতৰ সমাধান আছে।

70819154867. মাত্ৰ দুটা সমাধান আছে।

70819154868. অসীম সংখক সমাধান আছে।

Question Number : 68 Question Id : 70819116571 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 :

70819154869.  $1 - e^2$

70819154870.  $1 + e^2$

70819154871.  $2(1 + e^2)$

70819154872.  $2(1 - e^2)$

Question Number : 68 Question Id : 70819116571 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

ধৰা হ'ল  $[0, 2]$  অন্তৰালত  $f(x)$  এটা অৱকলনীয় ফলন যত  $f'(x) = f'(2-x)$ , সকলোবোৰ  $x \in (0, 2)$  ৰ বাবে যদি  $f(0) = 1$  আৰু  $f(2) = e^2$  হয়, তেন্তে  $\int_0^2 f(x) dx$  অনুকলনটোৰ মান হ'ব :

Options :

70819154869.  $1 - e^2$

70819154870.  $1 + e^2$

70819154871.  $2(1+e^2)$

70819154872.  $2(1-e^2)$

**Question Number : 69 Question Id : 70819116572 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 :**

70819154873.  $(0, 3)$

70819154874.  $(3, 6)$

70819154875.  $(6, 9)$

70819154876.  $(9, 12)$

**Question Number : 69 Question Id : 70819116572 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ধৰা হ'ল  $\mathbb{R}$  ত  $f$  এটি  $f''$  ছিত ফলন যত  $f(0) = 1$ ,  $f'(0) = 2$  আৰু  $f'(x) \neq 0$  সকলোবোৰ  $x \in \mathbb{R}$  ৰ বাবে। যদি

$\begin{vmatrix} f(x) & f'(x) \\ f'(x) & f''(x) \end{vmatrix} = 0$  সকলোবোৰ  $x \in \mathbb{R}$  ৰ বাবে হয়, তেন্তে  $f(1)$  ৰ মানটো থকা অন্তৰালটো হ'ব :

**Options :**

70819154873. (0, 3)

70819154874. (3, 6)

70819154875. (6, 9)

70819154876. (9, 12)

**Question Number : 70 Question Id : 70819116573 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

If the curve  $y = ax^2 + bx + c$ ,  $x \in \mathbb{R}$ , 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 :**

70819154877.  $a = 1, b = 1, c = 0$

70819154878.  $a = 1, b = 0, c = 1$

70819154879.  $a = -1, b = 1, c = 1$

70819154880.  $a = \frac{1}{2}, b = \frac{1}{2}, c = 1$

**Question Number : 70 Question Id : 70819116573 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ধরা হ'ল  $y = ax^2 + bx + c$ ,  $x \in \mathbb{R}$  এটা বক্র। যদি বক্রটোরে (1, 2) বিন্দুতে যায় আক  $y = x$  মূলবিন্দুত এই বক্রটোলৈ টনা এডাল স্পর্শবেখা বুজায়, তেন্তে  $a$ ,  $b$ ,  $c$  ব সম্ভাব্য মানবোব হ'ব :

**Options :**

70819154877.  $a=1, b=1, c=0$

70819154878.  $a=1, b=0, c=1$

70819154879.  $a=-1, b=1, c=1$

70819154880.  $a = \frac{1}{2}, b = \frac{1}{2}, c = 1$

**Question Number : 71 Question Id : 70819116574 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 :**

70819154881.  $\frac{n(n-1)(2n+1)}{6}$

70819154882.  $\frac{n(n+1)(2n+1)}{6}$

70819154883.  $\frac{n(2n+1)(3n+1)}{6}$

70819154884.  $\frac{n(n+1)^2(n+2)}{12}$

**Question Number : 71 Question Id : 70819116574 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

যদি  $n \geq 2$  এটা ধনাত্মক অখণ্ড সংখ্যা, তেন্তে,  ${}^{n+1}C_2 + 2({}^2C_2 + {}^3C_2 + {}^4C_2 + \dots + {}^nC_2)$  শ্ৰেণীটোৰ যোগফল,

হ'ব :

**Options :**

70819154881.  $\frac{n(n-1)(2n+1)}{6}$

70819154882.  $\frac{n(n+1)(2n+1)}{6}$

70819154883.  $\frac{n(2n+1)(3n+1)}{6}$

70819154884.  $\frac{n(n+1)^2(n+2)}{12}$

**Question Number : 72 Question Id : 70819116575 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**



For the system of linear equations :

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

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 :

70819154885. (A) and (D) only

70819154886. (A) and (E) only

70819154887. (C) and (D) only

70819154888. (B) and (E) only

Question Number : 72 Question Id : 70819116575 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

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

বৈখিক সমীকরণ প্রণালীটোৰ বাবে, তলৰ উক্তিবোৰ লোৱা হ'ল :

- (A) প্রণালীটোৰ অধিতীয় সমাধান আছে, যদি  $k \neq 2, k \neq -2$
- (B) প্রণালীটোৰ অধিতীয় সমাধান আছে, যদি  $k = -2$
- (C) প্রণালীটোৰ অধিতীয় সমাধান আছে, যদি  $k = 2$
- (D) প্রণালীটোৰ সমাধান নাই যদি  $k = 2$
- (E) প্রণালীটোৰ অসীম সংখ্যক সমাধান আছে, যদি  $k \neq -2$

তেম্বে তলৰ কোনবোৰ উক্তি সত্য ?

Options :

70819154885. কেৱল (A) আৰু (D)

70819154886. কেৱল (A) আৰু (E)

70819154887. কেৱল (C) আৰু (D)

70819154888. কেৱল (B) আৰু (E)

Question Number : 73 Question Id : 70819116576 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 :**

70819154889.  $(-\infty, -5) \cup (4, \infty)$

70819154890.  $(-5, -4) \cup (4, \infty)$

70819154891.  $(-\infty, -5) \cup (-4, \infty)$

70819154892.  $(-5, \infty)$

**Question Number : 73 Question Id : 70819116576 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ধরা হ'ল  $f: \mathbb{R} \rightarrow \mathbb{R}$  এটা ফলন, যত

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

ধরা হ'ল  $A = \{x \in \mathbb{R} : f \text{ বর্ধমান}\}$ , তেন্তে  $A$  সমান হ'ব :

**Options :**

70819154889.  $(-\infty, -5) \cup (4, \infty)$

70819154890.  $(-5, -4) \cup (4, \infty)$

70819154891.  $(-\infty, -5) \cup (-4, \infty)$

70819154892.  $(-5, \infty)$

Question Number : 74 Question Id : 70819116577 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 :

70819154893.  $\frac{1}{\sqrt{7}}$

70819154894.  $\frac{1}{2\sqrt{2}}$

70819154895.  $\sqrt{7} - 1$

70819154896.  $2\sqrt{2} - 1$

Question Number : 74 Question Id : 70819116577 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No  
Correct Marks : 4 Wrong Marks : 1

$\tan\left(\frac{1}{4}\sin^{-1}\frac{\sqrt{63}}{8}\right)$  ব সম্ভাব্য মানটো হ'ব :

Options :

70819154893.  $\frac{1}{\sqrt{7}}$

70819154894.  $\frac{1}{2\sqrt{2}}$

70819154895.  $\sqrt{7} - 1$

70819154896.  $2\sqrt{2} - 1$

**Question Number : 75 Question Id : 70819116578 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 :**

70819154897.  $3600\sqrt{3}$  m

70819154898.  $2400\sqrt{3}$  m

70819154899.  $1800\sqrt{3}$  m

70819154900.  $1200\sqrt{3}$  m

**Question Number : 75 Question Id : 70819116578 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

ভূমিত থকা এটা বিন্দু A ৰ সৈতে এখন জেট বিমানৰ উঠন কোণ হৈছে  $60^\circ$ । 432 কিঃমিঃ/ঘণ্টা বেগেৰে 20 ছেকেণ্ড উৰণৰ পিছত উঠনকোণ  $30^\circ$  লৈ পৰিবৰ্তন হয়। যদি জেট বিমানখনে এটা নিৰ্দিষ্ট উচ্চতাত উৰে, তেন্তে ভূমিৰ পৰা ইয়াৰ উচ্চতা হ'ব :

**Options :**

70819154897.  $3600\sqrt{3}$  m

70819154898.  $2400\sqrt{3} \text{ m}$

70819154899.  $1800\sqrt{3} \text{ m}$

70819154900.  $1200\sqrt{3} \text{ m}$

**Question Number : 76 Question Id : 70819116579 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 :**

70819154901.  $\vec{r} \cdot (3\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819154902.  $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819154903.  $\vec{r} \cdot (\hat{i} - 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

70819154904.  $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

**Question Number : 76 Question Id : 70819116579 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

$\vec{r} \cdot (\hat{i} + \hat{j} + \hat{k}) = 1$  আৰু  $\vec{r} \cdot (\hat{i} - 2\hat{j}) = -2$  সমতল দুখনৰ ছেদবিন্দুৰে আৰু  $(1, 0, 2)$  বিন্দুৰে যোৱা সমতলখনৰ ভেক্টৰ সমীকৰণটো হ'ব :

**Options :**

70819154901.  $\vec{r} \cdot (3\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819154902.  $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819154903.  $\vec{r} \cdot (\hat{i} - 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

70819154904.  $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

**Question Number : 77 Question Id : 70819116580 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)  $(\neg q \wedge (p \rightarrow q)) \rightarrow \neg p$

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

Then which of the following statements is correct ?

**Options :**

70819154905. (a) is a tautology but not (b).

70819154906. (b) is a tautology but not (a).

70819154907. (a) and (b) both are tautologies.

70819154908. (a) and (b) both are not tautologies.

**Question Number : 77 Question Id : 70819116580 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

p আৰু q উক্তি দুটাৰ বাবে, তলৰ যৌগিক উক্তিবোৰ লোৱা হ'ল :

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

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

তেম্বে তলৰ কোনবোৰ উক্তি সত্য ?

**Options :**

70819154905. (a) এটা পুনঃকল্পিত, কিন্তু (b) নহয়।

70819154906. (b) এটা পুনঃকল্পিত, কিন্তু (a) নহয়।

70819154907. (a) আৰু (b) দুয়ো পুনঃকল্পিত।

70819154908. (a) আৰু (b) দুয়ো পুনঃকল্পিত নহয়।

**Question Number : 78 Question Id : 70819116581 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 :**



70819154909. 10

70819154910.  $\frac{31}{5}$

70819154911. 5

70819154912.  $\frac{62}{5}$

**Question Number : 78 Question Id : 70819116581 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

যদি  $y=f(x)$  বক্রটো (1, 2) বিন্দুৰে যায় আৰু  $x \frac{dy}{dx} + y = bx^4$ , অৱকল সমীকৰণটোক সিদ্ধ কৰে, তেন্তে b ৰ কি

মানৰ বাবে,  $\int_1^2 f(x)dx = \frac{62}{5}$  হ'ব ?

**Options :**

70819154909. 10

70819154910.  $\frac{31}{5}$

70819154911. 5

70819154912.  $\frac{62}{5}$

**Question Number : 79 Question Id : 70819116582 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 :**

70819154913.  $\frac{65}{2^7}$

70819154914.  $\frac{65}{2^8}$

70819154915.  $\frac{135}{2^9}$

70819154916.  $\frac{35}{2^7}$

**Question Number : 79 Question Id : 70819116582 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

$\{1, 2, 3, 4, 5\}$  সংহতিটোৰ পৰা যাদৃচ্ছিকভাৱে বাছনি কৰা দুটা উপসংহতিৰ ছেদনত মাত্ৰ দুটা মৌল থকাৰ সম্ভাৱিতা হ'ব :

**Options :**

70819154913.  $\frac{65}{2^7}$

70819154914.  $\frac{65}{2^8}$

70819154915.  $\frac{135}{2^9}$

70819154916.  $\frac{35}{2^7}$

**Question Number : 80 Question Id : 70819116583 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 :**

70819154917.  $6\sqrt{3}$  square units

70819154918.  $9\sqrt{3}$  square units

70819154919.  $11\sqrt{3}$  square units

70819154920.  $12\sqrt{3}$  square units

**Question Number : 80 Question Id : 70819116583 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

$R = \{(x, y) : 5x^2 \leq y \leq 2x^2 + 9\}$  ক্ষেত্রখণ্ডৰ ক্ষেত্রফল হ'ব :

**Options :**

70819154917.  $6\sqrt{3}$  বর্গ একক

70819154918.  $9\sqrt{3}$  বর্গ একক

70819154919.  $11\sqrt{3}$  বর্গ একক

70819154920.  $12\sqrt{3}$  বর্গ একক

## Mathematics Section B

Section Id :	708191645
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 :	708191925
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 70819116584 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the variance of 10 natural numbers  $1, 1, 1, \dots, 1, k$  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 : 70819116584 Question Type : SA**

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

যদি 10টা স্বাভাবিক সংখ্যা  $1, 1, 1, \dots, 1, k$  ব প্রসবণ 10 তকৈ কম হয়, তেন্তে  $k$  ব সম্ভাৱা সৰ্বোচ্চ মান হ'ব \_\_\_\_\_।

**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 : 70819116585 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 : 70819116585 Question Type : SA**

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

ধৰা হ'ল P এনে এটা বিন্দু যত (5, 0) বিন্দুৰ পৰা P ৰ দূৰত্ব, (-5, 0) বিন্দুৰ পৰা P ৰ দূৰত্বৰ তিনিগুণ। যদি P বিন্দুৰ সম্ভাৱ পথ r ব্যাসাৰ্ধৰ এটা বৃত্ত বুজায়, তেন্তে  $4r^2$  সমান হ'ব \_\_\_\_\_।

**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 : 70819116586 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 : 70819116586 Question Type : SA**

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

যদি ধনাত্মক x-অক্ষ আৰু  $(x-2)^2 + (y-3)^2 = 25$  বৃত্তৰ (5, 7) বিন্দুত টনা অভিলম্ব আৰু স্পৰ্শকৰ দ্বাৰা গঠিত ত্ৰিভুজটোৰ কালি A হয়, তেন্তে 24A সমান হ'ব \_\_\_\_\_।

**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 : 70819116587 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 : 70819116587 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ধরা হ'ল  $i = \sqrt{-1}$ , যদি  $\frac{(-1 + i\sqrt{3})^{21}}{(1 - i)^{24}} + \frac{(1 + i\sqrt{3})^{21}}{(1 + i)^{24}} = k$  আক  $n = [|k|]$ ,  $|k|$  ব গবিষ্ঠ অখণ্ড অংশ হয়

তেস্তে  $\sum_{j=0}^{n+5} (j+5)^2 - \sum_{j=0}^{n+5} (j+5)$  ব মান হ'ব \_\_\_\_\_।

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 : 70819116588 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 : 70819116588 Question Type : SA**

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

$S_1, S_2, \dots, S_{10}$  দহজন ছাত্ৰক তিনিটা দ'ল A, B আৰু C ত এনেদৰে বিভক্ত কৰা হৈছে যাতে প্ৰত্যেক দলত কমেও এজন ছাত্ৰ থাকে আৰু C দ'লত অতিবেছি 3 জন ছাত্ৰ থাকে, তেন্তে তেনে দ'ল গঠন কৰাৰ সৰ্বমুঠ সম্ভাৱনাৰ সংখ্যা হ'ব \_\_\_\_\_।

**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 : 70819116589 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 : 70819116589 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$n$  আৰু  $r$  দুটা অখণ্ড সংখ্যাৰ বাবে, ধৰা হ'ল  $\binom{n}{r} = \begin{cases} {}^n C_r, & \text{যদি } n \geq r \geq 0 \\ 0, & \text{অন্যথা,} \end{cases}$

তেতিয়া  $k$  ৰ যি সৰ্বোচ্চ মান যাব বাবে,

$$\sum_{i=0}^k \binom{10}{i} \binom{15}{k-i} + \sum_{i=0}^{k+1} \binom{12}{i} \binom{13}{k+1-i}$$
 যোগফলটো হিত হয়, সেই মানটো হ'ব \_\_\_\_\_।

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 : 70819116590 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 : 70819116590 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

যদি  $a + \alpha = 1$ ,  $b + \beta = 2$  আৰু  $af(x) + \alpha f\left(\frac{1}{x}\right) = bx + \frac{\beta}{x}$ ,  $x \neq 0$ , তেন্তে,  $\frac{f(x) + f\left(\frac{1}{x}\right)}{x + \frac{1}{x}}$  বাৰ্শিটোৰ মান

হ'ব \_\_\_\_\_।

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 : 70819116591 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 : 70819116591 Question Type : SA**

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

ধৰা হ'ল  $\lambda$  এটা অখণ্ড সংখ্যা। যদি  $x - \lambda = 2y - 1 = -2z$  আৰু  $x = y + 2\lambda = z - \lambda$  বোখাদুডালৰ মাজৰ চুস্বতম

দূৰত্ব  $\frac{\sqrt{7}}{2\sqrt{2}}$  হয়, তেন্তে  $|\lambda|$  ৰ মান হ'ব \_\_\_\_\_।

**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 : 70819116592 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 : 70819116592 Question Type : SA**

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

এটা গুণোত্তৰ প্ৰগতিৰ প্ৰথম চাৰিটা পদৰ যোগফল  $\frac{65}{12}$  আৰু সিহঁতৰ প্ৰতিজন্মবোৰৰ যোগফল  $\frac{65}{18}$ । যদি গুণোত্তৰ প্ৰগতিটোৰ প্ৰথম তিনিটা পদৰ পূৰণফল 1 আৰু তৃতীয় পদটো  $\alpha$  হয়, তেন্তে  $2\alpha$  হ'ব \_\_\_\_\_।

**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 : 70819116593 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 : 70819116593 Question Type : SA**

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

$(x+1)^2 + |x-5| = \frac{27}{4}$  সমীকৰনটোৰ বাস্তৱ মূলৰ সংখ্যা হ'ব \_\_\_\_\_।

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001