

<b>Question Paper Name :</b>	B TECH EA 24th Feb 2021 Shift 1
<b>Subject Name :</b>	B TECH EA
<b>Creation Date :</b>	2021-02-23 19:49:38
<b>Duration :</b>	180
<b>Number of Questions :</b>	90
<b>Total Marks :</b>	300
<b>Display Marks:</b>	Yes

## B TECH EA

<b>Group Number :</b>	1
<b>Group Id :</b>	708191164
<b>Group Maximum Duration :</b>	0
<b>Group Minimum Duration :</b>	180
<b>Show Attended Group? :</b>	No
<b>Edit Attended Group? :</b>	No
<b>Break time :</b>	0
<b>Group Marks :</b>	300
<b>Is this Group for Examiner? :</b>	No

## Physics Section A

<b>Section Id :</b>	708191562
<b>Section Number :</b>	1
<b>Section type :</b>	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 :	708191842
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 70819115334 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The workdone by a gas molecule in an isolated system is given by,  $W = \alpha\beta^2 e^{-\frac{x^2}{\alpha kT}}$ , where  $x$  is the displacement,  $k$  is the Boltzmann constant and  $T$  is the temperature.  $\alpha$  and  $\beta$  are constants. Then the dimensions of  $\beta$  will be :

Options :

70819151151.  $[M^2 L T^2]$

70819151152.  $[M^0 L T^0]$

70819151153.  $[M L T^{-2}]$

70819151154.  $[M L^2 T^{-2}]$

Question Number : 1 Question Id : 70819115334 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

এটা পৃথকীকৃত নিকায়ত থকা গেছৰ অণুসমূহে কৰা কাৰ্য্যৰ পৰিমাণ,  $W = \alpha\beta^2 e^{-\frac{x^2}{\alpha kT}}$ , য'ত  $x$  সৰণ,  $k$  ব'ল্টজমেন ধ্রুবক (Boltzmann constant) আৰু  $T$  উষ্ণতা।  $\alpha$  আৰু  $\beta$  ধ্রুবক।  $\beta$  ৰ মাত্ৰা হ'ব :

Options :

70819151151.  $[M^2 L T^2]$

70819151152.  $[M^0 L T^0]$

70819151153.  $[M L T^{-2}]$

70819151154.  $[M L^2 T^{-2}]$

Question Number : 2 Question Id : 70819115335 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two stars of masses  $m$  and  $2m$  at a distance  $d$  rotate about their common centre of mass in free space. The period of revolution is :

Options :

70819151155.  $\frac{1}{2\pi} \sqrt{\frac{3Gm}{d^3}}$

70819151156.  $2\pi \sqrt{\frac{d^3}{3Gm}}$

70819151157.  $2\pi \sqrt{\frac{3Gm}{d^3}}$

70819151158.  $\frac{1}{2\pi} \sqrt{\frac{d^3}{3Gm}}$

Question Number : 2 Question Id : 70819115335 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

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

m আৰু 2m ভৰৰ, d দূৰত্বত থকা দুটা নক্ষত্ৰই, শূন্য স্থানত (free space) সিহঁতৰ সন্মিলিত (common) ভৰকেন্দ্ৰ সাপেক্ষে ঘূৰ্ণন কৰিছে। পৰিভ্ৰমণৰ পৰ্যায়কাল হ'ব :

**Options :**

70819151155.  $\frac{1}{2\pi} \sqrt{\frac{3Gm}{d^3}}$

70819151156.  $2\pi \sqrt{\frac{d^3}{3Gm}}$

70819151157.  $2\pi \sqrt{\frac{3Gm}{d^3}}$

70819151158.  $\frac{1}{2\pi} \sqrt{\frac{d^3}{3Gm}}$

**Question Number : 3 Question Id : 70819115336 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

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

Four identical particles of equal masses 1 kg made to move along the circumference of a circle of radius 1 m under the action of their own mutual gravitational attraction. The speed of each particle will be :

**Options :**

70819151159.  $\frac{\sqrt{(1+2\sqrt{2})G}}{2}$

70819151160.  $\sqrt{\frac{G}{2}(1+2\sqrt{2})}$

70819151161.  $\sqrt{G(1+2\sqrt{2})}$

70819151162.  $\sqrt{\frac{G}{2}(2\sqrt{2}-1)}$

**Question Number : 3 Question Id : 70819115336 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

প্রতিটো সমান ভৰ 1 kg ৰ চাৰিটা সাইলাখ একেই কণাক, পৰস্পৰ মধ্যাকৰ্ষণিক শক্তিৰ ক্ৰিয়াৰ ফলত, 1 m ব্যাসাৰ্ধৰ এটা বৃত্তৰ পৰিধিত গতি কৰিবলৈ বাধ্য কৰোৱা হৈছে। প্রতিটো কণাৰ দ্ৰুতি হ'ব :

**Options :**

70819151159.  $\frac{\sqrt{(1+2\sqrt{2})G}}{2}$

70819151160.  $\sqrt{\frac{G}{2}(1+2\sqrt{2})}$

70819151161.  $\sqrt{G(1+2\sqrt{2})}$

70819151162.  $\sqrt{\frac{G}{2}(2\sqrt{2}-1)}$

**Question Number : 4 Question Id : 70819115337 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

Moment of inertia (M.I.) of four bodies, having same mass and radius, are reported as ;

$I_1$  = M.I. of thin circular ring about its diameter,

$I_2$  = M.I. of circular disc about an axis perpendicular to disc and going through the centre,

$I_3$  = M.I. of solid cylinder about its axis and

$I_4$  = M.I. of solid sphere about its diameter.

Then :

**Options :**

70819151163.  $I_1 + I_2 = I_3 + \frac{5}{2} I_4$

70819151164.  $I_1 + I_3 < I_2 + I_4$

70819151165.  $I_1 = I_2 = I_3 < I_4$

70819151166.  $I_1 = I_2 = I_3 > I_4$

**Question Number : 4 Question Id : 70819115337 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

চাৰিটা সমান ভৰ আৰু সমান ব্যাসাৰ্ধৰ বস্তুৰ জড় ভ্ৰামক এনেদৰে পোৱা গৈছে :

$I_1$  = পাতল বৃত্তাকাৰ আঙুঠিৰ ইয়াৰ ব্যাস সাপেক্ষে জড় ভ্ৰামক।

$I_2$  = কেন্দ্ৰৰ মাজেদি লম্ব দিশত যোৱা অক্ষ সাপেক্ষে এখন বৃত্তাকাৰ থালৰ জড় ভ্ৰামক।

$I_3$  = নিজ অক্ষ সাপেক্ষে এটা গোটা চুঙাৰ জড় ভ্ৰামক।

$I_4$  = ব্যাস সাপেক্ষে এটা গোটা গোলকৰ জড় ভ্ৰামক।

তেতিয়া :

**Options :**

70819151163.  $I_1 + I_2 = I_3 + \frac{5}{2} I_4$

70819151164.  $I_1 + I_3 < I_2 + I_4$

70819151165.  $I_1 = I_2 = I_3 < I_4$

70819151166.  $I_1 = I_2 = I_3 > I_4$

**Question Number : 5 Question Id : 70819115338 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

Consider two satellites  $S_1$  and  $S_2$  with periods of revolution 1 hr. and 8 hr. respectively revolving around a planet in circular orbits. The ratio of angular velocity of satellite  $S_1$  to the angular velocity of satellite  $S_2$  is :

**Options :**

70819151167. 8 : 1

70819151168. 1 : 8

70819151169. 2 : 1

70819151170. 1 : 4

**Question Number : 5 Question Id : 70819115338 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

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

ধৰি লোৱা যে এটা গ্ৰহৰ চাৰিওফালে বৃত্তাকাৰ কক্ষত ঘূৰি থকা দুটা উপগ্ৰহ  $S_1$  আৰু  $S_2$  ৰ ক্ৰমে পৰিভ্ৰমণৰ পৰ্যায়কাল 1 hr. আৰু 8 hr.।  $S_1$  উপগ্ৰহৰ কৌণিক বেগৰ সৈতে  $S_2$  উপগ্ৰহৰ কৌণিক বেগৰ অনুপাত হ'ব :

**Options :**

70819151167. 8 : 1

70819151168. 1 : 8

70819151169. 2 : 1

70819151170. 1 : 4

**Question Number : 6 Question Id : 70819115339 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

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

Each side of a box made of metal sheet in cubic shape is 'a' at room temperature. The coefficient of linear expansion of the metal sheet is ' $\alpha$ '. The metal sheet is heated uniformly, by a small temperature  $\Delta T$ , so that its new temperature is  $T + \Delta T$ . Calculate the increase in the volume of the metal box.

**Options :**

70819151171.  $4\pi a^3 \alpha \Delta T$

70819151172.  $4a^3 \alpha \Delta T$

70819151173.  $\frac{4}{3} \pi a^3 \alpha \Delta T$

70819151174.  $3a^3 \alpha \Delta T$

**Question Number : 6 Question Id : 70819115339 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

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

কোঠাৰ উষ্ণতা 'T' ত, ধাতুৰ পাতৰে নিৰ্মিত এটা ঘনক আকৃতিৰ বাকচৰ প্ৰতিটো side 'a', হয়, ধাতুৰ পাতৰ বৈখিক প্ৰসাৰণ গুণাংক (coefficient of linear expansion) ' $\alpha$ '. ধাতুৰ পাতখনক সুসমভাৱে সামান্য উষ্ণতা  $\Delta T$  পৰিমাণে তপ্তোৱা হৈছে, যাতে ইয়াৰ নতুন উষ্ণতা  $T + \Delta T$  হয়। ধাতুৰ বাকচটোৰ আয়তনৰ বৃদ্ধি গণনা কৰা।

**Options :**

70819151171.  $4\pi a^3 \alpha \Delta T$

70819151172.  $4a^3 \alpha \Delta T$

70819151173.  $\frac{4}{3} \pi a^3 \alpha \Delta T$

70819151174.  $3a^3 \alpha \Delta T$

**Question Number : 7 Question Id : 70819115340 Question Type : MCQ Option Shuffling : Yes Is**

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If  $Y$ ,  $K$  and  $\eta$  are the values of Young's modulus, bulk modulus and modulus of rigidity of any material respectively. Choose the correct relation for these parameters.

Options :

70819151175.  $Y = \frac{9K\eta}{2\eta + 3K} \text{ N/m}^2$

70819151176.  $Y = \frac{9K\eta}{3K - \eta} \text{ N/m}^2$

70819151177.  $K = \frac{Y\eta}{9\eta - 3Y} \text{ N/m}^2$

70819151178.  $\eta = \frac{3YK}{9K + Y} \text{ N/m}^2$

Question Number : 7 Question Id : 70819115340 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

যদিহে  $Y$ ,  $K$  আৰু  $\eta$  ক্ৰমান্বয়ে যিকোনো এক পদাৰ্থৰ, ইয়ঙৰ গুণাংক, আয়তন গুণাংক আৰু বিকপন গুণাংক, (modulus of rigidity) হয়, এই প্ৰাচল (parameter) সমূহৰ মাজৰ শুদ্ধ সম্বন্ধ চয়ন কৰা।

Options :

70819151175.  $Y = \frac{9K\eta}{2\eta + 3K} \text{ N/m}^2$

70819151176.  $Y = \frac{9K\eta}{3K - \eta} \text{ N/m}^2$

70819151177.  $K = \frac{Y\eta}{9\eta - 3Y} \text{ N/m}^2$

70819151178.

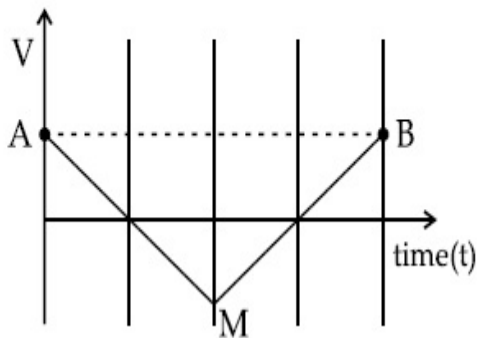
$$\eta = \frac{3YK}{9K+Y} \text{ N/m}^2$$

Question Number : 8 Question Id : 70819115341 Question Type : MCQ Option Shuffling : Yes Is

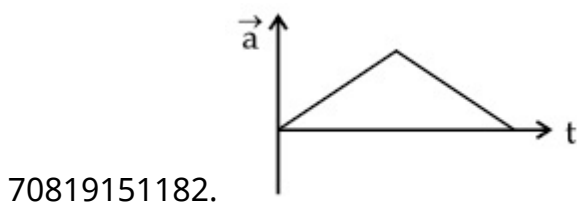
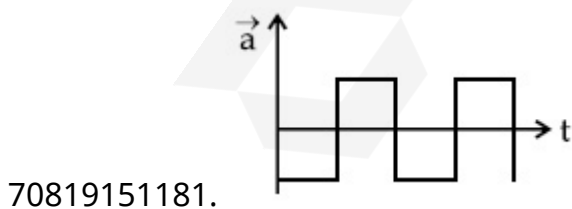
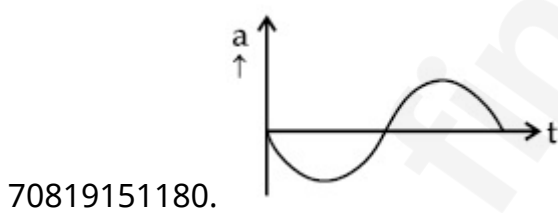
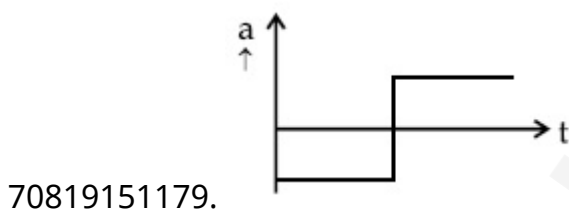
Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the velocity-time graph has the shape AMB, what would be the shape of the corresponding acceleration-time graph ?



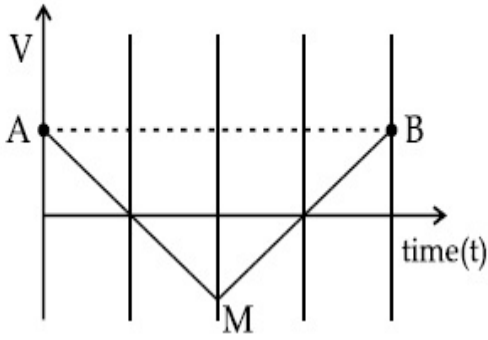
Options :



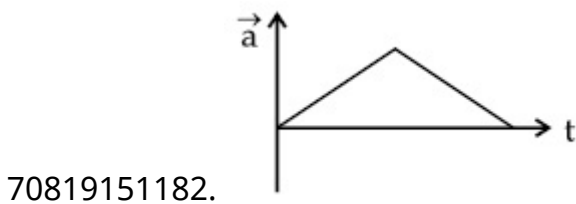
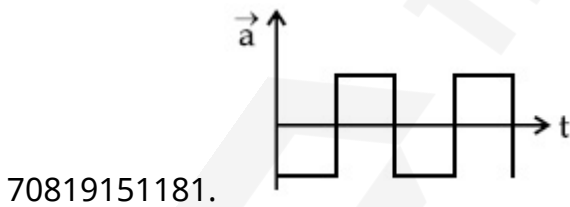
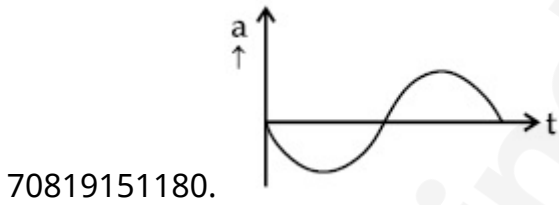
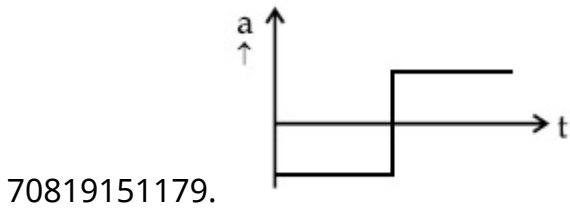
Question Number : 8 Question Id : 70819115341 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

যদিহে বেগ-সময়ৰ লেখচিত্ৰৰ আকৃতি AMB ৰ দৰে হয়, আনুসঙ্গিক ত্বৰণ-সময় লেখচিত্ৰৰ আকৃতি কেনে হ'ব ?



Options :



Question Number : 9 Question Id : 70819115342 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

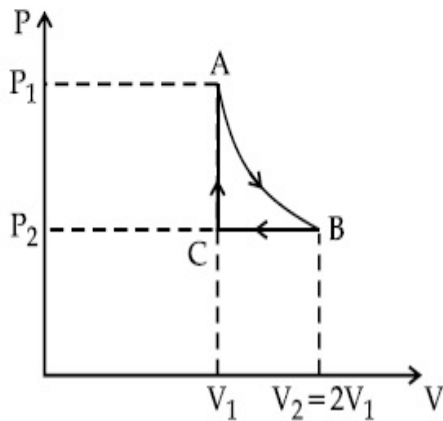
n mole of a perfect gas undergoes a cyclic process ABCA (see figure) consisting of the following processes.

A → B : Isothermal expansion at temperature T so that the volume is doubled from  $V_1$  to  $V_2 = 2V_1$  and pressure changes from  $P_1$  to  $P_2$ .

B → C : Isobaric compression at pressure  $P_2$  to initial volume  $V_1$ .

C → A : Isochoric change leading to change of pressure from  $P_2$  to  $P_1$ .

Total workdone in the complete cycle ABCA is :



Options :

70819151183. 0

70819151184.  $nRT \ln 2$

70819151185.  $nRT \left( \ln 2 + \frac{1}{2} \right)$

70819151186.  $nRT \left( \ln 2 - \frac{1}{2} \right)$

Question Number : 9 Question Id : 70819115342 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

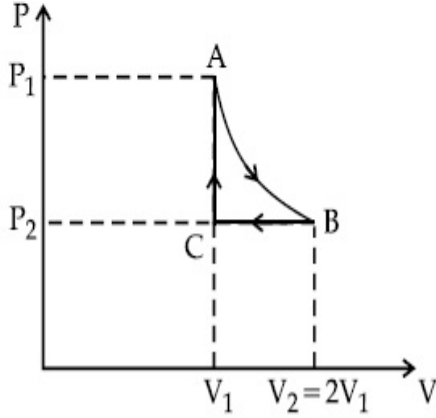
এটা আদর্শ গেছৰ  $n$  ম'ল পৰিমাণ, তলত দিয়া প্রক্রিয়াসমূহেৰে গঠিত এটা চক্রীয় (cyclic) প্রক্রিয়া ABC (চক্ৰত দেখা) বে সলনি হয় :

$A \rightarrow B$  : T উষ্ণতাত সমোষ্ণী প্রসাৰণ যাতে আয়তন  $V_1$  ৰ পৰা দুগুণ বাঢ়ি  $V_2 = 2V_1$  হয় আৰু চাপ  $P_1$  ৰ পৰা  $P_2$  লৈ সলনি হয়।

$B \rightarrow C$  : চাপ  $P_2$  ত প্রাৰম্ভিক আয়তন  $V_1$  পোৱালৈকে সমচাপী সংকোচন।

$C \rightarrow A$  : চাপ  $P_2$  ৰ পৰা  $P_1$  লৈ সলনি হোৱাকৈ সময়তনী প্রক্রিয়া।

সম্পূৰ্ণ চক্ৰ ABCA ত সম্পাদন হোৱা মুঠ কাৰ্য্যৰ পৰিমাণ হ'ল :



Options :

70819151183. 0

70819151184.  $nRT \ln 2$

70819151185.  $nRT \left( \ln 2 + \frac{1}{2} \right)$

70819151186.  $nRT \left( \ln 2 - \frac{1}{2} \right)$

Question Number : 10 Question Id : 70819115343 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List I with List II.

List I	List II
(a) Isothermal	(i) Pressure constant
(b) Isochoric	(ii) Temperature constant
(c) Adiabatic	(iii) Volume constant
(d) Isobaric	(iv) Heat content is constant

Choose the correct answer from the options given below :

**Options :**

70819151187. (a) → (i), (b) → (iii), (c) → (ii), (d) → (iv)

70819151188. (a) → (iii), (b) → (ii), (c) → (i), (d) → (iv)

70819151189. (a) → (ii), (b) → (iv), (c) → (iii), (d) → (i)

70819151190. (a) → (ii), (b) → (iii), (c) → (iv), (d) → (i)

**Question Number : 10 Question Id : 70819115343 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

তালিকা - I ৰ সৈতে তালিকা - II মিলোৱা :

তালিকা - I	তালিকা - II
(a) সমোষ্ণী	(i) স্থিৰ চাপ
(b) সমায়তনী	(ii) স্থিৰ উষ্ণতা
(c) অপবোধী	(iii) স্থিৰ আয়তন
(d) সমচাপ	(iv) তাপৰ মাত্ৰা (Heat content) স্থিৰ থাকে

তলৰ বিকল্পৰ পৰা শুদ্ধ উত্তৰ চয়ন কৰা :

**Options :**

70819151187. (a) → (i), (b) → (iii), (c) → (ii), (d) → (iv)

70819151188. (a) → (iii), (b) → (ii), (c) → (i), (d) → (iv)

70819151189. (a) → (ii), (b) → (iv), (c) → (iii), (d) → (i)

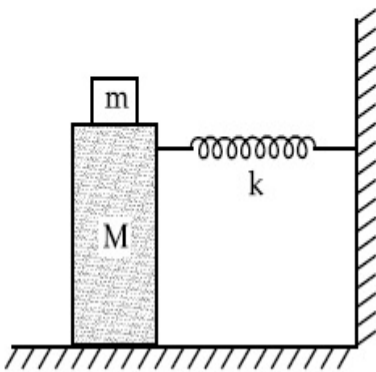
70819151190. (a)  $\rightarrow$  (ii), (b)  $\rightarrow$  (iii), (c)  $\rightarrow$  (iv), (d)  $\rightarrow$  (i)

**Question Number : 11 Question Id : 70819115344 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

In the given figure, a mass  $M$  is attached to a horizontal spring which is fixed on one side to a rigid support. The spring constant of the spring is  $k$ . The mass oscillates on a frictionless surface with time period  $T$  and amplitude  $A$ . When the mass is in equilibrium position, as shown in the figure, another mass  $m$  is gently fixed upon it. The new amplitude of oscillation will be :



**Options :**

70819151191.  $A \sqrt{\frac{M+m}{M}}$

70819151192.  $A \sqrt{\frac{M}{M+m}}$

70819151193.  $A \sqrt{\frac{M-m}{M}}$

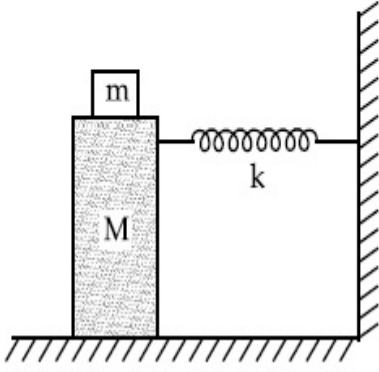
70819151194.  $A \sqrt{\frac{M}{M-m}}$

**Question Number : 11 Question Id : 70819115344 Question Type : MCQ Option Shuffling : Yes**

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

চিত্ৰত দেখুওৱা ধৰণে, এটা মূৰে দৃঢ় আলমৰ সৈতে সংলগ্ন এডাল আনুভূমিক স্প্ৰিংৰ সৈতে এটা ভৰ  $M$  সংযুক্ত হৈ আছে। স্প্ৰিংডালৰ স্প্ৰিং ফ্ৰেক  $k$ । বিস্তাৰ  $A$  আৰু পৰ্যায়কাল  $T$  সহিতে ভৰটোৱে এখন ঘৰ্ষণহীন তলত দোলিত হয়। চিত্ৰত দেখুওৱা ধৰণে যেতিয়া ভৰটো সাম্য অৱস্থানত থাকে, অন্য এটা ভৰ ' $m$ ' তাৰ ওপৰত লাহেকৈ দৃঢ় (fix) কৰা হয়। দোলনৰ নতুন বিস্তাৰ হ'ব :



Options :

70819151191.  $A \sqrt{\frac{M+m}{M}}$

70819151192.  $A \sqrt{\frac{M}{M+m}}$

70819151193.  $A \sqrt{\frac{M-m}{M}}$

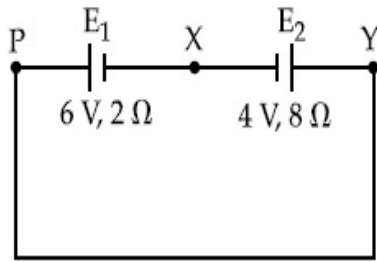
70819151194.  $A \sqrt{\frac{M}{M-m}}$

Question Number : 12 Question Id : 70819115345 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A cell  $E_1$  of emf 6 V and internal resistance  $2 \Omega$  is connected with another cell  $E_2$  of emf 4 V and internal resistance  $8 \Omega$  (as shown in the figure). The potential difference across points X and Y is :



Options :

70819151195. 2.0 V

70819151196. 3.6 V

70819151197. 5.6 V

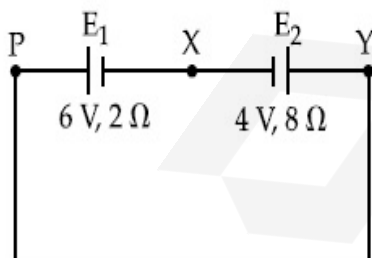
70819151198. 10.0 V

Question Number : 12 Question Id : 70819115345 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

আভ্যন্তরীণ রোধ  $2 \Omega$  আৰু বিদ্যুৎ চালক বল 6 V ৰ এটা কোষ  $E_1$  ক আভ্যন্তরীণ রোধ  $8 \Omega$  আৰু বিদ্যুৎ চালক বল 4 V ৰ অন্য এটা কোষ  $E_2$  ৰ সৈতে চিত্ৰত দেখুওৱা ধৰণে সংযোগ কৰা হৈছে। X আৰু Y বিন্দুৰ মাজৰ বিভৱ পাৰ্থক্য হ'ব :



Options :

70819151195. 2.0 V

70819151196. 3.6 V

**Question Number : 13 Question Id : 70819115346 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

A current through a wire depends on time as

$$i = \alpha_0 t + \beta t^2$$

where  $\alpha_0 = 20 \text{ A/s}$  and  $\beta = 8 \text{ As}^{-2}$ . Find the charge crossed through a section of the wire in 15 s.

**Options :**

70819151199. 260 C

70819151200. 2100 C

70819151201. 11250 C

70819151202. 2250 C

**Question Number : 13 Question Id : 70819115346 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

এডাল তাঁৰৰ মাজেৰে প্ৰাহিত প্ৰাহে সময়ৰ ওপৰত নিৰ্ভৰ কৰাৰ ধৰণ :

$$i = \alpha_0 t + \beta t^2$$

য'ত  $\alpha_0 = 20 \text{ A/s}$  আৰু  $\beta = 8 \text{ As}^{-2}$ । 15 ছেকেণ্ডত তাঁৰ ডালৰ এক অংশৰ মাজেদি পাৰ হোৱা আধানৰ পৰিমাণ নিৰ্ণয় কৰা।

**Options :**

70819151199. 260 C

70819151200. 2100 C

70819151201. 11250 C

70819151202. 2250 C

**Question Number : 14 Question Id : 70819115347 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Two equal capacitors are first connected in series and then in parallel. The ratio of the equivalent capacities in the two cases will be :

**Options :**

70819151203. 1 : 2

70819151204. 2 : 1

70819151205. 4 : 1

70819151206. 1 : 4

**Question Number : 14 Question Id : 70819115347 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

দুটা সমান ধাৰকক প্ৰথমতে শ্ৰেণীবদ্ধভাৱে আৰু তাৰ পাছত সমান্তৰালভাৱে সংযোগ কৰা হৈছে। দুয়ো ক্ষেত্ৰত সমতুল্য ধাৰকত্বৰ অনুপাত হ'ব :

**Options :**

70819151203. 1 : 2

70819151204. 2 : 1

70819151205. 4 : 1

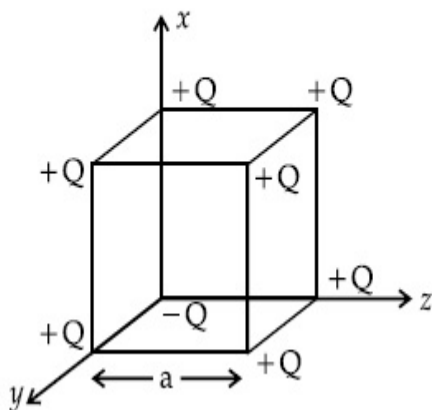
70819151206. 1 : 4

Question Number : 15 Question Id : 70819115348 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A cube of side 'a' has point charges +Q located at each of its vertices except at the origin where the charge is -Q. The electric field at the centre of cube is :



Options :

70819151207. 
$$\frac{-Q}{3\sqrt{3} \pi \epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$$

70819151208. 
$$\frac{Q}{3\sqrt{3} \pi \epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$$

70819151209. 
$$\frac{-2Q}{3\sqrt{3} \pi \epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$$

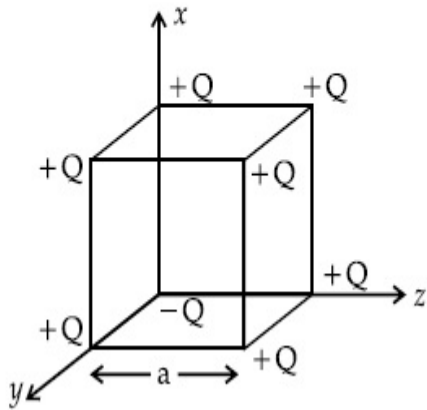
70819151210. 
$$\frac{2Q}{3\sqrt{3} \pi \epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$$

Question Number : 15 Question Id : 70819115348 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

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

এটা 'a' বাহুৰ ঘনকৰ প্রতিটো শীৰ্ষ বিন্দুত (vertice) +Q মানৰ আধান কণা আছে, কেৱল মাত্ৰ মূলবিন্দুত -Q মানৰ আধান কণা আছে। ঘনকটোৰ কেন্দ্ৰত বিদ্যুৎ ক্ষেত্ৰৰ মান হ'ব :



**Options :**

70819151207.  $\frac{-Q}{3\sqrt{3} \pi \epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$

70819151208.  $\frac{Q}{3\sqrt{3} \pi \epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$

70819151209.  $\frac{-2Q}{3\sqrt{3} \pi \epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$

70819151210.  $\frac{2Q}{3\sqrt{3} \pi \epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$

**Question Number : 16 Question Id : 70819115349 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

If an emitter current is changed by 4 mA, the collector current changes by 3.5 mA. The value of  $\beta$  will be :

**Options :**

70819151211. 7

70819151212. 0.875

70819151213. 0.5

70819151214. 3.5

**Question Number : 16 Question Id : 70819115349 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

যদিহে নির্গমক প্রবাহ (emitter current) 4 mA সলনি কৰা হয়, তেন্তে সংগ্রাহক প্রবাহ (collector current) 3.5 mA সলনি হয়।  $\beta$  ৰ মান হ'ব :

**Options :**

70819151211. 7

70819151212. 0.875

70819151213. 0.5

70819151214. 3.5

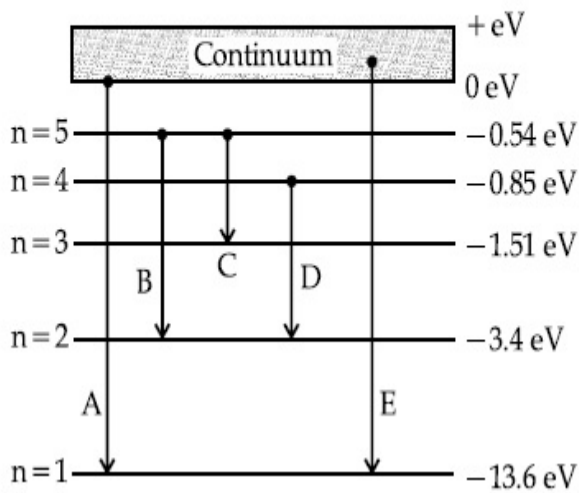
**Question Number : 17 Question Id : 70819115350 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

In the given figure, the energy levels of hydrogen atom have been shown along with some transitions marked A, B, C, D and E.

The transitions A, B and C respectively represent :



**Options :**

70819151215. The first member of the Lyman series, third member of Balmer series and second member of Paschen series.

70819151216. The ionization potential of hydrogen, second member of Balmer series and third member of Paschen series.

70819151217. The series limit of Lyman series, second member of Balmer series and second member of Paschen series.

70819151218. The series limit of Lyman series, third member of Balmer series and second member of Paschen series.

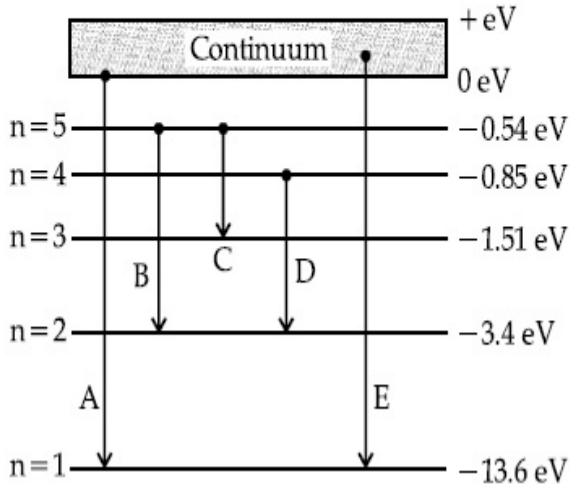
**Question Number : 17 Question Id : 70819115350 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

তলৰ চিত্ৰত, হাইড্ৰ'জেন এট'মৰ বিভিন্ন শক্তি স্তৰসমূহ কিছুমান সংক্ৰমণ (transitions) A, B, C, D আৰু E ৰ সৈতে দেখুওৱা হৈছে।

সংক্ৰমণ A, B আৰু C য়ে ক্ৰমে দৰ্শাইছে :



Options :

70819151215. লিমেন শ্ৰেণীৰ প্ৰথম সদস্য (member) বামাৰ শ্ৰেণীৰ তৃতীয় সদস্য (member) আৰু পাশ্চেন শ্ৰেণীৰ দ্বিতীয় সদস্যক।

70819151216. হাইড্ৰ'জেনৰ আয়নীকৰণ শক্তি, বামাৰ শ্ৰেণীৰ দ্বিতীয় সদস্য (member) আৰু পাশ্চেন শ্ৰেণীৰ তৃতীয় সদস্যক (member)।

70819151217. লিমেন শ্ৰেণীৰ শ্ৰেণী সীমা, বামাৰ শ্ৰেণীৰ দ্বিতীয় সদস্যক (member) আৰু পাশ্চেন শ্ৰেণীৰ দ্বিতীয় সদস্যক (member)।

70819151218. লিমেন শ্ৰেণীৰ শ্ৰেণী সীমা, বামাৰ শ্ৰেণীৰ তৃতীয় সদস্য (member) আৰু পাশ্চেন শ্ৰেণীৰ দ্বিতীয় সদস্যক (member)।

Question Number : 18 Question Id : 70819115351 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : Two photons having equal linear momenta have equal wavelengths.

Statement II : If the wavelength of photon is decreased, then the momentum and energy of a photon will also decrease.

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

**Options :**

70819151219. Both Statement I and Statement II are true

70819151220. Both Statement I and Statement II are false

70819151221. Statement I is true but Statement II is false

70819151222. Statement I is false but Statement II is true

**Question Number : 18 Question Id : 70819115351 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

তলত দুটা উক্তি দিয়া হৈছে :

উক্তি I : সমান বৈখিক ভৰবেগ থকা দুটা ফ'ট'নৰ তৰংগদৈৰ্ঘ্য সমান।

উক্তি II : যদিহে ফ'ট'নটোৰ তৰংগদৈৰ্ঘ্য হ্রাস কৰা হয়, তেন্তে ইয়াৰ ভৰবেগ আৰু শক্তি দুয়োটাই হ্রাস পাব।

উপৰোক্ত দুই উক্তিৰ আলমত, সৰ্বোচ্চ যুক্তিস্থিত উত্তৰ তলৰ বিকল্পৰ পৰা চয়ন কৰা :

**Options :**

70819151219. উক্তি I আৰু উক্তি II দুয়োটাই সঁচা।

70819151220. উক্তি I আৰু উক্তি II দুয়োটাই মিছা।

70819151221. উক্তি I সঁচা কিন্তু উক্তি II মিছা।

70819151222. উক্তি I মিছা কিন্তু উক্তি II সঁচা।

Question Number : 19 Question Id : 70819115352 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The focal length  $f$  is related to the radius of curvature  $r$  of the spherical convex mirror by :

Options :

70819151223.  $f = r$

70819151224.  $f = -r$

70819151225.  $f = -\frac{1}{2}r$

70819151226.  $f = +\frac{1}{2}r$

Question Number : 19 Question Id : 70819115352 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

এখন গোলাকাৰ উত্তল দাপোণৰ ভাঁজ ব্যাসার্ধ  $r$  ৰ সৈতে নাভি দৈৰ্ঘ্য  $f$  ৰ সম্বন্ধ :

Options :

70819151223.  $f = r$

70819151224.  $f = -r$

70819151225.  $f = -\frac{1}{2}r$

70819151226.  $f = +\frac{1}{2}r$

Question Number : 20 Question Id : 70819115353 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In a Young's double slit experiment, the width of the one of the slit is three times the other slit. The amplitude of the light coming from a slit is proportional to the slit-width. Find the ratio of the maximum to the minimum intensity in the interference pattern.

Options :

70819151227. 4 : 1

70819151228. 2 : 1

70819151229. 1 : 4

70819151230. 3 : 1

Question Number : 20 Question Id : 70819115353 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ইয়ংৰ দ্বি-ছিদ্র পৰীক্ষাত, এটা ছিদ্রৰ বেধ আনটোৰ ছিদ্র বেধৰ তিনিগুণ হয়। এটা ছিদ্রৰ পৰা অহা পোহৰৰ বিস্তাৰ ছিদ্রৰ বেধৰ সমানুপাতিক। সমাৰোপণৰ চাৰ্ণেকিত সৰ্বোচ্চ আৰু সৰ্বনিম্ন তীব্রতাৰ অনুপাত নিৰ্ণয় কৰা।

Options :

70819151227. 4 : 1

70819151228. 2 : 1

70819151229. 1 : 4

70819151230. 3 : 1

Section Id :	708191563
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 :	708191843
Question Shuffling Allowed :	Yes

Question Number : 21 Question Id : 70819115354 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The coefficient of static friction between a wooden block of mass 0.5 kg and a vertical rough wall is 0.2. The magnitude of horizontal force that should be applied on the block to keep it adhere to the wall will be \_\_\_\_\_ N.

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

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 21 Question Id : 70819115354 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

এখন উল্লম্বদিশত থকা অমসৃণ দেৱাল আৰু এটা 0.5 kg ভৰৰ কাঠৰ টুকুৰাৰ মাজৰ স্ট্ৰেটিক ঘৰ্ষণ গুণাংক 0.2। কাঠৰ টুকুৰাটোক দেৱালৰ সৈতে লগ লগাই ৰাখিবৰ বাবে টুকুৰাটোত প্ৰয়োগ কৰিবলগীয়া প্ৰয়োজনীয় আনুভূমিক বলৰ মান হ'ব

\_\_\_\_\_ N।

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

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 22 **Question Id :** 70819115355 **Question Type :** SA

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

An unpolarized light beam is incident on the polarizer of a polarization experiment and the intensity of light beam emerging from the analyzer is measured as 100 Lumens. Now, if the analyzer is rotated around the horizontal axis (direction of light) by  $30^\circ$  in clockwise direction, the intensity of emerging light will be \_\_\_\_\_ Lumens.

**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 :** 70819115355 **Question Type :** SA

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

এটা সমরতন পৰীক্ষাত, সমরতক (polarizer) ত এটা অসমরতিত পোহৰ বশ্মিপুঞ্জ (beam) আপতিত হৈছে আৰু বিশ্লেষক (analyzer) ৰ পৰা নিৰ্গত পোহৰৰ তীব্ৰতা 100 Lumens মাপ কৰা হৈছে। এতিয়া বিশ্লেষকটো আনুভূমিক অক্ষ (পোহৰৰ দিশত) সাপেক্ষে, ঘড়ীৰ কাঁটাৰ দিশত  $30^\circ$  ঘূৰোৱা হৈছে। নিৰ্গত পোহৰৰ তীব্ৰতা হ'ব \_\_\_\_\_ Lumens।

**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 : 70819115356 Question Type : SA**

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

A ball with a speed of 9 m/s collides with another identical ball at rest. After the collision, the direction of each ball makes an angle of  $30^\circ$  with the original direction. The ratio of velocities of the balls after collision is  $x : y$ , where  $x$  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 : 23 Question Id : 70819115356 Question Type : SA**

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

ছবিৰ অৱস্থাত থকা অন্য এটা সাইলাখ একেই বলৰ সৈতে, 9 m/s দ্ৰুতিৰ এটা বলৰ সংঘৰ্ষ হৈছে। সংঘৰ্ষৰ পিছত, প্ৰতিটো বলৰ দিশে প্ৰাৰম্ভিক দিশৰ সৈতে  $30^\circ$  কোণ কৰিছে। সংঘৰ্ষৰ পিছত দুয়োটা বলৰ বেগৰ অনুপাত  $x : y$ , য'ত  $x$  \_\_\_\_\_ ।

**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 : 70819115357 Question Type : SA**

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

A hydraulic press can lift 100 kg when a mass 'm' is placed on the smaller piston. It can lift \_\_\_\_\_ kg when the diameter of the larger piston is increased by 4 times and that of the smaller piston is decreased by 4 times keeping the same mass 'm' on the smaller piston.

**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 : 70819115357 Question Type : SA**

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

যেতিয়া সৰু পিষ্টনটোৰ ওপৰত 'm' পৰিমাণৰ ভৰ এটা থোৱা হয়, তেতিয়া এটা হাইড্ৰ'লিক প্ৰেছে (hydraulic press) 100 kg উঠাব পাৰে। যেতিয়া ডাঙৰ পিষ্টনটোৰ ব্যাস 4 গুণ অধিক বঢ়াই দিয়া হয় আৰু সৰু পিষ্টনটোৰ ওপৰত একেই 'm' ভৰ ৰাখি ইয়াৰ ব্যাস 4 গুণ হ্রাস কৰা হয়, তেতিয়া প্ৰেছেটোৱে \_\_\_\_\_ ওজন উঠাব পাৰে।

**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 : 70819115358 Question Type : SA**

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

An inclined plane is bent in such a way that the vertical cross-section is given by  $y = \frac{x^2}{4}$

where  $y$  is in vertical and  $x$  in horizontal direction. If the upper surface of this curved plane is rough with coefficient of friction  $\mu = 0.5$ , the maximum height in cm at which a stationary block will not slip downward is \_\_\_\_\_ 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 :** 25 **Question Id :** 70819115358 **Question Type :** SA

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

এখন হেলনীয়া তলক এনেভাৱে ভাঁজ দিয়া গৈছে যাতে ইয়াৰ লম্বুদিশত প্ৰস্থচ্ছেদ  $y = \frac{x^2}{4}$  হয়, য'ত  $y$  উলম্বুদিশত আৰু  $x$  আনুভূমিক দিশত আছে। যদি ভাঁজ দিয়া তলখনৰ ওপৰৰ পৃষ্ঠখন, ঘৰ্ষণ গুণাংক  $\mu = 0.5$  ৰ এক অমসৃণ পৃষ্ঠ হয়, এটা স্থিৰ অৱস্থাত থকা ব্লকে তললৈ পিচলি নহাকৈ থাকিব পৰা সৰ্বোচ্চ উচ্চতা হ'ল \_\_\_\_\_ 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 :** 26 **Question Id :** 70819115359 **Question Type :** SA

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

A resonance circuit having inductance and resistance  $2 \times 10^{-4}$  H and  $6.28 \Omega$  respectively oscillates at 10 MHz frequency. The value of quality factor of this resonator is \_\_\_\_\_.

[ $\pi = 3.14$ ]

**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 : 70819115359 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ক্রমে  $2 \times 10^{-4}$  H মানৰ আৱেশক আৰু  $6.28 \Omega$  মানৰ বোধযুক্ত এটা অনুনাদ বৰ্তনী 10 MHz কম্পনাংকৰে দেলিত হয়। এই অনুনাদ বৰ্তনীটোৰ  $[\pi=3.14]$  গুণক বাশি 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 : 27 Question Id : 70819115360 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

An audio signal  $v_m = 20 \sin 2\pi(1500t)$  amplitude modulates a carrier  $v_c = 80 \sin 2\pi(100,000t)$ .

The value of percent modulation 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 : 70819115360 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$v_c = 80 \sin 2\pi(100,000t)$  ব এটা বাহকক, এটা  $v_m = 20 \sin 2\pi(1500t)$  ব এটা শব্দ (audio) কেটে নিয়া কলিত কৰিছে। শতকৰা কলনৰ মান হ'ব \_\_\_\_\_ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

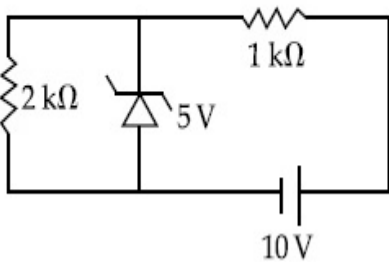
**Possible Answers :**

5 to 5.001

**Question Number :** 28 **Question Id :** 70819115361 **Question Type :** SA

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

In connection with the circuit drawn below, the value of current flowing through 2 k $\Omega$  resistor is \_\_\_\_\_  $\times 10^{-4}$  A.



**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

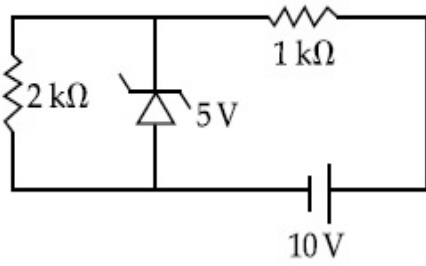
**Possible Answers :**

5 to 5.001

**Question Number :** 28 **Question Id :** 70819115361 **Question Type :** SA

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

তলৰ বৰ্তনী অনুসৰি,  $2\text{ k}\Omega$  ৰোধৰ মাজেদি প্ৰবাহিত বিদ্যুৎ প্ৰবাহৰ 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 :** 29 **Question Id :** 70819115362 **Question Type :** SA

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

An electromagnetic wave of frequency 5 GHz, is travelling in a medium whose relative electric permittivity and relative magnetic permeability both are 2. Its velocity in this medium is \_\_\_\_\_  $\times 10^7$  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 :** 29 **Question Id :** 70819115362 **Question Type :** SA

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

এটা মাধ্যম যাৰ পদাৰ্থৰ আপেক্ষিক বৈদ্যুতিক মাধ্যমাংক (electric permittivity) আৰু পদাৰ্থৰ আপেক্ষিক চৌম্বিক প্ৰৱেশ্যতা (magnetic permeability) দুয়োটাই 2, তাৰ মাজেদি এটা 5 GHz ৰ বিদ্যুৎ-চুম্বকীয় তৰংগই গতি কৰিছে। এই মাধ্যমত ইয়াৰ বেগ ক্ৰমে \_\_\_\_\_  $\times 10^7$  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 : 30 Question Id : 70819115363 Question Type : SA**

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

A common transistor radio set requires 12 V (D.C.) for its operation. The D.C. source is constructed by using a transformer and a rectifier circuit, which are operated at 220 V (A.C.) on standard domestic A.C. supply. The number of turns of secondary coil are 24, then the number of turns of primary are \_\_\_\_\_.

**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 : 70819115363 Question Type : SA**

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

এটা সাধাৰণ (common) ট্ৰেন্সিষ্টৰ বেডিঅ'ক কাৰ্যক্ষম কৰিবৰ বাবে 12 V প্ৰত্যক্ষ প্ৰৱাহৰ প্ৰয়োজন হয়। এটা ৰূপান্তৰক আৰু এটা সংদিশক বৰ্তনীৰ ব্যৱহাৰ কৰি, যিয়ে সাধাৰণ ঘৰত যোগান ধৰা 220 V ৰ পৰিবৰ্তী উৎসৰ (A.C. supply) সহায়ত কাম কৰে, প্ৰত্যক্ষ প্ৰৱাহৰ উৎসটো সজা হৈছে। যদি গৌণ কুণ্ডলীৰ পাকৰ সংখ্যা 24 হয়, তেন্তিয়া মুখ্য কুণ্ডলীত থকা পাকৰ সংখ্যা \_\_\_\_\_।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

## Chemistry Section A

Section Id :	708191564
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	708191844
Question Shuffling Allowed :	Yes

Question Number : 31 Question Id : 70819115364 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following are isostructural pairs ?

- A.  $\text{SO}_4^{2-}$  and  $\text{CrO}_4^{2-}$
- B.  $\text{SiCl}_4$  and  $\text{TiCl}_4$
- C.  $\text{NH}_3$  and  $\text{NO}_3^-$
- D.  $\text{BCl}_3$  and  $\text{BrCl}_3$

Options :

70819151241. A and B only

70819151242. A and C only

70819151243. B and C only

70819151244. C and D only

Question Number : 31 Question Id : 70819115364 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

তলত দিয়াবোৰৰ কোনটো সমগঠনতাৰ যোৰ ?

- A.  $\text{SO}_4^{2-}$  আৰু  $\text{CrO}_4^{2-}$
- B.  $\text{SiCl}_4$  আৰু  $\text{TiCl}_4$
- C.  $\text{NH}_3$  আৰু  $\text{NO}_3^-$
- D.  $\text{BCl}_3$  আৰু  $\text{BrCl}_3$

Options :

70819151241. A আৰু B মাত্ৰ

70819151242. A আৰু C মাত্ৰ

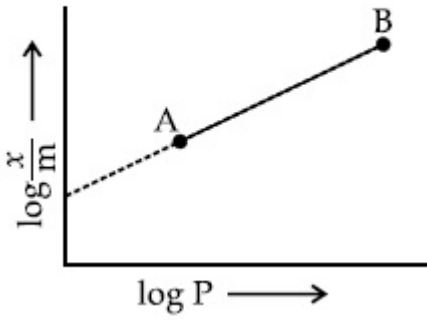
70819151243. B আৰু C মাত্ৰ

70819151244. C আৰু D মাত্ৰ

Question Number : 32 Question Id : 70819115365 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In Freundlich adsorption isotherm, slope of AB line is :



Options :

70819151245.  $n$  with  $(n, 0.1 \text{ to } 0.5)$

70819151246.  $\log n$  with  $(n > 1)$

70819151247.  $\log \frac{1}{n}$  with  $(n < 1)$

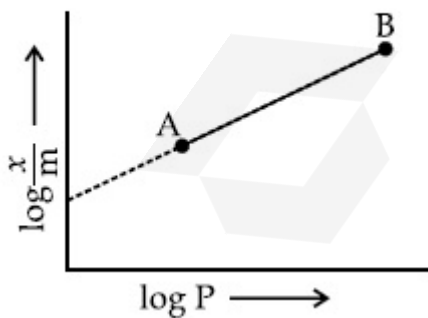
70819151248.  $\frac{1}{n}$  with  $\left(\frac{1}{n} = 0 \text{ to } 1\right)$

Question Number : 32 Question Id : 70819115365 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ফ্রেডলিকৰ সমতাপী অধিশোষণত, AB ৰেখাৰ নতি (slope) -



Options :

70819151245.  $n$  য'ত মান  $(0.1 - 0.5)$

70819151246.

$\log n$  য'ত  $n > 1$

70819151247.  $\log \frac{1}{n}$  য'ত  $n < 1$

70819151248.  $\frac{1}{n}$  য'ত  $\frac{1}{n} = 0$  ৰ পৰা 1 লৈ

**Question Number : 33 Question Id : 70819115366 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Consider the elements Mg, Al, S, P and Si, the correct increasing order of their first ionization enthalpy is :

**Options :**

70819151249. Al < Mg < Si < S < P

70819151250. Mg < Al < Si < P < S

70819151251. Mg < Al < Si < S < P

70819151252. Al < Mg < S < Si < P

**Question Number : 33 Question Id : 70819115366 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

মৌল Mg, Al, S, P আৰু Si ৰ ভিতৰত প্ৰথম আয়নীকৰণ এনথালপিৰ শুদ্ধ উৰ্দ্ধ ক্ৰমটো হ'ল -

**Options :**

70819151249. Al < Mg < Si < S < P

70819151250.  $Mg < Al < Si < P < S$

70819151251.  $Mg < Al < Si < S < P$

70819151252.  $Al < Mg < S < Si < P$

**Question Number : 34 Question Id : 70819115367 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Which of the following ore is concentrated using group 1 cyanide salt ?

**Options :**

70819151253. Calamine

70819151254. Malachite

70819151255. Siderite

70819151256. Sphalerite

**Question Number : 34 Question Id : 70819115367 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

বৰ্গ 1 ৰ ছায়েনাইড লবণ ব্যৱহাৰ কৰি তলৰ কোনটো আকৰ্ষিক গাঢ় কৰা হয় ?

**Options :**

70819151253. কেলামাইন

70819151254. মেলাকইট

ছিডেবাইট

70819151255.

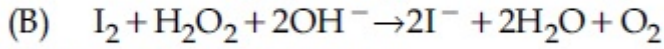
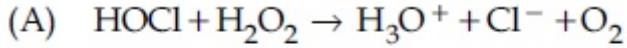
সফ'লেবাইট

70819151256.

Question Number : 35 Question Id : 70819115368 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



Choose the correct option.

Options :

70819151257.  $\text{H}_2\text{O}_2$  acts as oxidising agent in equations (A) and (B).

70819151258.  $\text{H}_2\text{O}_2$  acts as reducing agent in equations (A) and (B).

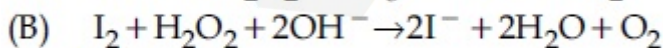
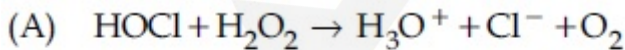
70819151259.  $\text{H}_2\text{O}_2$  act as oxidizing and reducing agent respectively in equations (A) and (B).

70819151260.  $\text{H}_2\text{O}_2$  acts as reducing and oxidising agent respectively in equations (A) and (B).

Question Number : 35 Question Id : 70819115368 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



শুদ্ধ বিকল্প চয়ন করা -

Options :

70819151257.  $\text{H}_2\text{O}_2$  এ সমীকরণ (A) আৰু (B) ত জাৰণ কৰ্তা হিচাবে কাম কৰে ।

70819151258.  $\text{H}_2\text{O}_2$  এ সমীকরণ (A) আৰু (B) ত বিজাৰণ কৰ্তা হিচাবে কাম কৰে।

70819151259.  $H_2O_2$  এ যথাক্রমে জারণ কৰ্তা আৰু বিজারণ কৰ্তা হিচাবে কাম কৰে সমীকৰণ (A) আৰু (B) ত।

70819151260.  $H_2O_2$  এ যথাক্রমে বিজারণ আৰু জারণ কৰ্তা হিচাবে কাম কৰে সমীকৰণ (A) আৰু (B) ৰ বাবে।

**Question Number : 36 Question Id : 70819115369 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

$Al_2O_3$  was leached with alkali to get X. The solution of X on passing of gas Y, forms Z. X, Y and Z respectively are :

**Options :**

70819151261.  $X = Na[Al(OH)_4]$ ,  $Y = SO_2$ ,  $Z = Al_2O_3$

70819151262.  $X = Al(OH)_3$ ,  $Y = SO_2$ ,  $Z = Al_2O_3 \cdot xH_2O$

70819151263.  $X = Al(OH)_3$ ,  $Y = CO_2$ ,  $Z = Al_2O_3$

70819151264.  $X = Na[Al(OH)_4]$ ,  $Y = CO_2$ ,  $Z = Al_2O_3 \cdot xH_2O$

**Question Number : 36 Question Id : 70819115369 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

$Al_2O_3$  ক্ষাৰৰ লগত নিষ্কালন কৰি পোৱা যায় X। X ৰ দ্ৰবৰ মাজেদি Y গেছ পাৰ হ'লে Z উৎপন্ন কৰে। X, Y আৰু Z হ'ল যথাক্রমে -

**Options :**

70819151261.  $X = Na[Al(OH)_4]$ ,  $Y = SO_2$ ,  $Z = Al_2O_3$

70819151262.  $X = Al(OH)_3$ ,  $Y = SO_2$ ,  $Z = Al_2O_3 \cdot xH_2O$

70819151263.  $X = \text{Al}(\text{OH})_3$ ,  $Y = \text{CO}_2$ ,  $Z = \text{Al}_2\text{O}_3$

70819151264.  $X = \text{Na}[\text{Al}(\text{OH})_4]$ ,  $Y = \text{CO}_2$ ,  $Z = \text{Al}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

**Question Number : 37 Question Id : 70819115370 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

The electrode potential of  $\text{M}^{2+}/\text{M}$  of 3d-series elements shows positive value for :

**Options :**

70819151265. Fe

70819151266. Co

70819151267. Zn

70819151268. Cu

**Question Number : 37 Question Id : 70819115370 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

3d-শ্রেণীৰ মৌল, যিয়ে  $\text{M}^{2+}/\text{M}$  তৰিৎদ্বাৰ বিভব ধনাত্মক মান দেখুৱায় -

**Options :**

70819151265. Fe

70819151266. Co

70819151267. Zn

70819151268. Cu

Question Number : 38 Question Id : 70819115371 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The major components in "Gun Metal" are :

Options :

70819151269. Cu, Sn and Zn

70819151270. Cu, Zn and Ni

70819151271. Cu, Ni and Fe

70819151272. Al, Cu, Mg and Mn

Question Number : 38 Question Id : 70819115371 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

“কামানী ধাতু” (Gun Metal) ৰ মূখ্য উপাদান হ'ল -

Options :

70819151269. Cu, Sn আৰু Zn

70819151270. Cu, Zn আৰু Ni

70819151271. Cu, Ni আৰু Fe

70819151272. Al, Cu, Mg আৰু Mn

Question Number : 39 Question Id : 70819115372 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The gas released during anaerobic degradation of vegetation may lead to :

Options :

70819151273. Acid rain

70819151274. Global warming and cancer

70819151275. Corrosion of metals

70819151276. Ozone hole

Question Number : 39 Question Id : 70819115372 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

অক্সিজেনৰ উপস্থিতিত বনস্পতিৰ অৱক্ষয়ত নিৰ্গত হোৱা গেছে অৰিহণা যোগায় -

Options :

70819151273. এছিড বৰষুণ

70819151274. গোলকীয় উত্তাপ বৃদ্ধি আৰু কৰ্কট ৰোগ

70819151275. ধাতুৰ ক্ষয়ীভৱন (Corrosion)

70819151276. অ'জন ছিদ্ৰ

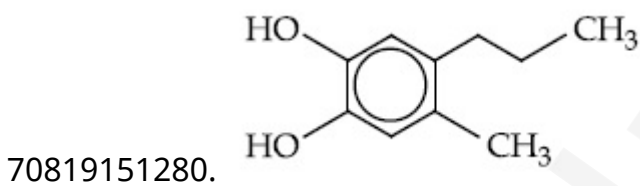
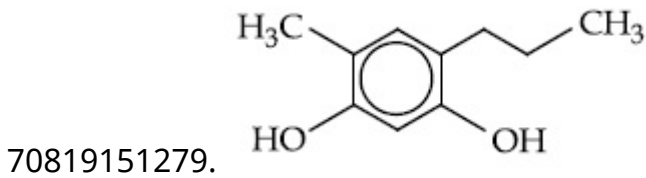
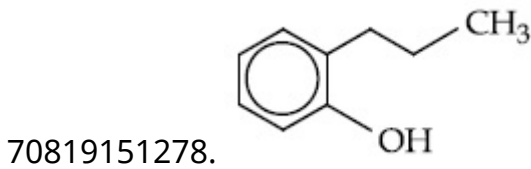
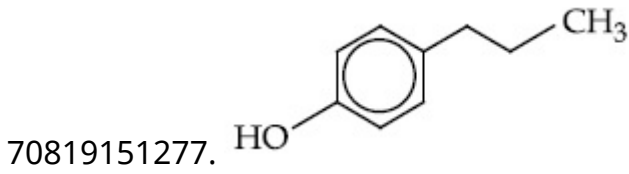
Question Number : 40 Question Id : 70819115373 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following compound gives pink colour on reaction with phthalic anhydride in conc.  $H_2SO_4$  followed by treatment with NaOH ?

Options :



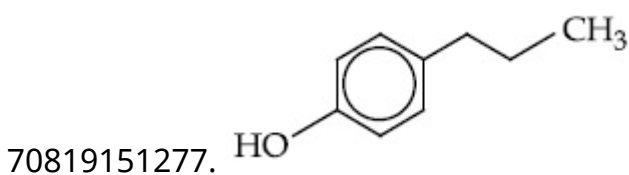
Question Number : 40 Question Id : 70819115373 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

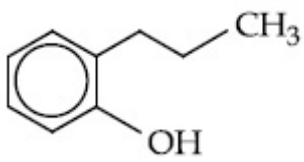
Correct Marks : 4 Wrong Marks : 1

প্লেলিক এনহাইড্রাইডক গাঢ়  $H_2SO_4$  ৰ লগত বিক্ৰিয়া কৰি তাৰ পাছত NaOH ৰ লগত মিহলি কৰিলে, নিম্নলিখিত কোনটো যৌগই গুলপীয়া বঙ দিয়ে ?

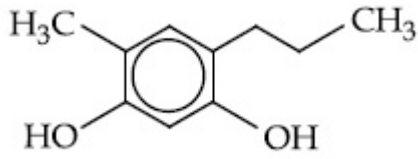
Options :



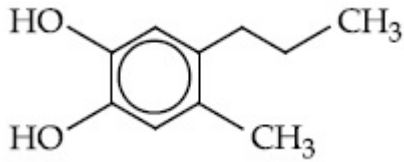
70819151278.



70819151279.



70819151280.

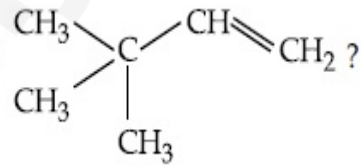


Question Number : 41 Question Id : 70819115374 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

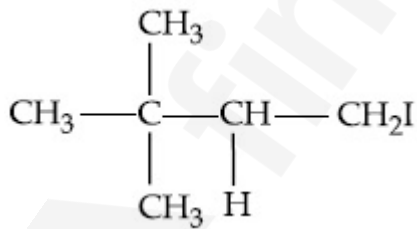
Correct Marks : 4 Wrong Marks : 1

What is the major product formed by HI on reaction with

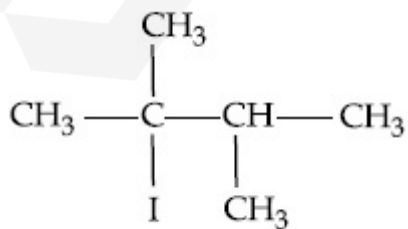


Options :

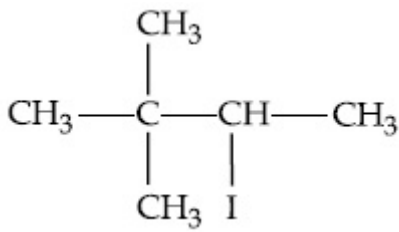
70819151281.



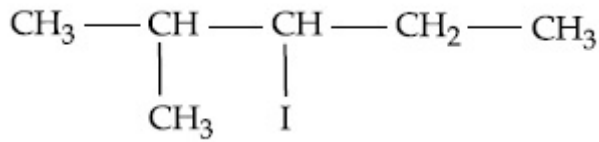
70819151282.



70819151283.



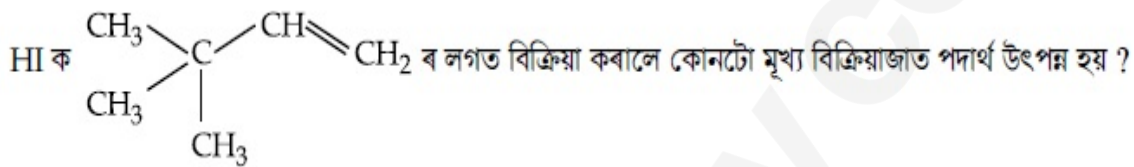
70819151284.



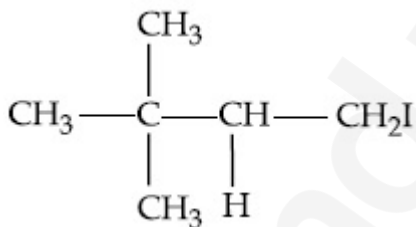
Question Number : 41 Question Id : 70819115374 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

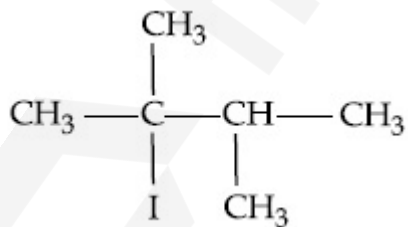
Correct Marks : 4 Wrong Marks : 1



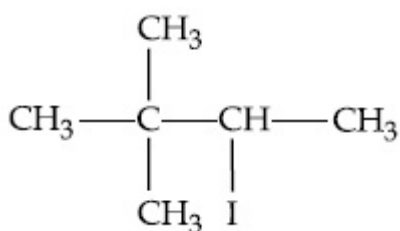
Options :



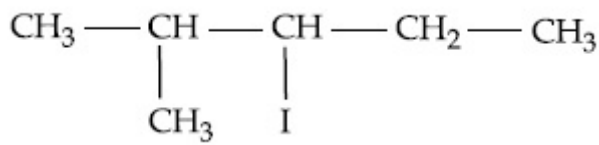
70819151281.



70819151282.



70819151283.



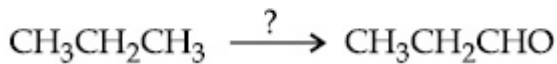
70819151284.

**Question Number : 42 Question Id : 7081915375 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Which of the following reagent is used for the following reaction ?



**Options :**

70819151285. Copper at high temperature and pressure

70819151286. Molybdenum oxide

70819151287. Manganese acetate

70819151288. Potassium permanganate

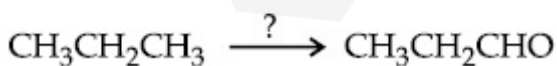
**Question Number : 42 Question Id : 7081915375 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

নিম্ন প্রদত্ত বিক্রিয়াত -

তলৰ কোনটো বিকাৰক ব্যৱহাৰ কৰা হয় ?



**Options :**

70819151285. ক'পাৰ উচ্চ উষ্ণতা আৰু চাপত

70819151286. ম'লিবডেনাম অক্সাইড

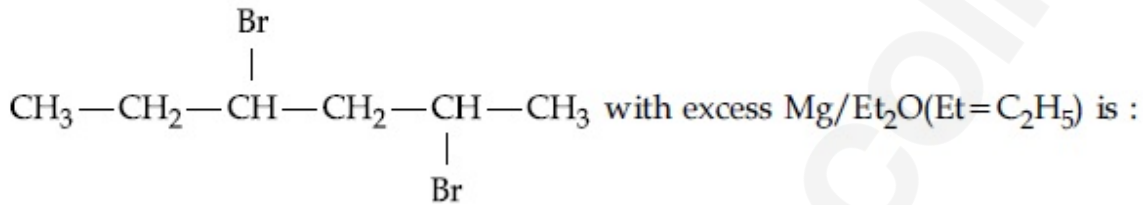
70819151287. মেসানিজ এছিটেট

70819151288. পটাছিয়াম পারম্যাঙ্গানেট

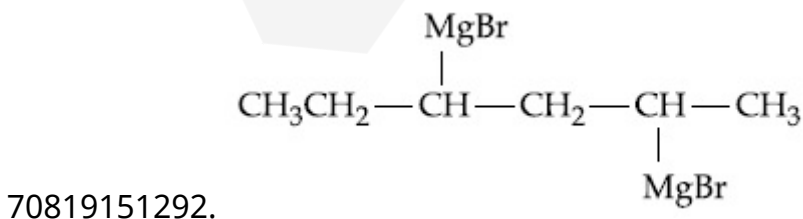
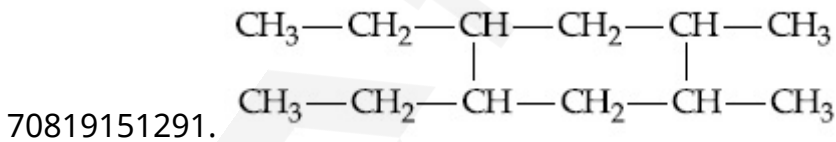
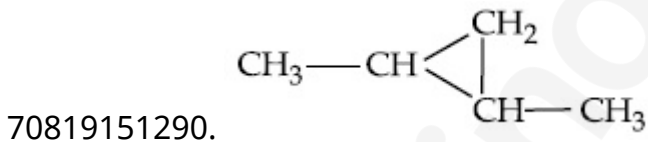
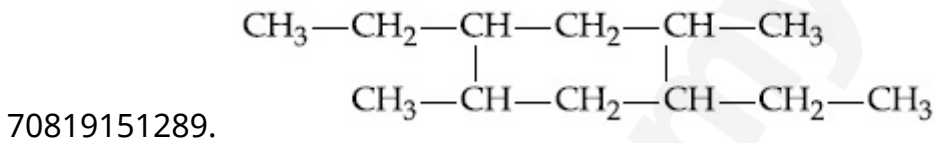
Question Number : 43 Question Id : 70819115376 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The product formed in the first step of the reaction of



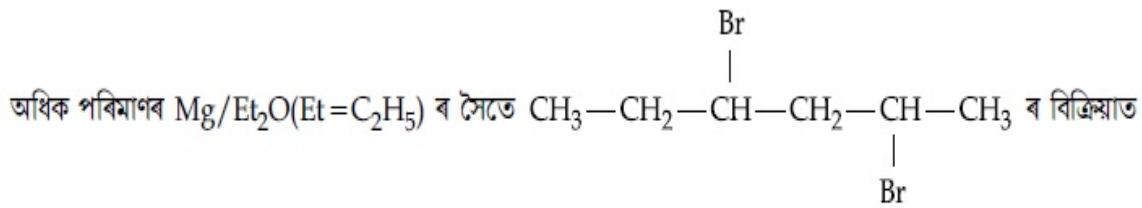
Options :



Question Number : 43 Question Id : 70819115376 Question Type : MCQ Option Shuffling : Yes

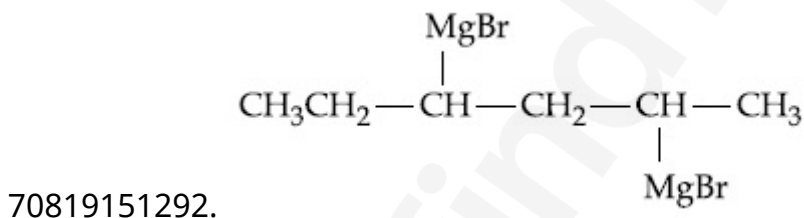
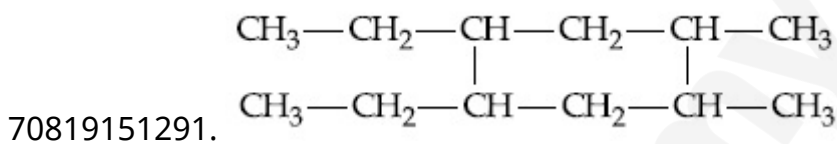
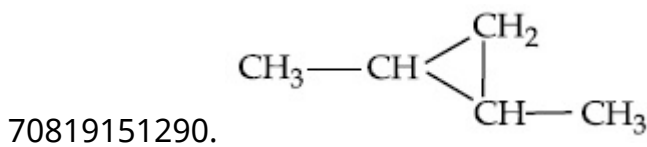
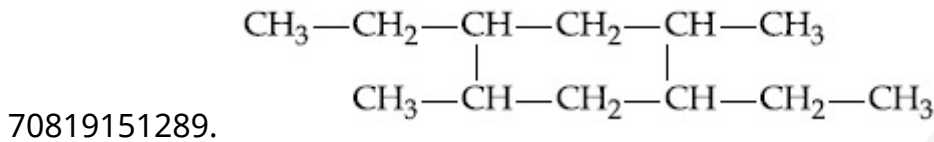
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



প্ৰথম খাপ (step) ত উৎপন্ন হোৱা পদাৰ্থটো হ'ল \_\_\_\_\_।

Options :

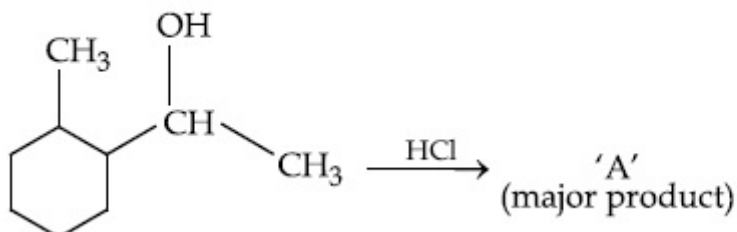


Question Number : 44 Question Id : 70819115377 Question Type : MCQ Option Shuffling : Yes

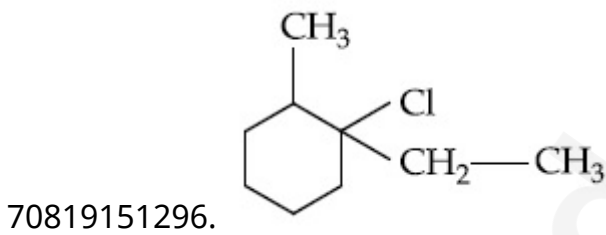
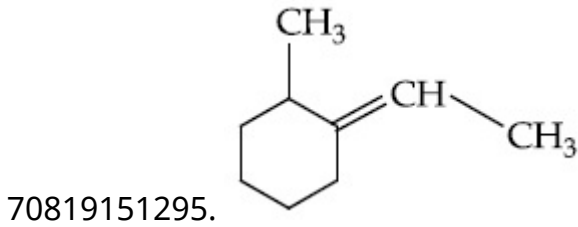
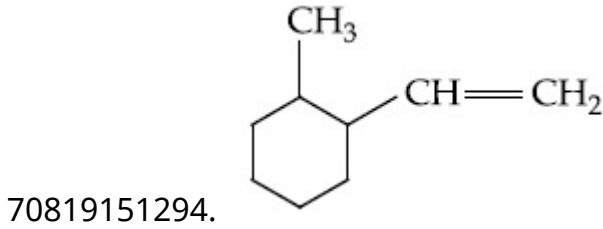
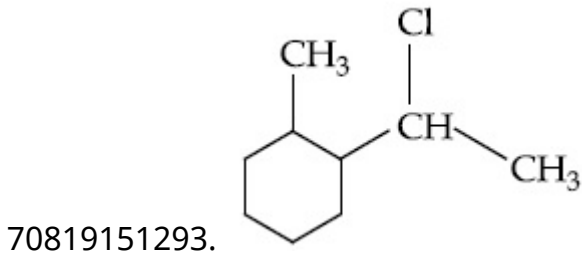
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

What is the final product (major) 'A' in the given reaction ?



Options :

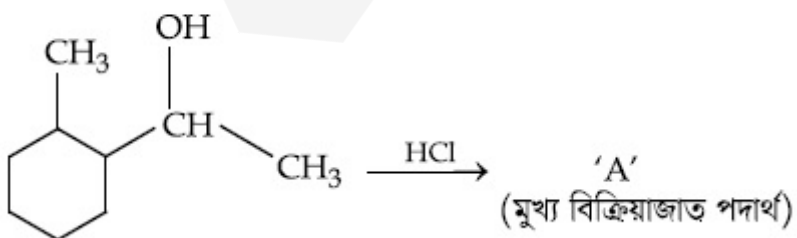


Question Number : 44 Question Id : 70819115377 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

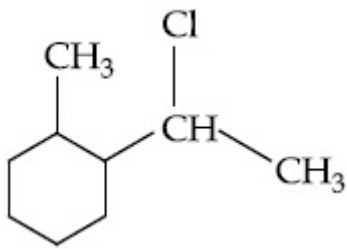
Correct Marks : 4 Wrong Marks : 1

নিম্নোক্ত বিক্রিয়াত অন্তিম বিক্রিয়াজাত পদার্থ (মুখ্য) কি ?

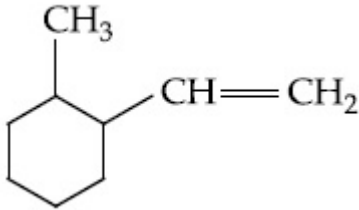


Options :

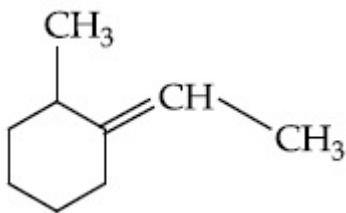
70819151293.



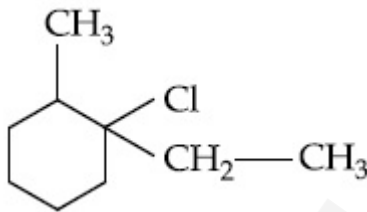
70819151294.



70819151295.



70819151296.

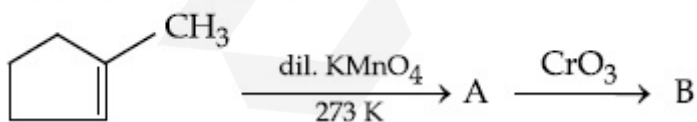


**Question Number : 45 Question Id : 70819115378 Question Type : MCQ Option Shuffling : Yes**

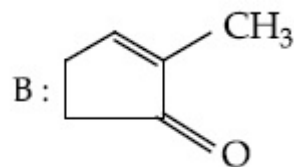
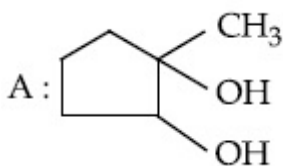
**Is Question Mandatory : No**

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

Identify products A and B.

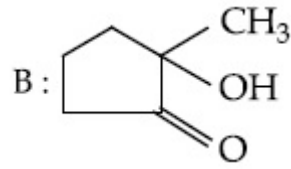
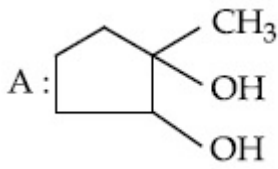


**Options :**

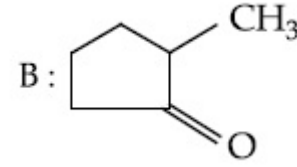
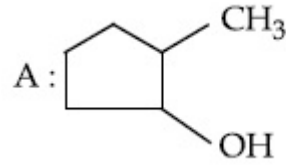


70819151297.

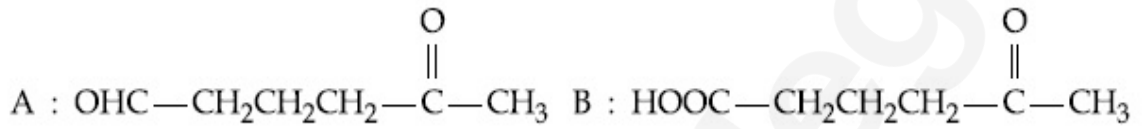
70819151298.



70819151299.



70819151300.

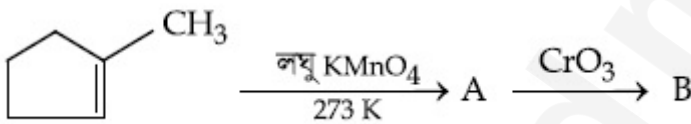


Question Number : 45 Question Id : 70819115378 Question Type : MCQ Option Shuffling : Yes

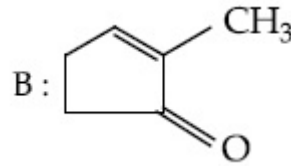
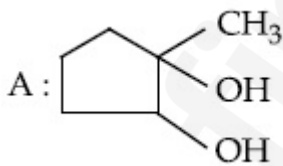
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

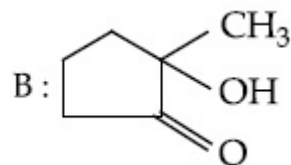
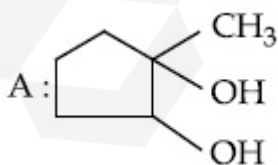
বিক্রিয়াজাত পদার্থ A আৰু B চিনাক্ত কৰা -



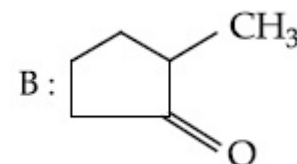
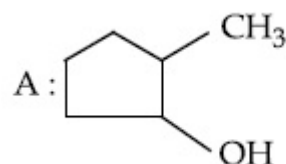
Options :



70819151297.

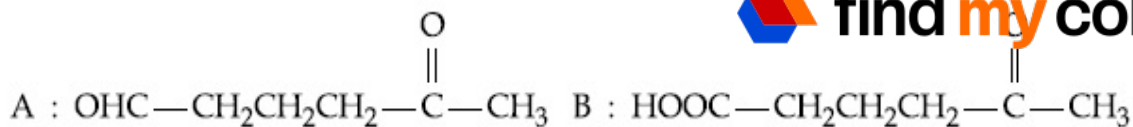


70819151298.



70819151299.

70819151300.

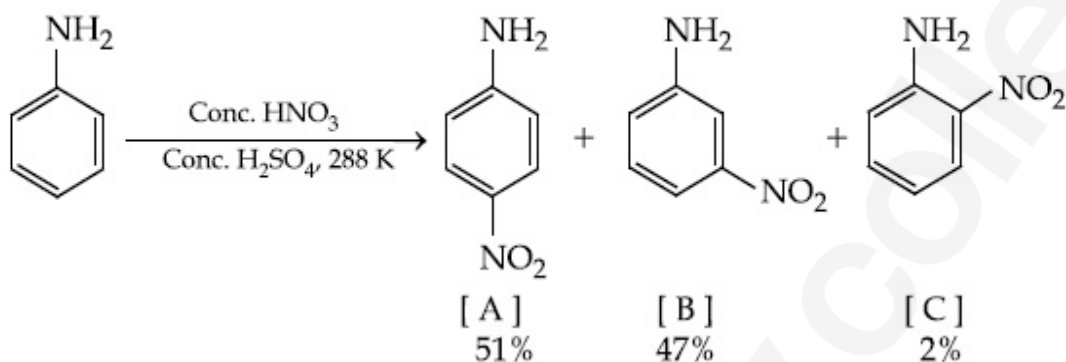


Question Number : 46 Question Id : 70819115379 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In the following reaction the reason why *meta*-nitro product also formed is :



Options :

70819151301.  $-\text{NH}_2$  group is highly *meta*-directive

70819151302.  $-\text{NO}_2$  substitution always takes place at *meta*-position

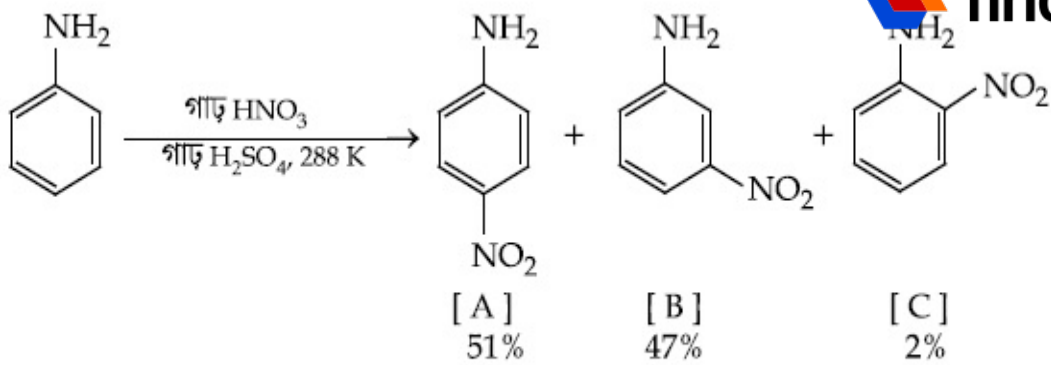
70819151303. Formation of anilinium ion

70819151304. low temperature

Question Number : 46 Question Id : 70819115379 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



উপৰোক্ত বিক্রিয়াত, মেটা-নাইট্র বিক্রিয়াজাত পদার্থ ও উৎপন্ন হোৱাৰ কাৰণ -

Options :

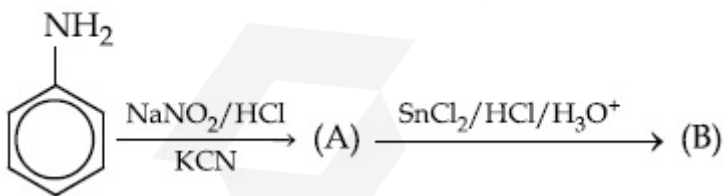
70819151301. - NH<sub>2</sub> সমূহ অতি বেছি মেটা নির্দেশক
70819151302. - NO<sub>2</sub> প্রতিস্থাপন সদায় মেটা ব স্থানত হয়
70819151303. এনিলিনিয়াম আয়নৰ সৃষ্টি
70819151304. নিম্ন উষ্ণতা

Question Number : 47 Question Id : 70819115380 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

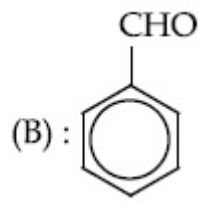
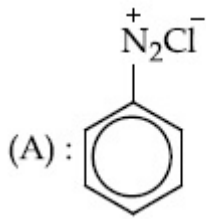
'A' and 'B' in the following reactions are :



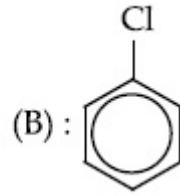
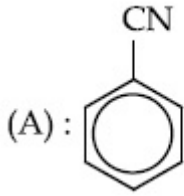
Options :



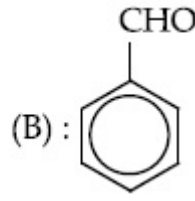
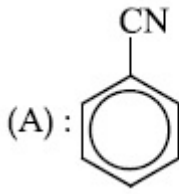
70819151305.



70819151306.



70819151307.



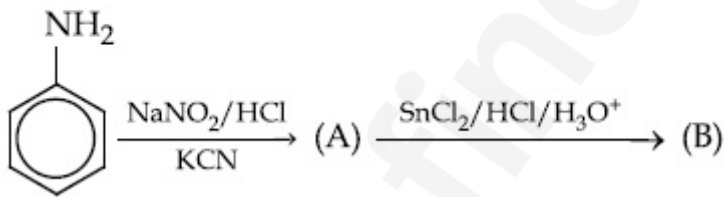
70819151308.

Question Number : 47 Question Id : 70819115380 Question Type : MCQ Option Shuffling : Yes

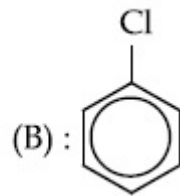
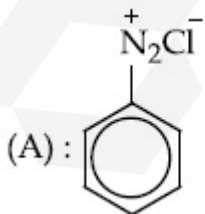
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

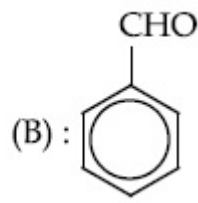
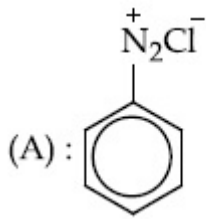
নিম্নলিখিত বিক্রিয়াত 'A' আৰু 'B' হ'ল -



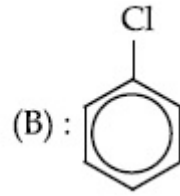
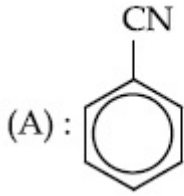
Options :



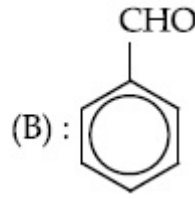
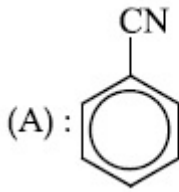
70819151305.



70819151306.



70819151307.



70819151308.

**Question Number : 48 Question Id : 70819115381 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

Match List I with List II.

List I (Monomer Unit)	List II (Polymer)
(a) Caprolactum	(i) Natural rubber
(b) 2-Chloro-1,3-butadiene	(ii) Buna-N
(c) Isoprene	(iii) Nylon 6
(d) Acrylonitrile	(iv) Neoprene

Choose the correct answer from the options given below :

**Options :**

70819151309. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819151310. (a) → (iv), (b) → (iii), (c) → (ii), (d) → (i)

70819151311. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819151312. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

Question Number : 48 Question Id : 70819115381 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

তালিকা - II ৰ সৈতে তালিকা I ক মিলোৱা -

তালিকা - I	তালিকা - II
একযোগী (ম'ন'মাৰ একক)	(বহুযোগী)
(a) কেপ্ৰ'লেকটাম	(i) প্ৰাকৃতিক ববৰ
(b) 2-ক্লোৰো-1,3-বিউটাডাইন	(ii) বুনা-এন
(c) আইছ'প্ৰিন	(iii) নাইলন 6
(d) এক্ৰাইল'নাইট্ৰাইল	(iv) নিউপ্ৰিন

নিম্নলিখিত বিকল্পৰপৰা শুদ্ধ উত্তৰ চয়ন কৰা -

Options :

70819151309. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819151310. (a) → (iv), (b) → (iii), (c) → (ii), (d) → (i)

70819151311. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819151312. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

Question Number : 49 Question Id : 70819115382 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Out of the following, which type of interaction is responsible for the stabilisation of  $\alpha$ -helix structure of proteins ?

Options :

70819151313. vander Waals forces

70819151314. Covalent bonding

70819151315. Ionic bonding

70819151316. Hydrogen bonding

**Question Number : 49 Question Id : 70819115382 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

প্ৰ'টিনৰ  $\alpha$ -হেলিক্স গঠনৰ সুস্থিৰতাৰ বাবে নিম্নলিখিতৰ ভিতৰত কোনটো পৰস্পৰ ক্ৰিয়া দয়ী ?

**Options :**

70819151313. ভেন ডাৰ বালছ্ বল

70819151314. সহযোজী বান্ধনি

70819151315. আয়নীয় বান্ধনি

70819151316. হাইড্ৰজেন বান্ধনি

**Question Number : 50 Question Id : 70819115383 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Given below are two statements :

**Statement I :** Colourless cupric metaborate is reduced to cuprous metaborate in a luminous flame.

**Statement II :** Cuprous metaborate is obtained by heating boric anhydride and copper sulphate in a non-luminous flame.

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

**Options :**

70819151317. Both Statement I and Statement II are true

70819151318. Both Statement I and Statement II are false

70819151319. Statement I is true but Statement II is false

70819151320. Statement I is false but Statement II is true

Question Number : 50 Question Id : 70819115383 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

তলত দুটা উক্তি দিয়া আছে -

উক্তি I: উজ্জ্বল জ্যোতিত বংবিহীন কিউপ্ৰিক মেটাৰ'ৰেট বিজাৰণ হয় কিউপ্ৰাছ মেটাৰ'ৰেট লৈ।

উক্তি II: অনুজ্জ্বল জ্যোতিত ব'ৰিক এনহাইড্ৰাইড আৰু ক'পাৰ ছালফেটক গৰম কৰিলে কিউপ্ৰাছ মেটাৰ'ৰেট উৎপন্ন হয়।

উপৰোক্ত উক্তিৰ আলমত, নিম্নলিখিত বিকল্পবপৰা শুদ্ধ উত্তৰ চয়ন কৰা -

Options :

70819151317. উক্তি I আৰু উক্তি II দুয়োটা সত্য

70819151318. উক্তি I আৰু উক্তি II দুয়োটা অসত্য

70819151319. উক্তি I শুদ্ধ কিন্তু উক্তি II অসত্য

70819151320. উক্তি I অশুদ্ধ কিন্তু উক্তি II সত্য

## Chemistry Section B

Section Id : 708191565

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 :

708191845

Question Shuffling Allowed :

Yes

Question Number : 51 Question Id : 70819115384 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

4.5 g of compound A (MW=90) was used to make 250 mL of its aqueous solution. The molarity of the solution in M is  $x \times 10^{-1}$ . The value of  $x$  is \_\_\_\_\_. (Rounded off to the nearest integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 51 Question Id : 70819115384 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

যৌগ A (আ: ভৰ : 90), 250 mL পানীত 4.5 g মিহলোৱা হ'ল। দ্ৰবটোৰ ম'লাৰিটি M হ'ল  $x \times 10^{-1}$ ।  $x$  ৰ মান হ'ল \_\_\_\_\_. (উত্তৰ নিকটতম অখণ্ড সংখ্যা)

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 : 70819115385 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The coordination number of an atom in a body-centered cubic structure is \_\_\_\_\_.  
[Assume that the lattice is made up of atoms.]

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 : 70819115385 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

এটা দেহকেন্দ্রিক ঘনকত এটা পৰমাণুৰ সমন্বয়ী সংখ্যা হ'ল \_\_\_\_\_।  
[ ধৰি লোৱা যে লেটিছটো পৰমাণুৰে গঠিত হৈছে ]

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 : 70819115386 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A proton and a  $\text{Li}^{3+}$  nucleus are accelerated by the same potential. If  $\lambda_{\text{Li}}$  and  $\lambda_{\text{p}}$  denote the de Broglie wavelengths of  $\text{Li}^{3+}$  and proton respectively, then the value of  $\frac{\lambda_{\text{Li}}}{\lambda_{\text{p}}}$  is  $x \times 10^{-1}$ .

The value of  $x$  is \_\_\_\_\_. (Rounded off to the nearest integer)  
 [Mass of  $\text{Li}^{3+}$  = 8.3 mass of proton]

**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 :** 70819115386 **Question Type :** SA

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

এটা প্ৰ'টন আৰু এটা  $\text{Li}^{3+}$  নিউক্লিয়াছ একে বিভবেৰে ত্বৰিত কৰা হৈছে। যদি  $\lambda_{\text{Li}}$  আৰু  $\lambda_{\text{p}}$  এ যথাক্ৰমে  $\text{Li}^{3+}$  আৰু প্ৰ'টনৰ ডি-ব্ৰগলি তৰংগদৈৰ্ঘ্য সূচায়, তেন্তে  $\frac{\lambda_{\text{Li}}}{\lambda_{\text{p}}}$  ৰ মান হ'ল  $x \times 10^{-1}$ ।  $x$  ৰ মান হ'ল \_\_\_\_\_। (উত্তৰ

নিকটতম পূৰ্ণ সংখ্যাত)

[ $\text{Li}^{3+}$  ৰ ভৰ =  $8.3 \times$  প্ৰ'টনৰ ভৰ]

**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 :** 70819115387 **Question Type :** SA

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

For the reaction  $A_{(g)} \rightarrow B_{(g)}$ , the value of the equilibrium constant at 300 K and 1 atm is equal to 100.0. The value of  $\Delta_r G$  for the reaction at 300 K and 1 atm in  $\text{J mol}^{-1}$  is  $-xR$ , where  $x$  is \_\_\_\_\_ . (Rounded off to the nearest integer)

[ $R=8.31 \text{ J mol}^{-1}\text{K}^{-1}$  and  $\ln 10=2.3$ ]

**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 :** 70819115387 **Question Type :** SA

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

$A_{(g)} \rightarrow B_{(g)}$  বিক্রিয়াটোৰ বাবে, 300 K আৰু 1 atm চাপত সাম্য ধ্ৰুৱকৰ মান 100.0। বিক্রিয়াটোৰ  $\Delta_r G$  ৰ মান, 300 K আৰু 1 atm ত হ'ল  $-xR$  ( $\text{J mol}^{-1}$  ত)। য'ত  $x$  হ'ল \_\_\_\_\_ । (উত্তৰ নিকটতম পূৰ্ণ সংখ্যাত)

[ $R=8.31 \text{ J mol}^{-1}\text{K}^{-1}$  আৰু  $\ln 10=2.3$ ]

**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 :** 70819115388 **Question Type :** SA

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

When 9.45 g of  $\text{ClCH}_2\text{COOH}$  is added to 500 mL of water, its freezing point drops by  $0.5^\circ\text{C}$ . The dissociation constant of  $\text{ClCH}_2\text{COOH}$  is  $x \times 10^{-3}$ . The value of  $x$  is \_\_\_\_\_ . (Rounded off to the nearest integer)

[ $K_f(\text{H}_2\text{O})=1.86 \text{ K kg mol}^{-1}$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 55 **Question Id :** 70819115388 **Question Type :** SA

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

যেতিয়া 500 mL পানীত 9.45 g  $\text{ClCH}_2\text{COOH}$  যোগ কৰা হয়, তেতিয়া ইয়াৰ হিমাংক নামি আছে  $0.5^\circ\text{C}$ ।  $\text{ClCH}_2\text{COOH}$  ৰ বিয়োজন ধ্ৰুৱক হ'ল  $x \times 10^{-3}$ ।  $x$  ৰ মান হ'ল \_\_\_\_\_। (নিকটতম পূৰ্ণ সংখ্যাত)।  
[ $K_f(\text{H}_2\text{O}) = 1.86 \text{ K kg mol}^{-1}$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 56 **Question Id :** 70819115389 **Question Type :** SA

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

At 1990 K and 1 atm pressure, there are equal number of  $\text{Cl}_2$  molecules and Cl atoms in the reaction mixture. The value of  $K_p$  for the reaction  $\text{Cl}_{2(g)} \rightleftharpoons 2\text{Cl}_{(g)}$  under the above conditions is  $x \times 10^{-1}$ . The value of  $x$  is \_\_\_\_\_. (Rounded off to the nearest integer)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

**Question Number : 56 Question Id : 70819115389 Question Type : SA**

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

1990 K আৰু 1 atm চাপত, এটা বিক্ৰিয়াৰ মিশ্ৰণত সমান সংখ্যাৰ  $\text{Cl}_2$  অণু আৰু  $\text{Cl}$  পৰমাণু আছে। উক্ত অৱস্থাত বিক্ৰিয়া  $\text{Cl}_{2(g)} \rightleftharpoons 2\text{Cl}_{(g)}$  ৰ বাবে  $K_p$  ৰ মান হ'ল  $x \times 10^{-1}$ ।  $x$  ৰ মান হ'ল \_\_\_\_\_। (উত্তৰ পূৰ্ণ সংখ্যাত)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

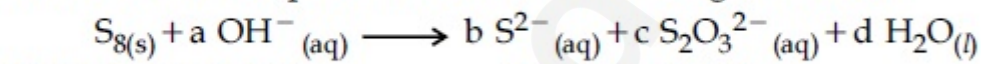
**Possible Answers :**

5 to 5.001

**Question Number : 57 Question Id : 70819115390 Question Type : SA**

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

The reaction of sulphur in alkaline medium is given below :



The values of 'a' is \_\_\_\_\_. (Integer answer)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

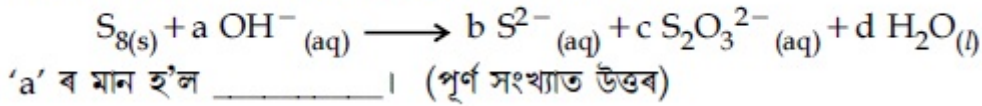
**Possible Answers :**

5 to 5.001

**Question Number : 57 Question Id : 70819115390 Question Type : SA**

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

ক্ষাৰকীয় মাধ্যমত ছালফাৰৰ বিক্ৰিয়াটো তলত দিয়া ধৰণৰ -



**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 : 70819115391 Question Type : SA**

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

Gaseous cyclobutene isomerizes to butadiene in a first order process which has a 'k' value of  $3.3 \times 10^{-4} s^{-1}$  at  $153^{\circ}C$ . The time in minutes it takes for the isomerization to proceed 40% to completion at this temperature is \_\_\_\_\_. (Rounded off to the nearest integer)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 58 Question Id : 70819115391 Question Type : SA**

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

গেছীয় ছাইক্ল'বিউটেন সমযোগীকৰণেৰে বিউটাডাইইনলৈ ৰূপান্তৰ হয় এটা প্ৰথম ক্ৰমৰ বিক্ৰিয়াৰ দ্বাৰা, য'ত 'k' ৰ মান  $153^{\circ}C$  ত  $3.3 \times 10^{-4} s^{-1}$ । সমযোগীকৰণৰ বাবে 40% সমাপ্ত হোৱাৰ কাৰণে আগবাঢ়ি যোৱাত এই উষ্ণতাত সময় লয় \_\_\_\_\_ (মিনিটত)। (নিকটবৰ্তী পূৰ্ণ সংখ্যাত উত্তৰ)

**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 : 70819115392 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Number of amphoteric compounds among the following is \_\_\_\_\_.

(A) BeO (B) BaO (C) Be(OH)<sub>2</sub> (D) Sr(OH)<sub>2</sub>

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 : 70819115392 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

তলত দিয়াবোৰত উভয়ধৰ্মী যৌগৰ সংখ্যা হ'ল \_\_\_\_\_।

(A) BeO (B) BaO (C) Be(OH)<sub>2</sub> (D) Sr(OH)<sub>2</sub>

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

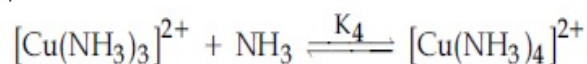
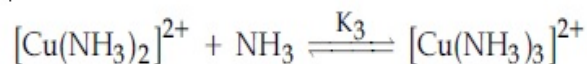
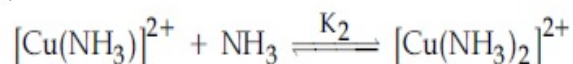
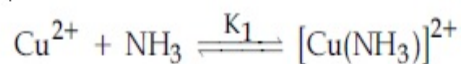
Possible Answers :

5 to 5.001

Question Number : 60 Question Id : 70819115393 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The stepwise formation of  $[\text{Cu}(\text{NH}_3)_4]^{2+}$  is given below :



The value of stability constants  $K_1$ ,  $K_2$ ,  $K_3$  and  $K_4$  are  $10^4$ ,  $1.58 \times 10^3$ ,  $5 \times 10^2$  and  $10^2$  respectively. The overall equilibrium constants for dissociation of  $[\text{Cu}(\text{NH}_3)_4]^{2+}$  is  $x \times 10^{-12}$ . The value of  $x$  is \_\_\_\_\_. (Rounded off to the nearest integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

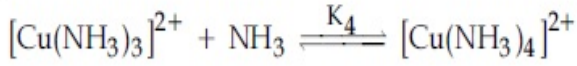
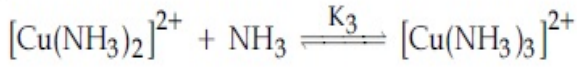
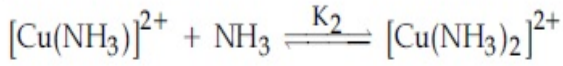
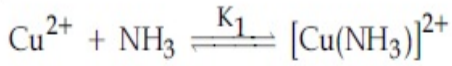
Possible Answers :

5 to 5.001

Question Number : 60 Question Id : 70819115393 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$[\text{Cu}(\text{NH}_3)_4]^{2+}$  ৰ বিভিন্ন খাপত হোৱা গঠন তলত দিয়া হৈছে :



সুস্থিৰ ধ্ৰুৱক  $K_1$ ,  $K_2$ ,  $K_3$  আৰু  $K_4$  ৰ মান হ'ল  $[\text{Cu}(\text{NH}_3)_4]^{2+}$   $10^4$ ,  $1.58 \times 10^3$ ,  $5 \times 10^2$  আৰু  $10^2$  যথাক্ৰমে।

$[\text{Cu}(\text{NH}_3)_4]^{2+}$  ৰ বিয়োজনৰ বাবে মূল সাম্য ধ্ৰুৱক হ'ল  $x \times 10^{-12}$ ।  $x$  ৰ মান হ'ল \_\_\_\_\_।

(নিকটতম পূৰ্ণ সংখ্যালৈ নিৰা)

**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

<b>Section Id :</b>	708191566
<b>Section Number :</b>	5
<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>	708191846

Question Shuffling Allowed :

Yes

Question Number : 61 Question Id : 70819115394 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let  $f: \mathbb{R} \rightarrow \mathbb{R}$  be defined as  $f(x) = 2x - 1$  and  $g: \mathbb{R} - \{1\} \rightarrow \mathbb{R}$  be defined as  $g(x) = \frac{x - \frac{1}{2}}{x - 1}$ .

Then the composition function  $f(g(x))$  is :

Options :

70819151331. one-one but not onto

70819151332. onto but not one-one

70819151333. neither one-one nor onto

70819151334. both one-one and onto

Question Number : 61 Question Id : 70819115394 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ধরা হ'ল  $f: \mathbb{R} \rightarrow \mathbb{R}$  যাতে  $g: \mathbb{R} - \{1\} \rightarrow \mathbb{R}$  যাতে  $f(x) = 2x - 1$ , আৰু  $g(x) = \frac{x - \frac{1}{2}}{x - 1}$ , দুটা ফলন। তেন্তে

$f(g(x))$  ফলনটো :

Options :

70819151331. একৈকী কিন্তু আচ্ছাদক নহয়।

70819151332. আচ্ছাদক কিন্তু একৈকী নহয়।

70819151333. একৈকী নহয়, আচ্ছাদকও নহয়।

**Question Number : 62 Question Id : 70819115395 Question Type : MCQ Option Shuffling : Yes**  
**Is Question Mandatory : No**

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

Let p and q be two positive numbers such that  $p + q = 2$  and  $p^4 + q^4 = 272$ . Then p and q are roots of the equation :

**Options :**

70819151335.  $x^2 - 2x + 136 = 0$

70819151336.  $x^2 - 2x + 16 = 0$

70819151337.  $x^2 - 2x + 8 = 0$

70819151338.  $x^2 - 2x + 2 = 0$

**Question Number : 62 Question Id : 70819115395 Question Type : MCQ Option Shuffling : Yes**  
**Is Question Mandatory : No**

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

ধৰা হ'ল p আৰু q দুটা ধনাত্মক সংখ্যা যত,  $p + q = 2$  আৰু  $p^4 + q^4 = 272$ । তেন্তে p আৰু q মূল হৈ থকা সমীকৰণটো হ'ব :

**Options :**

70819151335.  $x^2 - 2x + 136 = 0$

70819151336.  $x^2 - 2x + 16 = 0$

70819151337.  $x^2 - 2x + 8 = 0$

70819151338.  $x^2 - 2x + 2 = 0$

Question Number : 63 Question Id : 70819115396 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The system of linear equations

$$3x - 2y - kz = 10$$

$$2x - 4y - 2z = 6$$

$$x + 2y - z = 5m$$

is inconsistent if :

Options :

70819151339.  $k \neq 3, m \neq \frac{4}{5}$

70819151340.  $k = 3, m = \frac{4}{5}$

70819151341.  $k = 3, m \neq \frac{4}{5}$

70819151342.  $k \neq 3, m \in \mathbb{R}$

Question Number : 63 Question Id : 70819115396 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$3x - 2y - kz = 10$$

$$2x - 4y - 2z = 6$$

$x + 2y - z = 5m$ , সমীকরণ প্রণালীটো অসংগত হ'ব যদিহে :

Options :

70819151339.  $k \neq 3, m \neq \frac{4}{5}$

70819151340.  $k = 3, m = \frac{4}{5}$

70819151341.  $k = 3, m \neq \frac{4}{5}$

70819151342.  $k \neq 3, m \in \mathbb{R}$

**Question Number : 64 Question Id : 70819115397 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

The value of

$$-{}^{15}C_1 + 2.{}^{15}C_2 - 3.{}^{15}C_3 + \dots - 15.{}^{15}C_{15} + {}^{14}C_1 + {}^{14}C_3 + {}^{14}C_5 + \dots + {}^{14}C_{11} \text{ is :}$$

**Options :**

70819151343.  $2^{16} - 1$

70819151344.  $2^{13} - 14$

70819151345.  $2^{13} - 13$

70819151346.  $2^{14}$

**Question Number : 64 Question Id : 70819115397 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

$-{}^{15}C_1 + 2.{}^{15}C_2 - 3.{}^{15}C_3 + \dots - 15.{}^{15}C_{15} + {}^{14}C_1 + {}^{14}C_3 + {}^{14}C_5 + \dots + {}^{14}C_{11}$  ব মান হ'ব :

**Options :**

70819151343.  $2^{16} - 1$

70819151344.  $2^{13} - 14$

70819151345.  $2^{13} - 13$

70819151346.  $2^{14}$

**Question Number : 65 Question Id : 70819115398 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

If  $e^{(\cos^2 x + \cos^4 x + \cos^6 x + \dots) \log_e 2}$  satisfies the equation  $t^2 - 9t + 8 = 0$ , then the value of

$\frac{2 \sin x}{\sin x + \sqrt{3} \cos x} \left( 0 < x < \frac{\pi}{2} \right)$  is:

**Options :**

70819151347.  $\frac{1}{2}$

70819151348.  $\sqrt{3}$

70819151349.  $\frac{3}{2}$

70819151350.  $2\sqrt{3}$

**Question Number : 65 Question Id : 70819115398 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

যদি  $e^{(\cos^2 x + \cos^4 x + \cos^6 x + \dots) \log_e 2}$  য়ে  $t^2 - 9t + 8 = 0$  সমীকরণক সিদ্ধ করে, তেন্তে  $\frac{2 \sin x}{\sin x + \sqrt{3} \cos x}$  ( $0 < x < \frac{\pi}{2}$ )

ব মান হ'ব :

**Options :**

70819151347.  $\frac{1}{2}$

70819151348.  $\sqrt{3}$

70819151349.  $\frac{3}{2}$

70819151350.  $2\sqrt{3}$

**Question Number : 66 Question Id : 70819115399 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

$\lim_{x \rightarrow 0} \frac{\int_0^{x^2} (\sin \sqrt{t}) dt}{x^3}$  is equal to :

**Options :**

70819151351.  $\frac{2}{3}$

70819151352.  $\frac{3}{2}$

70819151353.  $\frac{1}{15}$

70819151354. 0

Question Number : 66 Question Id : 70819115399 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$\lim_{x \rightarrow 0} \frac{\int_0^{x^2} (\sin \sqrt{t}) dt}{x^3} \text{ সমান হবে :}$$

Options :

70819151351.  $\frac{2}{3}$

70819151352.  $\frac{3}{2}$

70819151353.  $\frac{1}{15}$

70819151354. 0

Question Number : 67 Question Id : 70819115400 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The function  $f(x) = \frac{4x^3 - 3x^2}{6} - 2 \sin x + (2x - 1) \cos x$  :

Options :

70819151355. increases in  $\left[\frac{1}{2}, \infty\right)$

70819151356. decreases in  $\left[\frac{1}{2}, \infty\right)$

70819151357.

increases in  $\left(-\infty, \frac{1}{2}\right]$

70819151358. decreases in  $\left(-\infty, \frac{1}{2}\right]$

Question Number : 67 Question Id : 70819115400 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$f(x) = \frac{4x^3 - 3x^2}{6} - 2 \sin x + (2x - 1) \cos x$  ফলনটো :

Options :

70819151355.  $\left[\frac{1}{2}, \infty\right)$  অন্তর্ভুক্ত বর্ধমান।

70819151356.  $\left[\frac{1}{2}, \infty\right)$  অন্তর্ভুক্ত হ্রাসমান।

70819151357.  $\left(-\infty, \frac{1}{2}\right]$  অন্তর্ভুক্ত বর্ধমান।

70819151358.  $\left(-\infty, \frac{1}{2}\right]$  অন্তর্ভুক্ত হ্রাসমান।

Question Number : 68 Question Id : 70819115401 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A scientific committee is to be formed from 6 Indians and 8 foreigners, which includes at least 2 Indians and double the number of foreigners as Indians. Then the number of ways, the committee can be formed, is :

Options :

70819151359. 1050

70819151360. 1625

70819151361. 560

70819151362. 575

Question Number : 68 Question Id : 70819115401 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

6 জন ভাৰতীয় আৰু 8 জন বিদেশী বিজ্ঞানীলৈ এখন বৈজ্ঞানিক সমিতি গঠন কৰিব লাগে য'ত কমেও 2 জন ভাৰতীয় বিজ্ঞানী থাকে আৰু ভাৰতীয় বিজ্ঞানীৰ দুগুণ সংখ্যক বিদেশী বিজ্ঞানী থাকে। তেন্তে সমিতিখন গঠন কৰাৰ উপায়ৰ সংখ্যা হ'ব :

Options :

70819151359. 1050

70819151360. 1625

70819151361. 560

70819151362. 575

Question Number : 69 Question Id : 70819115402 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If  $f: \mathbb{R} \rightarrow \mathbb{R}$  is a function defined by  $f(x) = [x - 1] \cos\left(\frac{2x - 1}{2}\right)\pi$ , where  $[ \cdot ]$  denotes the greatest

integer function, then  $f$  is :

Options :

70819151363. discontinuous only at  $x=1$

70819151364. discontinuous at all integral values of  $x$  except at  $x=1$

70819151365. continuous only at  $x=1$

70819151366. continuous for every real  $x$

Question Number : 69 Question Id : 70819115402 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

যদি  $f: \mathbb{R} \rightarrow \mathbb{R}$  এটা ফলন যাতে  $f(x) = [x-1] \cos\left(\frac{2x-1}{2}\right)\pi$ , য'ত  $[\cdot]$  য়ে গৰিষ্ঠ অখণ্ড ফলন বুজাইছে। তেন্তে

$f$  ফলনটো :

Options :

70819151363. মাত্ৰ  $x=1$  বিন্দুত বিচ্ছিন্ন।

70819151364.  $x=1$  ৰ বাদে  $x$  ৰ সকলো অখণ্ড মানৰ বাবে বিচ্ছিন্ন।

70819151365. মাত্ৰ  $x=1$  ত অবিচ্ছিন্ন।

70819151366.  $x$  ৰ প্ৰত্যেক বাস্তৱ মানৰ বাবে অবিচ্ছিন্ন।

Question Number : 70 Question Id : 70819115403 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If  $\int \frac{\cos x - \sin x}{\sqrt{8 - \sin 2x}} dx = a \sin^{-1} \left( \frac{\sin x + \cos x}{b} \right) + c$ , where  $c$  is a constant of integration, then

the ordered pair  $(a, b)$  is equal to :

**Options :**

70819151367. (3, 1)

70819151368. (1, 3)

70819151369. (-1, 3)

70819151370. (1, -3)

**Question Number : 70 Question Id : 70819115403 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

যদি  $\int \frac{\cos x - \sin x}{\sqrt{8 - \sin 2x}} dx = a \sin^{-1} \left( \frac{\sin x + \cos x}{b} \right) + c$ , য'ত  $c$  এটা অনুকলন ধ্রুবক, তেন্তে  $(a, b)$  ক্রমিত

যোৰটো সমান হ'ব :

**Options :**

70819151367. (3, 1)

70819151368. (1, 3)

70819151369. (-1, 3)

70819151370. (1, -3)

**Question Number : 71 Question Id : 70819115404 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

The area (in sq. units) of the part of the circle  $x^2 + y^2 = 36$ , which is outside parabola  $y^2 = 9x$ , is :

**Options :**

70819151371.  $24\pi + 3\sqrt{3}$

70819151372.  $24\pi - 3\sqrt{3}$

70819151373.  $12\pi + 3\sqrt{3}$

70819151374.  $12\pi - 3\sqrt{3}$

**Question Number : 71 Question Id : 70819115404 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

$y^2 = 9x$  অধিবৃত্তৰ বহিঃ অংশত থকা  $x^2 + y^2 = 36$  বৃত্তৰ অংশটোৰ কালি (বৰ্গ এককত) হ'ব :

**Options :**

70819151371.  $24\pi + 3\sqrt{3}$

70819151372.  $24\pi - 3\sqrt{3}$

70819151373.  $12\pi + 3\sqrt{3}$

70819151374.  $12\pi - 3\sqrt{3}$

**Question Number : 72 Question Id : 70819115405 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

The population  $P = P(t)$  at time ' $t$ ' of a certain species follows the differential equation

$$\frac{dP}{dt} = 0.5P - 450. \text{ If } P(0) = 850, \text{ then the time at which population becomes zero is :}$$

**Options :**

70819151375.  $\log_e 9$

70819151376.  $\frac{1}{2} \log_e 18$

70819151377.  $\log_e 18$

70819151378.  $2 \log_e 18$

**Question Number : 72 Question Id : 70819115405 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

কোনো এটা নির্দিষ্ট প্রজাতির জনসংখ্যা  $t$  সময়ত  $P = P(t)$  য়ে  $\frac{dp}{dt} = 0.5P - 450$  অৱকলনীয় সমীকৰণটো অনুসৰণ কৰে। যদি  $P(0) = 850$ , তেন্তে জনসংখ্যা শূন্য হৈ যোৱা সময় হ'ব :

**Options :**

70819151375.  $\log_e 9$

70819151376.  $\frac{1}{2} \log_e 18$

70819151377.  $\log_e 18$

70819151378.  $2 \log_e 18$

Question Number : 73 Question Id : 70819115406 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A man is walking on a straight line. The arithmetic mean of the reciprocals of the intercepts of this line on the coordinate axes is  $\frac{1}{4}$ . Three stones A, B and C are placed at the points (1, 1), (2, 2) and (4, 4) respectively. Then which of these stones is/are on the path of the man ?

Options :

70819151379. A only

70819151380. B only

70819151381. C only

70819151382. All the three

Question Number : 73 Question Id : 70819115406 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

এজন মানুহে এডাল সৰলৰেখাৰে খোজ কাঢ়ি আছে। অক্ষদ্বয়ৰ ওপৰত ৰেখাডালৰ ছেদাংশৰ প্ৰতিক্ৰমৰ সমান্তৰ মাধ্য  $\frac{1}{4}$ । (1, 1), (2, 2) আৰু (4, 4) বিন্দুত তিনিটা শিলগুটি ক্ৰমে A, B আৰু C ৰখা হৈছে। তেন্তে কোনটো বা কোনবোৰ শিলগুটি মানুহজনৰ পথত থাকিব ?

Options :

70819151379. কেৱল A

70819151380. কেৱল B

70819151381. কেৱল C

70819151382. তিনিওটা

**Question Number : 74 Question Id : 70819115407 Question Type : MCQ Option Shuffling : Yes**  
**Is Question Mandatory : No**

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

The locus of the mid-point of the line segment joining the focus of the parabola  $y^2 = 4ax$  to a moving point of the parabola, is another parabola whose directrix is :

**Options :**

70819151383.  $x = a$

70819151384.  $x = -\frac{a}{2}$

70819151385.  $x = 0$

70819151386.  $x = \frac{a}{2}$

**Question Number : 74 Question Id : 70819115407 Question Type : MCQ Option Shuffling : Yes**  
**Is Question Mandatory : No**

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

$y^2 = 4ax$  অধিবৃত্তৰ নাভি আৰু অধিবৃত্তৰ যিকোনো বিন্দু সংযোগী ৰেখাৰ মধ্যবিন্দুৰ সঞ্চাৰ পথটো এটা অধিবৃত্ত হ'লে, সেই অধিবৃত্তৰ নিয়ামিকাৰ সমীকৰণ হ'ব :

**Options :**

70819151383.  $x = a$

70819151384.  $x = -\frac{a}{2}$

70819151385.  $x = 0$

70819151386.

$$x = \frac{a}{2}$$

**Question Number : 75 Question Id : 70819115408 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

If the tangent to the curve  $y = x^3$  at the point  $P(t, t^3)$  meets the curve again at  $Q$ , then the ordinate of the point which divides  $PQ$  internally in the ratio  $1 : 2$  is :

**Options :**

70819151387.  $0$

70819151388.  $2t^3$

70819151389.  $-t^3$

70819151390.  $-2t^3$

**Question Number : 75 Question Id : 70819115408 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

$y = x^3$  বক্রৰ  $P(t, t^3)$  বিন্দুত টনা স্পর্শকডালে বক্রটোক আকৌ  $Q$  বিন্দুত কাটে। তেন্তে  $PQ$  বেখাখণ্ডটোক  $1 : 2$  অনুপাতত অন্তঃ বিভক্ত কৰা বিন্দুটোৰ কোটি ( $y$ -স্থানাংক) হ'ব :

**Options :**

70819151387.  $0$

70819151388.  $2t^3$

70819151389.  $-t^3$

**Question Number : 76 Question Id : 70819115409 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

The equation of the plane passing through the point  $(1, 2, -3)$  and perpendicular to the planes  $3x + y - 2z = 5$  and  $2x - 5y - z = 7$ , is :

**Options :**

70819151391.  $6x - 5y + 2z + 10 = 0$

70819151392.  $11x + y + 17z + 38 = 0$

70819151393.  $6x - 5y - 2z - 2 = 0$

70819151394.  $3x - 10y - 2z + 11 = 0$

**Question Number : 76 Question Id : 70819115409 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

$(1, 2, -3)$  বিন্দুৰে যোৱা আৰু  $3x + y - 2z = 5$  আৰু  $2x - 5y - z = 7$  সমতল দুখনৰ ওপৰত লম্ব হোৱা সমতলখনৰ সমীকৰণটো হ'ব :

**Options :**

70819151391.  $6x - 5y + 2z + 10 = 0$

70819151392.  $11x + y + 17z + 38 = 0$

70819151393.  $6x - 5y - 2z - 2 = 0$

70819151394.  $3x - 10y - 2z + 11 = 0$

Question Number : 77 Question Id : 70819115410 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The distance of the point (1, 1, 9) from the point of intersection of the line

$$\frac{x-3}{1} = \frac{y-4}{2} = \frac{z-5}{2} \text{ and the plane } x+y+z=17 \text{ is :}$$

Options :

70819151395.  $2\sqrt{19}$

70819151396.  $19\sqrt{2}$

70819151397.  $\sqrt{38}$

70819151398. 38

Question Number : 77 Question Id : 70819115410 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$\frac{x-3}{1} = \frac{y-4}{2} = \frac{z-5}{2} \text{ রেখা আৰু } x+y+z=17 \text{ সমতলৰ ছেদবিন্দুৰ পৰা } (1, 1, 9) \text{ বিন্দুটোৰ দূৰত্ব হ'ব :}$$

Options :

70819151395.  $2\sqrt{19}$

70819151396.  $19\sqrt{2}$

70819151397.  $\sqrt{38}$

70819151398. 38

**Question Number : 78 Question Id : 70819115411 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

An ordinary dice is rolled for a certain number of times. If the probability of getting an odd number 2 times is equal to the probability of getting an even number 3 times, then the probability of getting an odd number for odd number of times is :

**Options :**

70819151399.  $\frac{1}{32}$

70819151400.  $\frac{3}{16}$

70819151401.  $\frac{5}{16}$

70819151402.  $\frac{1}{2}$

**Question Number : 78 Question Id : 70819115411 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

এটা সাধাৰণ পাশতি কেইবাবাৰো দলিওৱা হ'ল। যদি 2 বাৰ অযুগ্ম সংখ্যা প্ৰাপ্তিৰ সম্ভাৱিতা 3 বাৰ যুগ্ম সংখ্যা প্ৰাপ্তিৰ সম্ভাৱিতাৰ সমান হয়, তেন্তে অযুগ্মবাৰ অযুগ্ম সংখ্যা পোৱাৰ সম্ভাৱিতা হ'ব :

**Options :**

70819151399.  $\frac{1}{32}$

70819151400.  $\frac{3}{16}$

70819151401.  $\frac{5}{16}$

70819151402.  $\frac{1}{2}$

**Question Number : 79 Question Id : 70819115412 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Two vertical poles are 150 m apart and the height of one is three times that of the other. If from the middle point of the line joining their feet, an observer finds the angles of elevation of their tops to be complementary, then the height of the shorter pole (in meters) is :

**Options :**

70819151403. 25

70819151404. 30

70819151405.  $20\sqrt{3}$

70819151406.  $25\sqrt{3}$

**Question Number : 79 Question Id : 70819115412 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

150 m দূৰত্বত অৱস্থিত দুটা উলম্ব খুটিৰ এটাৰ উচ্চতা আনটোৰ তিনিগুণ। যদি খুটি দুটাৰ পাদবিন্দু সংযোগী ৰেখাডালৰ মধ্যবিন্দুৰ পৰা এজন পৰ্যবেক্ষকে খুটি দুটাৰ শীৰ্ষবিন্দুৰ উঠন কোণ পূৰ্বকোণ হিচাপে দেখা পায়, তেন্তে চুটি খুটিটোৰ উচ্চতা (মিটাৰত) হ'ব :

**Options :**

70819151403. 25

70819151404. 30

70819151405.  $20\sqrt{3}$

70819151406.  $25\sqrt{3}$

**Question Number : 80 Question Id : 70819115413 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

The statement among the following that is a tautology is :

**Options :**

70819151407.  $A \wedge (A \vee B)$

70819151408.  $A \vee (A \wedge B)$

70819151409.  $[ A \wedge (A \rightarrow B) ] \rightarrow B$

70819151410.  $B \rightarrow [ A \wedge (A \rightarrow B) ]$

**Question Number : 80 Question Id : 70819115413 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

তলৰ কোনটো উক্তি এটা পুনঃকৃষ্টি হ'ব :

**Options :**

70819151407.  $A \wedge (A \vee B)$

70819151408.  $A \vee (A \wedge B)$

70819151409.  $[ A \wedge (A \rightarrow B) ] \rightarrow B$

70819151410.  $B \rightarrow [ A \wedge (A \rightarrow B) ]$

## Mathematics Section B

Section Id :	708191567
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 :	708191847
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 70819115414 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the least and the largest real values of  $\alpha$ , for which the equation  $z + \alpha|z - 1| + 2i = 0$  ( $z \in \mathbb{C}$  and  $i = \sqrt{-1}$ ) has a solution, are  $p$  and  $q$  respectively; then  $4(p^2 + q^2)$  is equal to \_\_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

**Question Number : 81 Question Id : 70819115414 Question Type : SA**

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

যদি  $\alpha$ ,  $\beta$  ক্ষুদ্রতম আৰু বৃহত্তম বাস্তৱ মানৰ বাবে  $z + \alpha|z - 1| + 2i = 0$  ( $z \in \mathbb{C}$  and  $i = \sqrt{-1}$ ) সমীকৰণৰ ক্ৰমে  $p$  আৰু  $q$  দুটা মূল হয়, তেন্তে  $4(p^2 + q^2)$  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 : 82 Question Id : 70819115415 Question Type : SA**

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

Let  $B_i$  ( $i=1, 2, 3$ ) be three independent events in a sample space. The probability that only  $B_1$  occur is  $\alpha$ , only  $B_2$  occurs is  $\beta$  and only  $B_3$  occurs is  $\gamma$ . Let  $p$  be the probability that none of the events  $B_i$  occurs and these 4 probabilities satisfy the equations  $(\alpha - 2\beta) p = \alpha\beta$  and  $(\beta - 3\gamma) p = 2\beta\gamma$  (All the probabilities are assumed to lie in the interval  $(0, 1)$ ). Then  $\frac{P(B_1)}{P(B_3)}$  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 : 70819115415 Question Type : SA**

Correct Marks : 4 Wrong Marks : 0

ধৰা হ'ল  $B_i$  ( $i=1, 2, 3$ ) এটা প্ৰতিদৰ্শ স্থানৰ তিনিটা স্বতন্ত্ৰ ঘটনা। কেৱল  $B_1$  ঘটাৰ সম্ভাৱিতা  $\alpha$ ,  $B_2$  ঘটাৰ সম্ভাৱিতা  $\beta$ , আৰু  $B_3$  ঘটাৰ সম্ভাৱিতা  $\gamma$ । যদি কোনো এটা ঘটনা  $B_1, B_2, B_3$  নঘটাৰ সম্ভাৱিতা  $p$  আৰু এই চাৰিটা সম্ভাৱিতাই

$(\alpha - 2\beta)p = \alpha\beta$  আৰু  $(\beta - 3\gamma)p = 2\beta\gamma$  সমীকৰণটোক সিদ্ধ কৰে, তেন্তে  $\frac{P(B_1)}{P(B_3)}$  সমান হ'ব \_\_\_\_\_।

(আটাইবোৰ সম্ভাৱিতা  $(0, 1)$  অন্তৰালত থাকিব)

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 : 70819115416 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let  $P = \begin{bmatrix} 3 & -1 & -2 \\ 2 & 0 & \alpha \\ 3 & -5 & 0 \end{bmatrix}$ , where  $\alpha \in \mathbb{R}$ . Suppose  $Q = [q_{ij}]$  is a matrix satisfying  $PQ = kI_3$  for

some non-zero  $k \in \mathbb{R}$ . If  $q_{23} = -\frac{k}{8}$  and  $|Q| = \frac{k^2}{2}$ , then  $\alpha^2 + k^2$  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 : 83 Question Id : 70819115416 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ধৰা হ'ল  $P = \begin{bmatrix} 3 & -1 & -2 \\ 2 & 0 & \alpha \\ 3 & -5 & 0 \end{bmatrix}$ , য'ত  $\alpha \in \mathbb{R}$ , ধৰা হ'ল  $Q = [q_{ij}]$  এটা মৌলিকমত্ৰ যি  $PQ = kI_3$  ক সিদ্ধ কৰে, কিছুমান

অশূন্য  $k \in \mathbb{R}$  ৰ বাবে যদি  $q_{23} = -\frac{k}{8}$  আৰু  $|Q| = \frac{k^2}{2}$ , তেন্তে  $\alpha^2 + k^2$  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 :** 84 **Question Id :** 70819115417 **Question Type :** SA

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

Let  $M$  be any  $3 \times 3$  matrix with entries from the set  $\{0, 1, 2\}$ . The maximum number of such matrices, for which the sum of diagonal elements of  $M^T M$  is seven, 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 :** 84 **Question Id :** 70819115417 **Question Type :** SA

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

$\{0, 1, 2\}$  সংহতিৰ মৌলৰে গঠিত  $M$  এটা  $3 \times 3$  আকাৰৰ মৌলিকমত্ৰ। যদি  $M^T M$  মৌলিকমত্ৰটোৰ বিকৰ্ণ মৌলবোৰৰ যোগফল 7 হয়, তেন্তে তেনেকুৱা মৌলিকমত্ৰৰ সৰ্ববৰ্চা 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 : 85 Question Id : 70819115418 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let  $A = \{n \in \mathbb{N} : n \text{ is a 3-digit number}\}$

$B = \{9k + 2 : k \in \mathbb{N}\}$

and  $C = \{9k + l : k \in \mathbb{N}\}$  for some  $l$  ( $0 < l < 9$ )

If the sum of all the elements of the set  $A \cap (B \cup C)$  is  $274 \times 400$ , then  $l$  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 : 85 Question Id : 70819115418 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$A = \{n \in \mathbb{N} : n \text{ তিনিঅংকীয়া সংখ্যা}\}$

$B = \{9k + 2 : k \in \mathbb{N}\}$

আৰু  $C = \{9k + l : k \in \mathbb{N}\}$ , কিছুমান  $l$  বৰাবে, ( $0 < l < 9$ )

যদি  $A \cap (B \cup C)$  সংহতিটোৰ আটাইবোৰ মৌলৰ যোগফল  $274 \times 400$  হয়, তেন্তে  $l$  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 : 86 Question Id : 70819115419 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The minimum value of  $\alpha$  for which the equation  $\frac{4}{\sin x} + \frac{1}{1 - \sin x} = \alpha$  has at least one solution in  $\left(0, \frac{\pi}{2}\right)$  is \_\_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 86 Question Id : 70819115419 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$\left(0, \frac{\pi}{2}\right)$  অন্তর্ভুক্ত  $\frac{4}{\sin x} + \frac{1}{1 - \sin x} = \alpha$  সমীকরণটির অতি কমেও এটা সমাধান থাকাকৈ  $\alpha$  ব নিম্নতম 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 : 87 Question Id : 70819115420 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If  $\int_{-a}^a (|x| + |x - 2|) dx = 22$ , ( $a > 2$ ) and  $[x]$  denotes the greatest integer  $\leq x$ ,

then  $\int_a^{-a} (x + [x]) dx$  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 : 87 Question Id : 70819115420 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

যদি  $\int_{-a}^a (|x| + |x - 2|) dx = 22$ , ( $a > 2$ ) আৰু  $[x] =$  গৰিষ্ঠ অখণ্ড সংখ্যা  $\leq x$  বুজায়, তেন্তে  $\int_a^{-a} (x + [x]) dx$  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 : 88 Question Id : 70819115421 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If one of the diameters of the circle  $x^2 + y^2 - 2x - 6y + 6 = 0$  is a chord of another circle  $C$ , whose center is at  $(2, 1)$ , then its radius 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 :** 70819115421 **Question Type :** SA

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

যদি  $x^2 + y^2 - 2x - 6y + 6 = 0$  বৃত্তৰ এডাল ব্যাস অন্য এটা বৃত্ত  $C$  ৰ জ্যা হয়, যাৰ কেন্দ্ৰ  $(2, 1)$ , তেন্তে  $C$  ৰ ব্যাসার্ধ 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 :** 70819115422 **Question Type :** SA

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

Let three vectors  $\vec{a}$ ,  $\vec{b}$  and  $\vec{c}$  be such that  $\vec{c}$  is coplanar with  $\vec{a}$  and  $\vec{b}$ ,  $\vec{a} \cdot \vec{c} = 7$  and  $\vec{b}$  is perpendicular to  $\vec{c}$ , where  $\vec{a} = -\hat{i} + \hat{j} + \hat{k}$  and  $\vec{b} = 2\hat{i} + \hat{k}$ , then the value of  $2|\vec{a} + \vec{b} + \vec{c}|^2$  is \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 89 Question Id : 70819115422 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ধরা হ'ল  $\vec{a}$ ,  $\vec{b}$  আৰু  $\vec{c}$  তিনিটা ভেক্টৰ যাতে ভেক্টৰ  $\vec{c}$ ,  $\vec{a}$  আৰু  $\vec{b}$  ৰ সৈতে একে সমতলীয়,  $\vec{a} \cdot \vec{c} = 7$ , আৰু  $\vec{b} \perp \vec{c}$  য'ত  $\vec{a} = -\hat{i} + \hat{j} + \hat{k}$  আৰু  $\vec{b} = 2\hat{i} + \hat{k}$ , তেন্তে  $2|\vec{a} + \vec{b} + \vec{c}|^2$  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 : 90 Question Id : 70819115423 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$\lim_{n \rightarrow \infty} \tan \left\{ \sum_{r=1}^n \tan^{-1} \left( \frac{1}{1+r+r^2} \right) \right\}$  is equal to \_\_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

Question Number : 90 Question Id : 70819115423 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$$\lim_{n \rightarrow \infty} \tan \left\{ \sum_{r=1}^n \tan^{-1} \left( \frac{1}{1+r+r^2} \right) \right\} \text{ সমান হ'ব } \underline{\hspace{2cm}}।$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

