

National Testing Agency

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B TECH EA

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Physics Section A

Section Id :	864351229
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	864351229
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 8643513421 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

A car accelerates from rest at a constant rate α for some time after which it decelerates at a constant rate β to come to rest. If the total time elapsed is t seconds, the total distance travelled is :

Options :

86435110261. $\frac{2 \alpha \beta}{(\alpha + \beta)} t^2$

86435110262. $\frac{\alpha \beta}{2(\alpha + \beta)} t^2$

86435110263. $\frac{4 \alpha \beta}{(\alpha + \beta)} t^2$

86435110264. $\frac{\alpha \beta}{4 (\alpha + \beta)} t^2$

Question Number : 1 Question Id : 8643513421 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

এখন গাড়ীয়ে ছিৰ অৱস্থাৰ পৰা গ্ৰন্থক হাৰ α ত কিছুসময়ৰ বাবে ত্বৰিত হয় যাৰ পাছত ই গ্ৰন্থক হাৰ β ত মছৰিত হৈ ছিৰ অৱস্থালৈ আহে। যদিহে অতিবাহিত হোৱা মুঠ সময় t second হয়, অতিক্ৰম কৰা মুঠ দূৰত্ব হয় :

Options :

86435110261. $\frac{2 \alpha \beta}{(\alpha + \beta)} t^2$

86435110262. $\frac{\alpha \beta}{2(\alpha + \beta)} t^2$

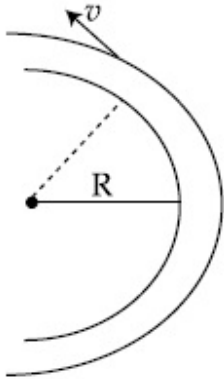
86435110263. $\frac{4 \alpha \beta}{(\alpha + \beta)} t^2$

86435110264. $\frac{\alpha \beta}{4 (\alpha + \beta)} t^2$

Question Number : 2 Question Id : 8643513422 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A modern grand - prix racing car of mass m is travelling on a flat track in a circular arc of radius R with a speed v . If the coefficient of static friction between the tyres and the track is μ_s , then the magnitude of negative lift F_L acting downwards on the car is : (Assume forces on the four tyres are identical and g = acceleration due to gravity)



Options :

86435110265. $m \left(\frac{v^2}{\mu_s R} + g \right)$

86435110266. $m \left(g - \frac{v^2}{\mu_s R} \right)$

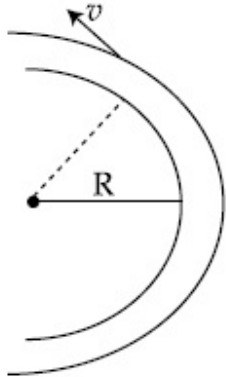
86435110267. $m \left(\frac{v^2}{\mu_s R} - g \right)$

86435110268. $- m \left(g + \frac{v^2}{\mu_s R} \right)$

Question Number : 2 Question Id : 8643513422 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

m ভৰৰ এখন আধুনিক গ্ৰাঁ-প্ৰি বেচিং গাড়ীয়ে v দ্ৰুতিৰে R ব্যাসাৰ্ধৰ বৃত্তাকাৰ চাপৰ সমতলীয় ট্ৰেকত গতি কৰি আছে। যদিহে ট্ৰেক আৰু টায়ৰৰ মাজৰ স্থৈতিক ঘৰ্ষণ গুণাংক μ_s হয়, তেন্তে গাড়ীখনত অধোমুখে ক্ৰিয়া কৰি থকা ঋণাত্মক উত্থাপন F_L (lift) ৰ মান হয় : (ধৰা চাৰিওটা টায়ৰত সাইলাথ একেই বল আছে আৰু $g =$ মাধ্যাকৰ্ষণিক ত্বৰণ)



Options :

86435110265. $m \left(\frac{v^2}{\mu_s R} + g \right)$

86435110266. $m \left(g - \frac{v^2}{\mu_s R} \right)$

86435110267. $m \left(\frac{v^2}{\mu_s R} - g \right)$

86435110268. $-m \left(g + \frac{v^2}{\mu_s R} \right)$

Question Number : 3 Question Id : 8643513423 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A Carnot's engine working between 400 K and 800 K has a work output of 1200 J per cycle. The amount of heat energy supplied to the engine from the source in each cycle is :

Options :

86435110269. 2400 J

86435110270. 1600 J

86435110271. 3200 J

86435110272. 1800 J

Question Number : 3 Question Id : 8643513423 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

400 K আৰু 800 K ৰ মাজত কাম কৰি থকা এটা কাণ্টি ইঞ্জিনৰ প্ৰতি চক্ৰত সম্পাদিত কাৰ্য্য 1200 J । প্ৰতিটো চক্ৰত উৎসৰ পৰা ইঞ্জিনটোক যোগান ধৰা তাপ শক্তিৰ পৰিমাণ :

Options :

86435110269. 2400 J

86435110270. 1600 J

86435110271. 3200 J

86435110272. 1800 J

Question Number : 4 Question Id : 8643513424 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A solenoid of 1000 turns per metre has a core with relative permeability 500. Insulated windings of the solenoid carry an electric current of 5 A. The magnetic flux density produced by the solenoid is : (permeability of free space = $4\pi \times 10^{-7}$ H/m)

Options :

86435110273. $10^{-4}\pi$ T

86435110274. $2 \times 10^{-3}\pi$ T

86435110275. $\frac{\pi}{5}$ T

86435110276. π T

Question Number : 4 Question Id : 8643513424 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

প্রতি মিটাৰত 1000 পাক থকা এটা চলেনইডৰ অন্তৰ্ভাগৰ আপেক্ষিক প্ৰৱেশ্যতা 500। চলেনইডটোৰ অন্তৰিত (Insulated) কুণ্ডলীসমূহে 5 A বিদ্যুৎপ্ৰবাহ কঢ়িয়াইছে। চলেনইডটোৰ দ্বাৰা উৎপন্ন হোৱা চৌম্বিক অভিৰাহ ঘনত্ব হয় : (মুক্ত স্থানৰ প্ৰৱেশ্যতা = $4\pi \times 10^{-7}$ H/m)

Options :

86435110273. $10^{-4}\pi$ T

86435110274. $2 \times 10^{-3}\pi$ T

86435110275. $\frac{\pi}{5}$ T

86435110276. π T

Question Number : 5 Question Id : 8643513425 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A current of 10 A exists in a wire of crosssectional area of 5 mm² with a drift velocity of 2×10^{-3} ms⁻¹. The number of free electrons in each cubic meter of the wire is _____.

Options :

86435110277. 2×10^6

86435110278. 1×10^{23}

86435110279. 625×10^{25}

86435110280. 2×10^{25}

Question Number : 5 Question Id : 8643513425 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

2×10^{-3} ms⁻¹ অপবাহ দ্ৰুতিৰে 10 A ৰ এক প্ৰবাহ 5 mm² পৃষ্ঠচ্ছেদৰ এডাল তাঁৰত আছে। তাঁৰদালৰ প্ৰতি ঘনমিটাৰত থকা ইলেক্ট্ৰনৰ সংখ্যা হয় _____।

Options :

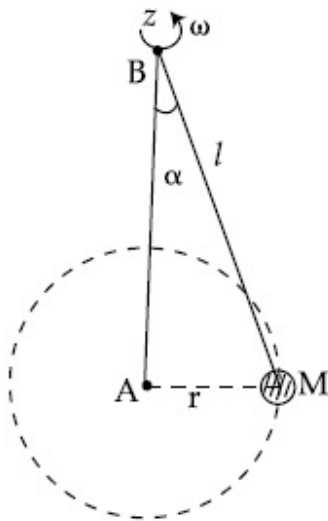
86435110277. 2×10^6

86435110278. 1×10^{23} 86435110279. 625×10^{25} 86435110280. 2×10^{25}

Question Number : 6 Question Id : 8643513426 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A mass M hangs on a massless rod of length l which rotates at a constant angular frequency. The mass M moves with steady speed in a circular path of constant radius. Assume that the system is in steady circular motion with constant angular velocity ω . The angular momentum of M about point A is L_A which lies in the positive z direction and the angular momentum of M about point B is L_B . The correct statement for this system is :



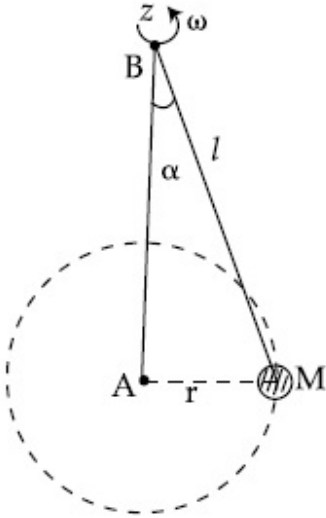
Options :

86435110281. L_A and L_B are both constant in magnitude and direction86435110282. L_A is constant, both in magnitude and direction86435110283. L_B is constant, both in magnitude and direction86435110284. L_B is constant in direction with varying magnitude

Question Number : 6 Question Id : 8643513426 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

l দৈৰ্ঘ্যৰ এডাল ভৰহীন বডত এক ভৰ M ওলমি আছে যিয়ে এক ধ্ৰুৱক কৌণিক কম্পনাংকৰে ঘূৰি আছে। M ভৰটোৱে স্থিৰ দ্ৰুতিৰে ধ্ৰুৱক ব্যাসাৰ্ধৰ এক বৃত্তাকাৰ পথত গতি কৰে। ধৰি লোৱা যে নিকায়টোৱে এক ধ্ৰুৱক বেগ ω ৰে স্থিৰ বৃত্তাকাৰ গতিত আছে। বিন্দু A সাপেক্ষে M ৰ কৌণিক ভৰবেগ L_A যিয়ে ধনাত্মক z দিশত আছে আৰু বিন্দু B সাপেক্ষে M ৰ কৌণিক ভৰবেগ L_B । এই নিকায়টোৰ বাবে শুদ্ধ বিবৃতি হয় :



Options :

86435110281. L_A আৰু L_B দুয়োৰে মান আৰু দিশ ধ্ৰুৱক।

86435110282. মান আৰু দিশ দুয়োক্ষেত্ৰত L_A ধ্ৰুৱক।

86435110283. মান আৰু দিশ দুয়োক্ষেত্ৰত L_B ধ্ৰুৱক।

86435110284. পৰিৱৰ্তিত মানৰ সৈতে L_B ৰ দিশ ধ্ৰুৱক।

Question Number : 7 Question Id : 8643513427 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An AC current is given by $I = I_1 \sin \omega t + I_2 \cos \omega t$. A hot wire ammeter will give a reading :

Options :

86435110285. $\frac{I_1 + I_2}{\sqrt{2}}$

86435110286. $\frac{I_1 + I_2}{2\sqrt{2}}$

86435110287. $\sqrt{\frac{I_1^2 + I_2^2}{2}}$

86435110288. $\sqrt{\frac{I_1^2 - I_2^2}{2}}$

Question Number : 7 Question Id : 8643513427 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

এক পরিবর্তী প্রবাহ দর্শোরা হৈছে $I = I_1 \sin \omega t + I_2 \cos \omega t$ । এটা গৰম তাঁৰৰ এমিটাৰে (hot wire ammeter) দিয়া পাঠ :

Options :

86435110285. $\frac{I_1 + I_2}{\sqrt{2}}$

86435110286. $\frac{I_1 + I_2}{2\sqrt{2}}$

86435110287. $\sqrt{\frac{I_1^2 + I_2^2}{2}}$

86435110288. $\sqrt{\frac{I_1^2 - I_2^2}{2}}$

Question Number : 8 Question Id : 8643513428 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A polyatomic ideal gas has 24 vibrational modes. What is the value of γ ?

Options :

86435110289. 10.3

86435110290. 1.30

86435110291. 1.03

86435110292. 1.37

Question Number : 8 Question Id : 8643513428 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

এটা বহুপাৰমাণৱিক আদৰ্শগেছৰ 24 কম্পনৰ ধৰণ (vibrational mode) আছে। γ ৰ মান কি হ'ব ?

Options :

86435110289. 10.3

86435110290. 1.30

86435110291. 1.03

86435110292. 1.37

Question Number : 9 Question Id : 8643513429 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

When two soap bubbles of radii a and b ($b > a$) coalesce, the radius of curvature of common surface is :

Options :

86435110293. $\frac{ab}{b-a}$

86435110294. $\frac{ab}{a+b}$

86435110295. $\frac{b-a}{ab}$

86435110296. $\frac{a+b}{ab}$

Question Number : 9 Question Id : 8643513429 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

যেতিয়া a আৰু b ব্যাসাৰ্ধৰ ($b > a$) দুটা চাবোনৰ বুদ্ধ্বদ্ একত্ৰিত হয়, উমৈহতীয় পৃষ্ঠখনৰ ভাঁজ ব্যাসাৰ্ধ হয় :

Options :

86435110293. $\frac{ab}{b-a}$

86435110294. $\frac{ab}{a+b}$

86435110295. $\frac{b-a}{ab}$

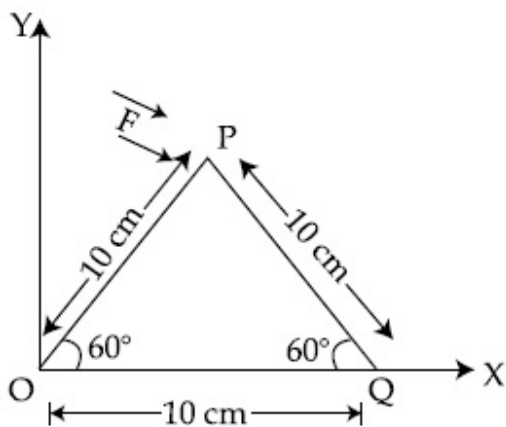
86435110296. $\frac{a+b}{ab}$

Question Number : 10 Question Id : 8643513430 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A triangular plate is shown. A force $\vec{F} = 4\hat{i} - 3\hat{j}$ is applied at point P. The torque at point

P with respect to point 'O' and 'Q' are :



Options :

86435110297. $-15 - 20\sqrt{3}, 15 - 20\sqrt{3}$

86435110298. $15 + 20\sqrt{3}, 15 - 20\sqrt{3}$

86435110299. $15 - 20\sqrt{3}, 15 + 20\sqrt{3}$

86435110300. $-15 + 20\sqrt{3}, 15 + 20\sqrt{3}$

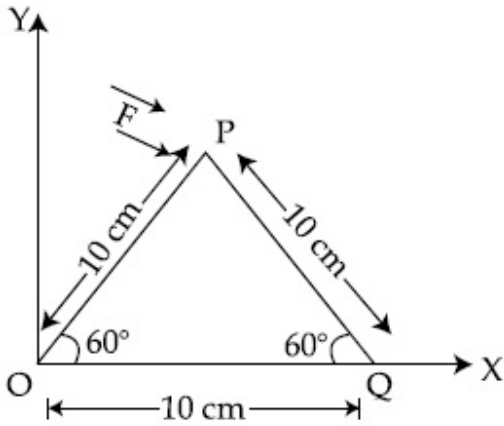
Question Number : 10 Question Id : 8643513430 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

এখন ত্রিভুজাকৃতির প্লেট দেখুওরা হৈছে। P বিন্দুত এটা বল $\vec{F} = 4\hat{i} - 3\hat{j}$ প্রয়োগ কৰা হৈছে। P বিন্দুত 'O' আৰু

'Q' বিন্দু অনুযায়ী টৰ্ক হয় :



Options :

86435110297. $-15 - 20\sqrt{3}, 15 - 20\sqrt{3}$

86435110298. $15 + 20\sqrt{3}, 15 - 20\sqrt{3}$

86435110299. $15 - 20\sqrt{3}, 15 + 20\sqrt{3}$

86435110300. $-15 + 20\sqrt{3}, 15 + 20\sqrt{3}$

Question Number : 11 Question Id : 8643513431 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two identical metal wires of thermal conductivities K_1 and K_2 respectively are connected in series. The effective thermal conductivity of the combination is :

Options :

86435110301. $\frac{K_1 K_2}{K_1 + K_2}$

86435110302. $\frac{2K_1 K_2}{K_1 + K_2}$

$$86435110303. \quad \frac{K_1 + K_2}{2K_1 K_2}$$

$$86435110304. \quad \frac{K_1 + K_2}{K_1 K_2}$$

Question Number : 11 Question Id : 8643513431 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

তাপ পৰিবাহীতা ক্ৰমে K_1 আৰু K_2 ৰ দুডাল সাইলাখ একেই ধাতুৰ তাঁৰক শ্ৰেণীবদ্ধভাৱে সংযোগ কৰা হৈছে। এই যৌগব্যৱস্থাটোৰ প্ৰভাৱী (effective) তাপ পৰিবাহীতা হয় :

Options :

$$86435110301. \quad \frac{K_1 K_2}{K_1 + K_2}$$

$$86435110302. \quad \frac{2K_1 K_2}{K_1 + K_2}$$

$$86435110303. \quad \frac{K_1 + K_2}{2K_1 K_2}$$

$$86435110304. \quad \frac{K_1 + K_2}{K_1 K_2}$$

Question Number : 12 Question Id : 8643513432 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A boy is rolling a 0.5 kg ball on the frictionless floor with the speed of 20 ms^{-1} . The ball gets deflected by an obstacle on the way. After deflection it moves with 5% of its initial kinetic energy. What is the speed of the ball now ?

Options :

$$86435110305. \quad 1.00 \text{ ms}^{-1}$$

$$86435110306. \quad 4.47 \text{ ms}^{-1}$$

$$86435110307. \quad 14.41 \text{ ms}^{-1}$$

86435110308. 19.0 ms^{-1} **Question Number : 12 Question Id : 8643513432 Question Type : MCQ Option Shuffling : Yes Is****Question Mandatory : No****Correct Marks : 4 Wrong Marks : 1**

20 ms^{-1} দ্রুতিৰে 0.5 kg ৰ বল এটা এখন ঘৰ্ষণহীন তলত এজন ল'ৰাই বগৰাই আছে। গতিপথত বলটো এটা বাধাৰ দ্বাৰা বিচ্যুত হৈছে। বিচ্যুতৰ পাছত ই ইয়াৰ প্ৰাৰম্ভিক গতি শক্তিৰ 5% ৰ সৈতে গতি কৰে। এতিয়া বলটোৰ দ্রুতি কি হ'ব ?

Options :86435110305. 1.00 ms^{-1} 86435110306. 4.47 ms^{-1} 86435110307. 14.41 ms^{-1} 86435110308. 19.0 ms^{-1} **Question Number : 13 Question Id : 8643513433 Question Type : MCQ Option Shuffling : Yes Is****Question Mandatory : No****Correct Marks : 4 Wrong Marks : 1**

The thickness at the centre of a plano convex lens is 3 mm and the diameter is 6 cm. If the speed of light in the material of the lens is $2 \times 10^8 \text{ ms}^{-1}$. The focal length of the lens is _____.

Options :

86435110309. 30 cm

86435110310. 15 cm

86435110311. 1.5 cm

86435110312. 0.30 cm

Question Number : 13 Question Id : 8643513433 Question Type : MCQ Option Shuffling : Yes Is**Question Mandatory : No****Correct Marks : 4 Wrong Marks : 1**

এখন সমতল-উত্তল লেন্সৰ কেন্দ্ৰত ডাঠ /বেধ 3 mm আৰু ব্যাস 6 cm। যদিহে লেন্সৰ পদাৰ্থত পোহৰৰ দ্ৰুতি $2 \times 10^8 \text{ ms}^{-1}$ হয়, লেন্সৰ নাভিদৈৰ্ঘ্য হয় _____।

Options :

86435110309. 30 cm

86435110310. 15 cm

86435110311. 1.5 cm

86435110312. 0.30 cm

Question Number : 14 Question Id : 8643513434 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which level of the single ionized carbon has the same energy as the ground state energy of hydrogen atom ?

Options :

86435110313. 1

86435110314. 4

86435110315. 6

86435110316. 8

Question Number : 14 Question Id : 8643513434 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

আয়নীকৃত একক কাৰ্বনৰ কোনটো স্তৰৰ হাইড্ৰ'জেন পৰমাণুৰ ভূমি-স্তৰৰ সৈতে একেই শক্তি আছে ?

Options :

86435110313. 1

86435110314. 4

86435110315. 6

86435110316. 8

Question Number : 15 Question Id : 8643513435 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two ideal polyatomic gases at temperatures T_1 and T_2 are mixed so that there is no loss of energy. If F_1 and F_2 , m_1 and m_2 , n_1 and n_2 be the degrees of freedom, masses, number of molecules of the first and second gas respectively, the temperature of mixture of these two gases is :

Options :

86435110317.
$$\frac{n_1 F_1 T_1 + n_2 F_2 T_2}{n_1 + n_2}$$

86435110318.
$$\frac{n_1 F_1 T_1 + n_2 F_2 T_2}{F_1 + F_2}$$

86435110319.
$$\frac{n_1 F_1 T_1 + n_2 F_2 T_2}{n_1 F_1 + n_2 F_2}$$

86435110320.
$$\frac{n_1 T_1 + n_2 T_2}{n_1 + n_2}$$

Question Number : 15 Question Id : 8643513435 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

উষ্ণতা T_1 আৰু T_2 ত থকা দুটা আদৰ্শ বহুপাৰমাণৱিক গেছ মিশ্ৰণ কৰা হৈছে যাতে শক্তিৰ কোনো অপচয় নহয়। F_1 আৰু F_2 , m_1 আৰু m_2 , n_1 আৰু n_2 ক্ৰমে প্ৰথম আৰু দ্বিতীয় গেছৰ বাবে স্বতন্ত্ৰতা মাত্ৰা (degrees of freedom), ভৰ আৰু অণুৰ সংখ্যা। এই দুই গেছৰ মিশ্ৰণৰ উষ্ণতা হ'ব :

Options :

86435110317.
$$\frac{n_1 F_1 T_1 + n_2 F_2 T_2}{n_1 + n_2}$$

86435110318.
$$\frac{n_1 F_1 T_1 + n_2 F_2 T_2}{F_1 + F_2}$$

86435110319.
$$\frac{n_1 F_1 T_1 + n_2 F_2 T_2}{n_1 F_1 + n_2 F_2}$$

$$\frac{n_1 T_1 + n_2 T_2}{n_1 + n_2}$$

86435110320.

Question Number : 16 Question Id : 8643513436 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

For what value of displacement the kinetic energy and potential energy of a simple harmonic oscillation become equal ?

Options :

86435110321. $x = \pm A$

86435110322. $x = 0$

86435110323. $x = \pm \frac{A}{\sqrt{2}}$

86435110324. $x = \frac{A}{2}$

Question Number : 16 Question Id : 8643513436 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

সৰণৰ কি মানৰ বাবে এটা সৰল পৰ্যাবৃত্ত দোলনৰ গতি-শক্তি আৰু স্থিতি-শক্তি সমান হয় ?

Options :

86435110321. $x = \pm A$

86435110322. $x = 0$

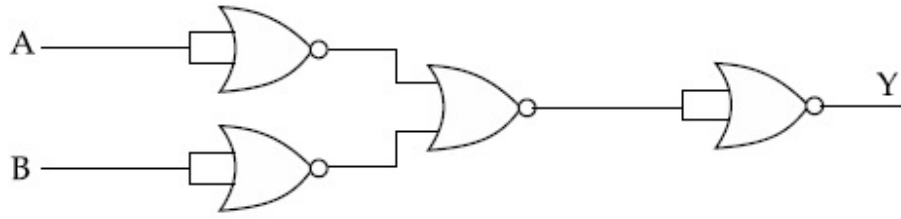
86435110323. $x = \pm \frac{A}{\sqrt{2}}$

86435110324. $x = \frac{A}{2}$

Question Number : 17 Question Id : 8643513437 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The output of the given combination gates represents :



Options :

86435110325. AND Gate

86435110326. NOR Gate

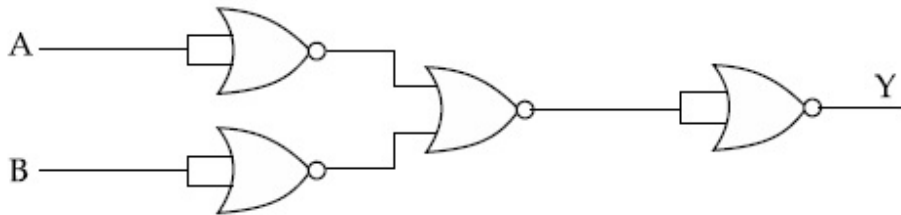
86435110327. NAND Gate

86435110328. XOR Gate

Question Number : 17 Question Id : 8643513437 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

দিয়া গেটসমূহৰ সংযোজনৰ আউটপুটে সূচায় :



Options :

86435110325. AND গেট

86435110326. NOR গেট

86435110327. NAND গেট

86435110328. XOR গেট

Question Number : 18 Question Id : 8643513438 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An electron of mass m and a photon have same energy E . The ratio of wavelength of electron to that of photon is : (c being the velocity of light)

Options :

86435110329. $\left(\frac{E}{2m}\right)^{1/2}$

86435110330. $c (2mE)^{1/2}$

86435110331. $\frac{1}{c} \left(\frac{2m}{E}\right)^{1/2}$

86435110332. $\frac{1}{c} \left(\frac{E}{2m}\right)^{1/2}$

Question Number : 18 Question Id : 8643513438 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

m ভৰৰ এটা ইলেক্ট্ৰন আৰু এটা ফ'ট'নৰ একেই E শক্তি আছে। ইলেক্ট্ৰনৰ তৰংগদৈৰ্ঘ্যৰ সৈতে ফ'ট'নৰ তৰংগদৈৰ্ঘ্যৰ অনুপাত হয় : (c পোহৰৰ বেগ)

Options :

86435110329. $\left(\frac{E}{2m}\right)^{1/2}$

86435110330. $c (2mE)^{1/2}$

86435110331. $\frac{1}{c} \left(\frac{2m}{E}\right)^{1/2}$

86435110332. $\frac{1}{c} \left(\frac{E}{2m}\right)^{1/2}$

Question Number : 19 Question Id : 8643513439 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The vernier scale used for measurement has a positive zero error of 0.2 mm. If while taking a measurement it was noted that '0' on the vernier scale lies between 8.5 cm and 8.6 cm, vernier coincidence is 6, then the correct value of measurement is _____ cm. (least count = 0.01 cm)

Options :

86435110333. 8.58 cm

86435110334. 8.56 cm

86435110335. 8.54 cm

86435110336. 8.36 cm

Question Number : 19 Question Id : 8643513439 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

মাপনৰ বাবে ব্যৱহৃত এডাল ভাৰ্ণিয়াৰ স্কেলৰ 0.2 mm ধনাত্মক শূন্য ত্ৰুটি আছে। যদিহে মাপ লওঁতে দেখা যায় যে ভাৰ্ণিয়াৰ '0' 8.5 cm আৰু 8.6 cm ৰ মাজত আছে, ভাৰ্ণিয়াৰ ঘাত 6 ত মিলি আছে, তেন্তে মাপৰ শুদ্ধ মান হয় _____ cm। (নিম্নতম গণনা = 0.01 cm)

Options :

86435110333. 8.58 cm

86435110334. 8.56 cm

86435110335. 8.54 cm

86435110336. 8.36 cm

Question Number : 20 Question Id : 8643513440 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If an electron is moving in the n^{th} orbit of the hydrogen atom, then its velocity (v_n) for the n^{th} orbit is given as :

Options :

86435110337. $v_n \propto n^2$

86435110338. $v_n \propto n$

86435110339. $v_n \propto \frac{1}{n^2}$

86435110340. $v_n \propto \frac{1}{n}$

Question Number : 20 Question Id : 8643513440 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

যদি হাইড্র'জেন পৰমাণুৰ n তম কক্ষকপথত এটা ইলেক্ট্ৰনে গতি কৰি আছে, তেন্তে n তম কক্ষকপথৰ বাবে ইয়াৰ বেগ (v_n) দিয়া যায় :

Options :

86435110337. $v_n \propto n^2$

86435110338. $v_n \propto n$

86435110339. $v_n \propto \frac{1}{n^2}$

86435110340. $v_n \propto \frac{1}{n}$

Physics Section B

Section Id :	864351230
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 :	864351230
Question Shuffling Allowed :	Yes

Question Number : 21 Question Id : 8643513441 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

For VHF signal broadcasting, _____ km² of maximum service area will be covered by an antenna tower of height 30 m, if the receiving antenna is placed at ground. Let radius of the earth be 6400 km. (Round off to the Nearest Integer) (Take π as 3.14)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 21 Question Id : 8643513441 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

VHF সংকেত সম্প্রচারৰ বাবে, যদিহে গ্ৰাহক এণ্টেনা মাটিত থাকে, 30 m উচ্চতাৰ এক এণ্টেনা স্তম্ভই সৰ্বোচ্চ _____ km² সেৱা ক্ষেত্ৰ আবৃত কৰিব। ধৰা পৃথিৱীৰ ব্যাসাৰ্ধ 6400 km। (নিকটতম পূৰ্ণসংখ্যালৈ গোটকৰণ কৰা) ($\pi = 3.14$ লোৱা)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 22 Question Id : 8643513442 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If 2.5×10^{-6} N average force is exerted by a light wave on a non - reflecting surface of 30 cm² area during 40 minutes of time span, the energy flux of light just before it falls on the surface is _____ W/cm². (Round off to the Nearest Integer)

(Assume complete absorption and normal incidence conditions are there)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 22 Question Id : 8643513442 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

30 cm² কালিৰ এখন অপৰাবৰ্তী (non - reflecting) পৃষ্ঠত 40 মিনিট সময় ধৰি এটা পোহৰ তৰংগই 2.5×10^{-6} N গড় বল দিয়ে। পৃষ্ঠত পৰাৰ ঠিক আগতে পোহৰ শক্তি অভিবাহ হয় _____ W/cm²। (নিকটতম পূৰ্ণসংখ্যালৈ গোটেৰণ কৰা)

(ধৰি লোৱা তাত সম্পূৰ্ণ শোষণ হৈছে আৰু উলম্বভাৱে আপতন হৈছে)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

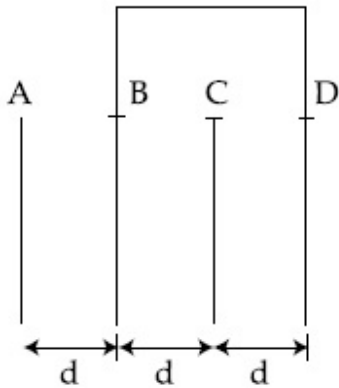
Possible Answers :

100

Question Number : 23 Question Id : 8643513443 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Four identical rectangular plates with length, $l = 2$ cm and breadth, $b = \frac{3}{2}$ cm are arranged as shown in figure. The equivalent capacitance between A and C is $\frac{x\epsilon_0}{d}$. The value of x is _____ . (Round off to the Nearest Integer)



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

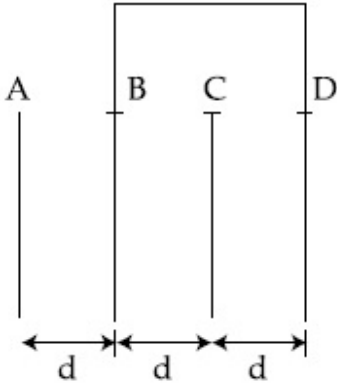
Possible Answers :

100

Question Number : 23 Question Id : 8643513443 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

চিত্রত দেখুওৱা ধৰণে দৈৰ্ঘ্য, $l=2\text{ cm}$ আৰু প্ৰস্থ, $b = \frac{3}{2}\text{ cm}$ ৰ চাৰিখন সাইলাখ একেই আয়তকাৰ পাত সজোৱা হৈছে। A আৰু C ৰ মাজত সমতুল্য ধাৰকত্ব $\frac{x\epsilon_0}{d}$ । x ৰ মান _____। (নিকটতম পূৰ্ণসংখ্যালৈ গোটকৰণ কৰা)



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 24 Question Id : 8643513444 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The equivalent resistance of series combination of two resistors is 's'. When they are connected in parallel, the equivalent resistance is 'p'. If $s = np$, then the minimum value for n is _____. (Round off to the Nearest Integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 24 Question Id : 8643513444 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

দুটা বোধৰ শ্ৰেণীবদ্ধ সজ্জাৰ সমতুল্য বোধ 's'। যেতিয়া সিহঁতক সমান্তৰালভাৱে সজোৱা হয়, সমতুল্য বোধ হয় 'p'। যদি $s = np$ হয়, তেন্তে n ৰ নিম্নতম মান হয় _____। (নিকটতম পূৰ্ণসংখ্যালৈ গোটকৰণ কৰা)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 25 **Question Id :** 8643513445 **Question Type :** SA

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

A parallel plate capacitor whose capacitance C is 14 pF is charged by a battery to a potential difference $V = 12$ V between its plates. The charging battery is now disconnected and a porcelain plate with $k = 7$ is inserted between the plates, then the plate would oscillate back and forth between the plates with a constant mechanical energy of _____ pJ.

(Assume no friction)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 25 **Question Id :** 8643513445 **Question Type :** SA

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

এটা বেটেৰীৰ সহায়ত, পাতদুখনৰ মাজৰ বিভৱান্তৰ $V = 12$ V হোৱালৈ এটা সমান্তৰাল পাত ধাৰকক, যাৰ ধাৰকত্ব C হয় 14 pF, আধানযুক্ত কৰা হৈছে। বেটেৰীটো এতিয়া বিচ্ছিন্ন কৰি $k = 7$ ৰ এখন পৰ্চেলৈইন প্লেট পাতদুখনৰ মাজত সোমোৱাই দিয়া হৈছে। তেতিয়া পাতদুখনৰ মাজত প্লেটখনে এক ধ্ৰুৱক যান্ত্ৰিক শক্তি _____ pJ ৰে অগা-পিছাকৈ দোলন কৰিব। (কোনো ঘৰ্ষণ নাই বুলি ধৰা)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 26 **Question Id :** 8643513446 **Question Type :** SA

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

The radius in kilometer to which the present radius of earth ($R = 6400$ km) to be compressed so that the escape velocity is increased 10 times is _____ .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 26 **Question Id :** 8643513446 **Question Type :** SA

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

যাতে পলায়ন বেগ 10 গুণ বৃদ্ধি হয় তাৰ বাবে পৃথিৱীৰ বৰ্তমান ব্যাসার্ধক ($R = 6400$ km) _____ km ব্যাসার্ধ পৰ্য্যন্ত সংকোচিত কৰিব লাগিব।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 27 **Question Id :** 8643513447 **Question Type :** SA

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

The angular speed of truck wheel is increased from 900 rpm to 2460 rpm in 26 seconds. The number of revolutions by the truck engine during this time is _____.

(Assuming the acceleration to be uniform).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 27 **Question Id :** 8643513447 **Question Type :** SA

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

26 seconds ত এটা ট্ৰাকৰ চকাৰ কৌণিক দ্ৰুটি 900 rpm ৰ পৰা 2460 rpm লৈ বৃদ্ধি কৰা হৈছে। এই সময়ছোৱাত ট্ৰাকৰ ইঞ্জিনৰ পৰিক্ৰমণৰ সংখ্যা হয় _____।

(স্বৰন সুযম বুলি ধৰি)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 28 **Question Id :** 8643513448 **Question Type :** SA

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

Consider two identical springs each of spring constant k and negligible mass compared to the mass M as shown. Fig. 1 shows one of them and Fig. 2 shows their series combination.

The ratios of time period of oscillation of the two SHM is $T_b/T_a = \sqrt{x}$, where value of x is

_____. (Round off to the Nearest Integer)

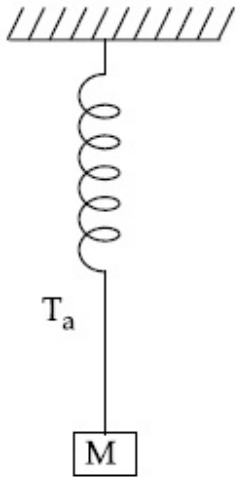


Fig 1

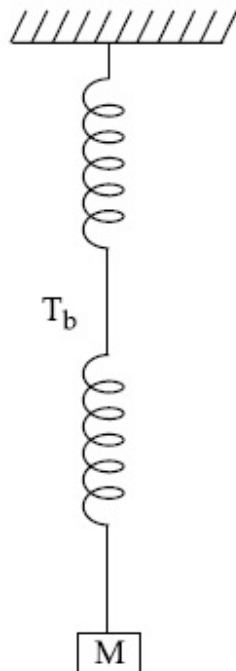


Fig 2

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

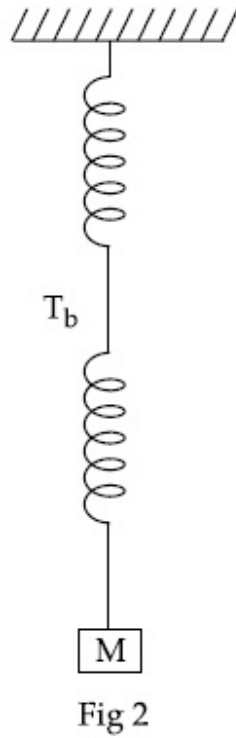
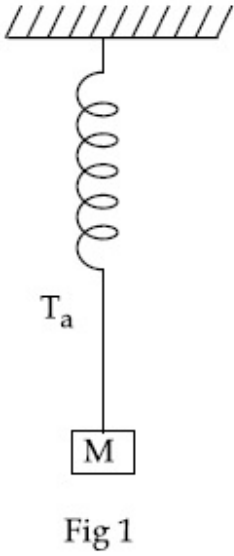
Possible Answers :

100

Question Number : 28 Question Id : 8643513448 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

প্রত্যেকৰে স্প্ৰিং ফ্ৰিক k ৰ আৰু M ভৰৰ তুলনাত নগন্য ভৰৰ দুডাল স্প্ৰিং চিত্ৰত দেখুওৱা ধৰণে ৰখা হৈছে। চিত্ৰ 1 ত সিহঁতৰ এটা দেখুওৱা হৈছে আৰু চিত্ৰ 2 ত সিহঁতৰ শ্ৰেণীবদ্ধ সংযোজন দেখুওৱা হৈছে। দুয়োটা সৰল পৰ্যাবৃত্ত দোলকৰ দোলনৰ পৰ্যায়কালৰ অনুপাত $T_b/T_a = \sqrt{x}$, য'ত x ৰ মান _____। (নিকটতম পূৰ্ণসংখ্যালৈ গোটকৰণ কৰা)



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 29 Question Id : 8643513449 Question Type : SA

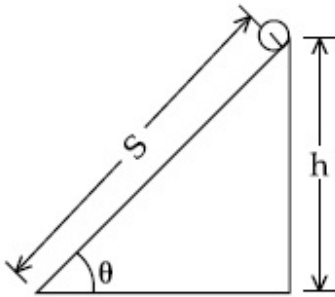
Correct Marks : 4 Wrong Marks : 0

The following bodies,

- (1) a ring
- (2) a disc
- (3) a solid cylinder
- (4) a solid sphere,

of same mass ' m ' and radius ' R ' are allowed to roll down without slipping simultaneously from the top of the inclined plane. The body which will reach first at the bottom of the inclined plane is _____.

[Mark the body as per their respective numbering given in the question]



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 29 **Question Id :** 8643513449 **Question Type :** SA

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

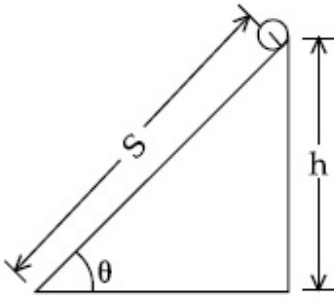
একেই ভৰ 'm' আৰু ব্যাসাৰ্ধ 'R' ৰ এই চাৰিটা বস্তু,

- (1) এটা আঙুঠি
- (2) এটা থাল
- (3) এটা গোটা চুঙা
- (4) এটা গোটা গোলক ক

এখন হেলনীয়া তলৰ শীৰ্ষবিন্দুৰ পৰা সমসাময়িকভাৱে নিপিছলাকৈ বাগৰি আহিবলৈ দিয়া হৈছে।

হেলনীয়া তলখনৰ তলি প্ৰথমে পোৱা বস্তুটো হয় _____ ।

[প্ৰতিটো বস্তুক প্ৰশ্নত দিয়া, সংখ্যাৰূপে অনুসৰি চিন দিয়া]



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

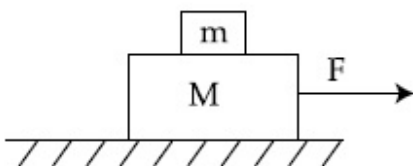
Question Number : 30 **Question Id :** 8643513450 **Question Type :** SA

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

Two blocks ($m=0.5 \text{ kg}$ and $M=4.5 \text{ kg}$) are arranged on a horizontal frictionless table as shown in figure. The coefficient of static friction between the two blocks is $\frac{3}{7}$. Then the

maximum horizontal force that can be applied on the larger block so that the blocks move

together is _____ N. (Round off to the Nearest Integer) [Take g as 9.8 ms^{-2}]



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

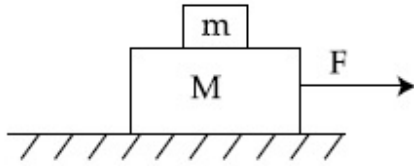
Question Number : 30 **Question Id :** 8643513450 **Question Type :** SA

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

এখন আনুভূমিক ঘর্ষণহীন টেবুলত চিত্রত দেখুওৱা ধৰণে দুটা ব্লকক ($m = 0.5 \text{ kg}$ আৰু $M = 4.5 \text{ kg}$) সজোৱা হৈছে।

দুয়োটা ব্লকৰ মাজৰ স্ট্ৰেটিক ঘৰ্ষণ গুণাংক $\frac{3}{7}$ । যাতে ব্লক দুটা একেলগে গতি কৰে তাৰ বাবে ডাঙৰ ব্লকটোত দিব পৰা

সৰ্বোচ্চ আনুভূমিক বল হয় _____ N। (নিকটতম পূৰ্ণসংখ্যালৈ গোটকৰণ কৰা) [$g = 9.8 \text{ ms}^{-2}$ লোৱা]



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Chemistry Section A

Section Id :	864351231
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 :	864351231
Question Shuffling Allowed :	Yes

Question Number : 31 **Question Id :** 8643513451 **Question Type :** MCQ **Option Shuffling :** Yes **Is**

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A central atom in a molecule has two lone pairs of electrons and forms three single bonds.
The shape of this molecule is :

Options :

86435110351. planar triangular

86435110352. T-shaped

86435110353. see-saw

86435110354. trigonal pyramidal

Question Number : 31 Question Id : 8643513451 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

এটা অণুত থকা কেন্দ্ৰীয় পৰমাণুত দুটা একাকী ইলেক্ট্ৰনযুগ্ম আছে আৰু তিনিটা একক বান্ধনি বনায়। এই অণুৰ আকৃতি :

Options :

86435110351. সমতলীয় ত্ৰিভুজাকাৰ

86435110352. T-আকৃতিৰ

86435110353. ঢেঁকী আকৃতি

86435110354. ত্ৰিভুজাকাৰ পিৰামিডীয়

Question Number : 32 Question Id : 8643513452 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A colloidal system consisting of a gas dispersed in a solid is called a/an :

Options :

86435110355. aerosol

86435110356. solid sol

86435110357. foam

86435110358. গেল

Question Number : 32 Question Id : 8643513452 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

এটা কলয়ড, য'ত এটা গেছ বিস্তাৰণ কৰা হয় এটা কঠিনত, তাক কোৱা হয় এটা :

Options :

86435110355. এৰোছল

86435110356. কঠিন ছল

86435110357. ফ'ম

86435110358. জেল

Question Number : 33 Question Id : 8643513453 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The absolute value of the electron gain enthalpy of halogens satisfies :

Options :

86435110359. $F > Cl > Br > I$

86435110360. $Cl > F > Br > I$

86435110361. $Cl > Br > F > I$

86435110362. $I > Br > Cl > F$

Question Number : 33 Question Id : 8643513453 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

হেল'জেনৰ ইলেক্ট্ৰন গ্ৰহণ এনথালপী এ তৃপ্ত কৰা বিশুদ্ধ (absolute) মান হ'ল :

Options :

86435110359. $F > Cl > Br > I$

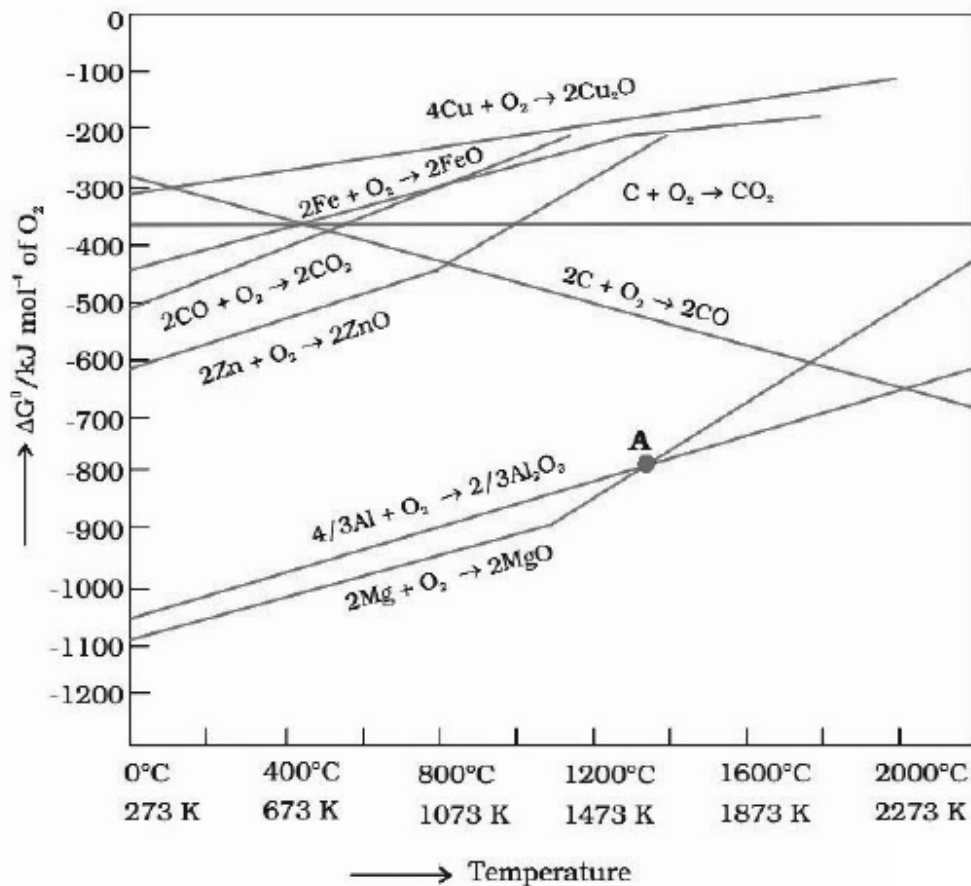
86435110360. $Cl > F > Br > I$

86435110361. $\text{Cl} > \text{Br} > \text{F} > \text{I}$ 86435110362. $\text{I} > \text{Br} > \text{Cl} > \text{F}$

Question Number : 34 Question Id : 8643513454 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The point of intersection and sudden increase in the slope, in the diagram given below, respectively, indicates :



Options :

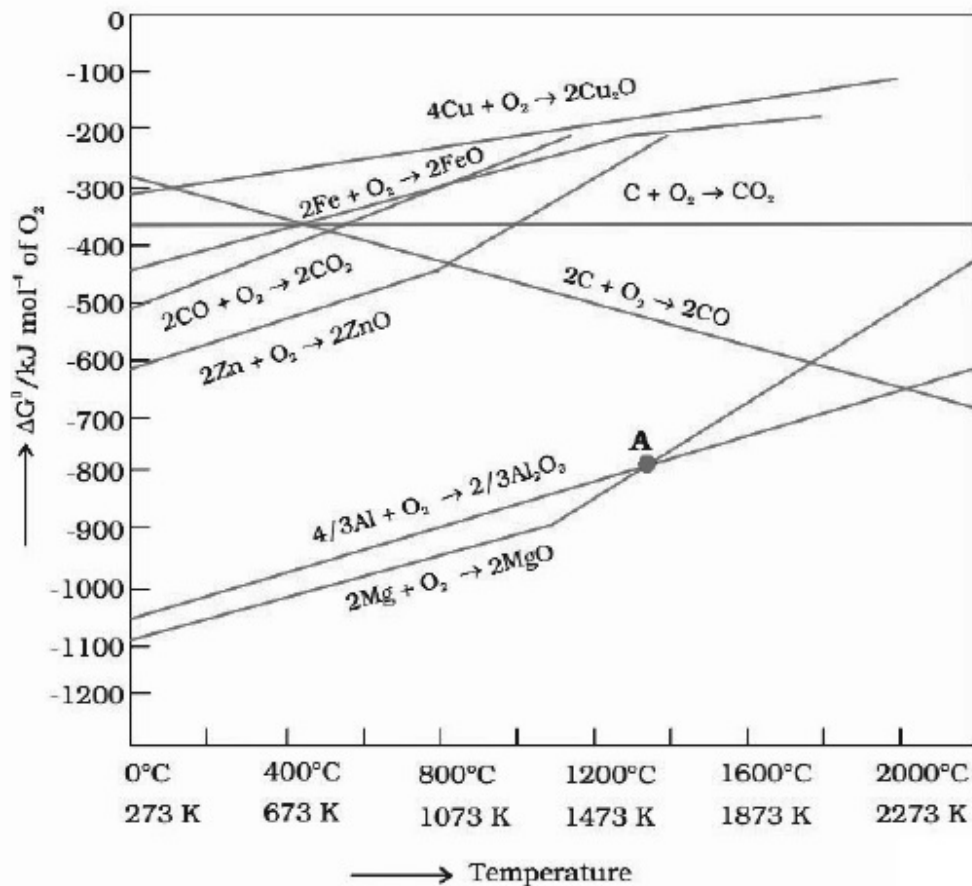
86435110363. $\Delta G < 0$ and decomposition of the metal oxide86435110364. $\Delta G > 0$ and decomposition of the metal oxide86435110365. $\Delta G = 0$ and melting or boiling point of the metal oxide86435110366. $\Delta G = 0$ and reduction of the metal oxide

Question Number : 34 Question Id : 8643513454 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ছেদবিন্দু আৰু হঠাতে বাঢ়ি যোৱা নতিএ নিম্নলিখিত চিত্ৰত, যথাক্ৰমে সূচায়



Options :

86435110363. $\Delta G < 0$ আৰু ধাতু অক্সাইডৰ বিয়োজন

86435110364. $\Delta G > 0$ আৰু ধাতু অক্সাইডৰ বিয়োজন

86435110365. $\Delta G = 0$ আৰু ধাতু অক্সাইডৰ গলনাংক বা উতলাংক

86435110366. $\Delta G = 0$ আৰু ধাতু অক্সাইডৰ বিজাৰণ

Question Number : 35 Question Id : 8643513455 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The **INCORRECT** statement(s) about heavy water is (are)

- (A) used as a moderator in nuclear reactor
- (B) obtained as a by-product in fertilizer industry
- (C) used for the study of reaction mechanism
- (D) has a higher dielectric constant than water

Choose the correct answer from the options given below :

Options :

86435110367. (C) only

86435110368. (B) only

86435110369. (D) only

86435110370. (B) and (D) only

Question Number : 35 Question Id : 8643513455 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

গধুৰ পানীৰ বিষয়ে অশুদ্ধ উক্তি (উক্তিবোৰ) হ'ল :

- (A) নিউক্লীয় বিক্রিয়াত মছৰক হিচাপে ব্যৱহাৰ কৰা হয়।
- (B) উৰ্বৰ (fertilizer) উদ্যোগত উপ-উৎপাদন হিচাপে পোৱা যায়।
- (C) বিক্রিয়াৰ ক্রিয়াবিধি অধ্যয়নৰ বাবে ব্যৱহাৰ কৰা হয়।
- (D) পানীতকৈ বেছি পৰাবৈদ্যুতিক ধ্ৰুৱক ব মান।

নিম্নলিখিত বিকল্পৰ পৰা শুদ্ধ উত্তৰ বাছি উলিওৱা :

Options :

86435110367. (C) মাত্ৰ

86435110368. (B) মাত্ৰ

86435110369. (D) মাত্ৰ

86435110370. (B) আৰু (D) মাত্ৰ

Question Number : 36 Question Id : 8643513456 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The correct order of conductivity of ions in water is :

Options :

86435110371. $\text{Cs}^+ > \text{Rb}^+ > \text{K}^+ > \text{Na}^+$

86435110372. $\text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$

86435110373. $\text{K}^+ > \text{Na}^+ > \text{Cs}^+ > \text{Rb}^+$

86435110374. $\text{Rb}^+ > \text{Na}^+ > \text{K}^+ > \text{Li}^+$

Question Number : 36 Question Id : 8643513456 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

পানিত আয়নবোৰৰ পৰিৱহণতাৰ শুদ্ধ ক্ৰম :

Options :

86435110371. $\text{Cs}^+ > \text{Rb}^+ > \text{K}^+ > \text{Na}^+$

86435110372. $\text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$

86435110373. $\text{K}^+ > \text{Na}^+ > \text{Cs}^+ > \text{Rb}^+$

86435110374. $\text{Rb}^+ > \text{Na}^+ > \text{K}^+ > \text{Li}^+$

Question Number : 37 Question Id : 8643513457 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following compound CANNOT act as a Lewis base ?

Options :

86435110375. ClF_3

86435110376. PCl_5

86435110377. NF_3

86435110378. SF_4

Question Number : 37 Question Id : 8643513457 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

নিম্নলিখিত কোনটো যৌগই লুইছ ক্ষাৰ হিচাপে ভূমিকা লব নোৱাৰে ?

Options :

86435110375. ClF_3

86435110376. PCl_5

86435110377. NF_3

86435110378. SF_4

Question Number : 38 Question Id : 8643513458 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

What is the spin-only magnetic moment value (BM) of a divalent metal ion with atomic number 25, in it's aqueous solution ?

Options :

86435110379. 5.0

86435110380. 5.26

86435110381. 5.92

86435110382. zero

Question Number : 38 Question Id : 8643513458 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

এটা দ্বিযোজী ধাতু আয়ন, যাৰ পাৰমাণৱিক সংখ্যা 25, তাৰ পানীৰ দ্ৰৱত ঘূৰ্ণন মাত্ৰ চুম্বকীয় ভ্ৰামকৰ মান (BM) কি ?

Options :

86435110379. 5.0

86435110380. 5.26

86435110381. 5.92

86435110382. শূন্য

Question Number : 39 Question Id : 8643513459 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : Potassium permanganate on heating at 573 K forms potassium manganate.

Statement II : Both potassium permanganate and potassium manganate are tetrahedral and paramagnetic in nature.

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

Options :

86435110383. Both statement I and statement II are false

86435110384. Both statement I and statement II are true

86435110385. Statement I is true but statement II is false

86435110386. Statement I is false but statement II is true

Question Number : 39 Question Id : 8643513459 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

তলত দুটা উক্তি দিয়া হ'ল :

উক্তি I : পটাছিয়াম পাবম্যাঙ্গানেটক 573 K লৈ গৰম কৰিলে পটাছিয়াম ম্যাঙ্গানেট উৎপন্ন কৰে।

উক্তি II : পটাছিয়াম পাবম্যাঙ্গানেট আৰু পটাছিয়াম ম্যাঙ্গানেট দুয়োটা চতুৰ্ফলকীয় আৰু অনুচুম্বকীয় প্ৰকৃতিৰ।

ওপৰৰ উক্তিৰ আলমত, আটাইতকৈ উপযুক্ত উক্তিটো নিম্নলিখিত বিকল্পৰপৰা বাছি উলিওৱা :

Options :

86435110383. উক্তি I আৰু উক্তি II দুয়োটা অসত্য

86435110384. উক্তি I আৰু উক্তি II দুয়োটা সত্য

86435110385. উক্তি I সত্য কিন্তু উক্তি II অসত্য

86435110386. উক্তি I অসত্য কিন্তু উক্তি II সত্য

Question Number : 40 Question Id : 8643513460 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Reducing smog is a mixture of :

Options :

86435110387. Smoke, fog and O_3

86435110388. Smoke, fog and SO_2

86435110389. Smoke, fog and N_2O_3

86435110390. Smoke, fog and $CH_2 = CH - CHO$

Question Number : 40 Question Id : 8643513460 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

বিজাৰক ধূৱলী এটা মিশ্ৰ হ'ল :

Options :

86435110387. ধোঁৱা, কুঁৱলী আৰু O_3

86435110388. ধোঁৱা, কুঁৱলী আৰু SO_2

86435110389. ধোঁৱা, কুঁৱলী আৰু N_2O_3

86435110390. ধোঁৱা, কুঁৱলী আৰু $CH_2 = CH - CHO$

Question Number : 41 Question Id : 8643513461 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : Retardation factor (R_f) can be measured in meter/centimeter.

Statement II : R_f value of a compound remains constant in all solvents.

Choose the most appropriate answer from the options given below :

Options :

86435110391. Both statement I and statement II are true

86435110392. Both statement I and statement II are false

86435110393. Statement I is true but statement II is false

86435110394. Statement I is false but statement II is true

Question Number : 41 Question Id : 8643513461 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

তলত দুটা উক্তি দিয়া হ'ল :

উক্তি I : মছৰীকৰণ মাত্ৰা (R_f) মিটাৰ/ছেণ্টিমিটাৰত মাপ কৰিব পাৰে।

উক্তি II : এটা যৌগৰ R_f ৰ মান সকলো দ্ৰাৱকতে একে থাকে।

নিম্নলিখিত বিকল্পবপৰা আটাইতকৈ উপযুক্ত উত্তৰটো বাছি উলিওৱা :

Options :

86435110391. উক্তি I আৰু উক্তি II দুয়োটা সত্য

86435110392. উক্তি I আৰু উক্তি II দুয়োটা অসত্য

86435110393. উক্তি I সত্য কিন্তু উক্তি II অসত্য

86435110394. উক্তি I অসত্য কিন্তু উক্তি II সত্য

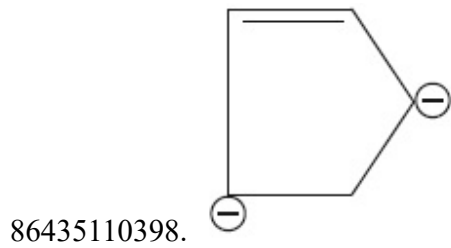
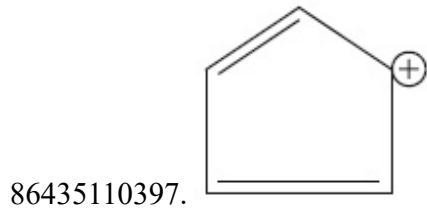
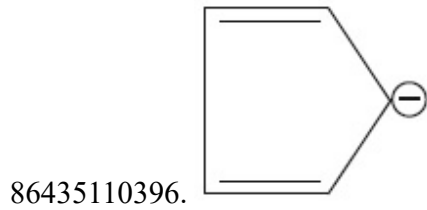
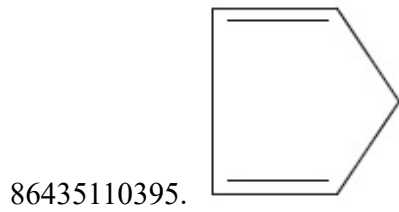
Question Number : 42 Question Id : 8643513462 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following is an aromatic compound ?

Options :

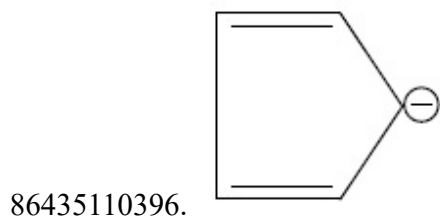
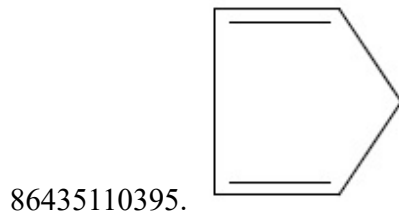


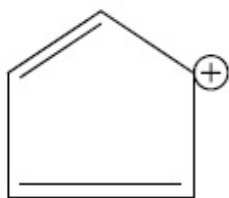
Question Number : 42 Question Id : 8643513462 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

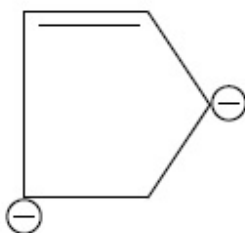
নিম্নলিখিত কোনটো এটা অর'মেটিক যৌগ ?

Options :





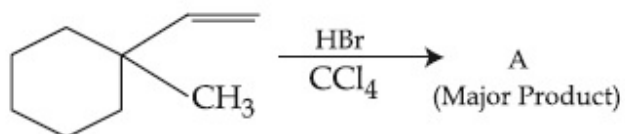
86435110397.



86435110398.

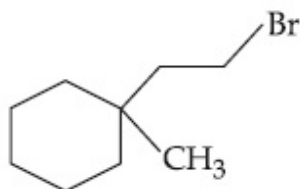
Question Number : 43 Question Id : 8643513463 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

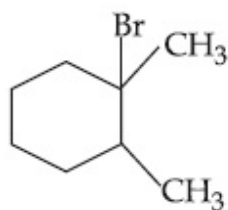


Product "A" in the above chemical reaction is :

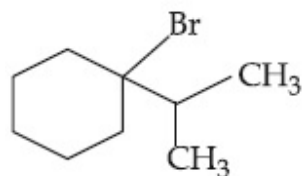
Options :



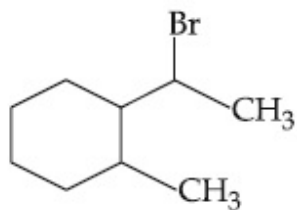
86435110399.



86435110400.



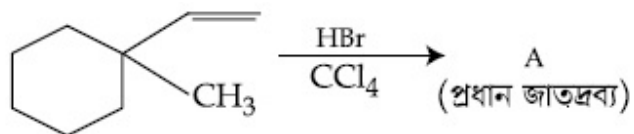
86435110401.



86435110402.

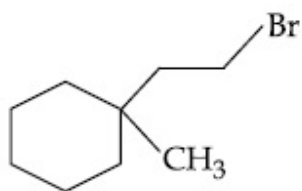
Question Number : 43 Question Id : 8643513463 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

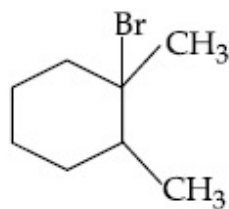


ওপৰৰ ৰাসায়নিক বিক্ৰিয়াত জাতদ্রব্য "A" হ'ল :

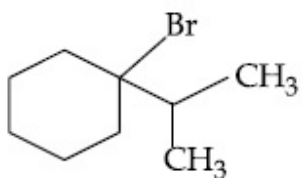
Options :



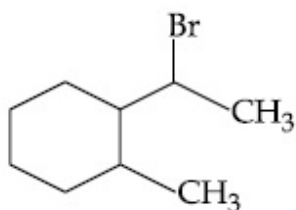
86435110399.



86435110400.



86435110401.



86435110402.

Question Number : 44 Question Id : 8643513464 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



The above reaction requires which of the following reaction conditions ?

Options :

86435110403. 623 K, Cu, 300 atm

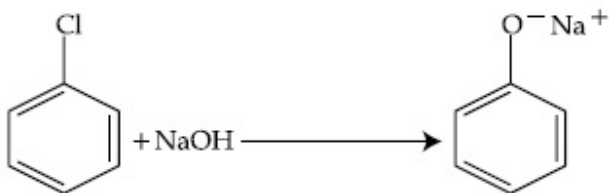
86435110404. 573 K, Cu, 300 atm

86435110405. 623 K, 300 atm

86435110406. 573 K, 300 atm

Question Number : 44 Question Id : 8643513464 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



ওপৰত দিয়া বিক্ৰিয়াই তলত দিয়া কোনটো বিক্ৰিয়া চৰ্ত বিচাৰে।

Options :

86435110403. 623 K, Cu, 300 atm

86435110404. 573 K, Cu, 300 atm

86435110405. 623 K, 300 atm

86435110406. 573 K, 300 atm

Question Number : 45 Question Id : 8643513465 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Mesityl oxide is a common name of :

Options :

86435110407. 4-Methyl pent-3-en-2-one

86435110408. 2,4-Dimethyl pentan-3-one

86435110409. 2-Methyl cyclohexanone

86435110410. 3-Methyl cyclohexane carbaldehyde

Question Number : 45 Question Id : 8643513465 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

মেছিটাইলঅক্সাইড হ'ল এটা সাধাৰণ নাম :

Options :

86435110407. 4-মিঠাইল পেন্ট-3-ইন-2-অ'ন

86435110408. 2,4-ডাইমিঠাইল পেন্টেন-3-অ'ন

86435110409. 2-মিঠাইল চাইক্ল'হেক্সান'ন

86435110410. 3-মিঠাইল চাইক্ল'হেক্সেন কাৰবেলডিহাইড

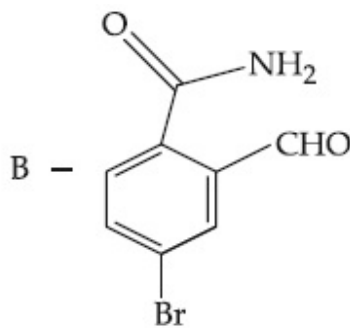
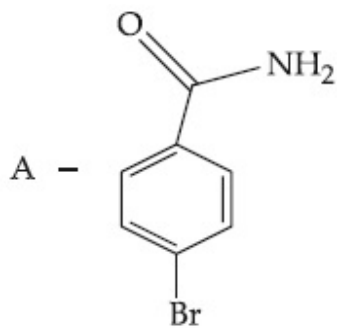
Question Number : 46 Question Id : 8643513466 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

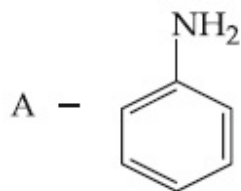
Hoffmann bromamide degradation of benzamide gives product A, which upon heating with CHCl_3 and NaOH gives product B.

The structures of A and B are :

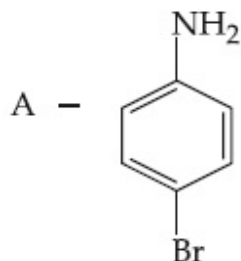
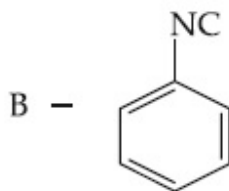
Options :



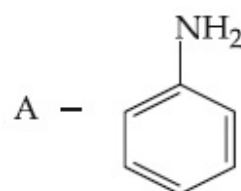
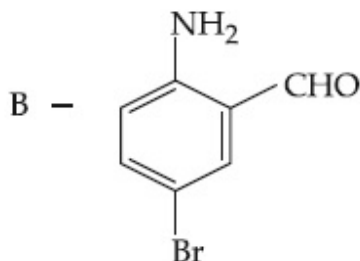
86435110411.



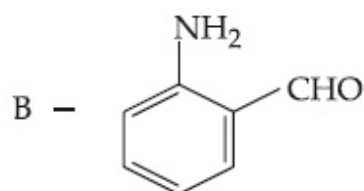
86435110412.



86435110413.



86435110414.



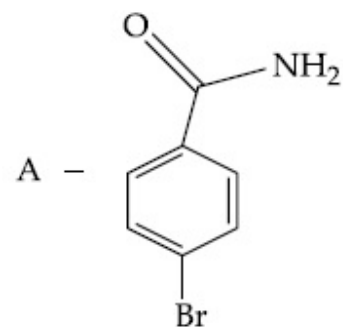
Question Number : 46 Question Id : 8643513466 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

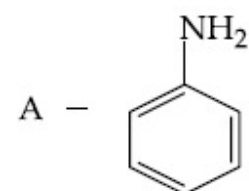
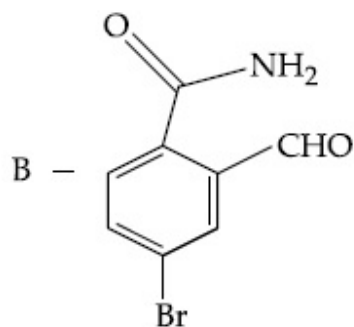
বেনযেমাইডৰ হফমেন ব্ৰ'মামাইড অৱনমন বিক্ৰিয়াই দিয়ে জাতদ্রব্য A, যাক CHCl_3 আৰু NaOH ৰ লগত গৰম কৰিলে দিয়ে জাতদ্রব্য B।

A আৰু B ৰ গঠন যথাক্ৰমে :

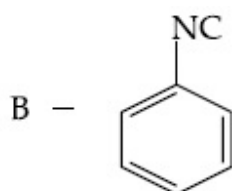
Options :

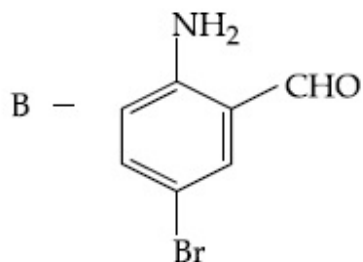
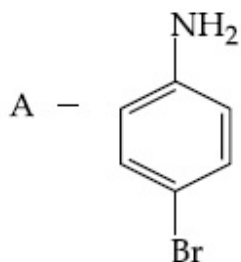


86435110411.

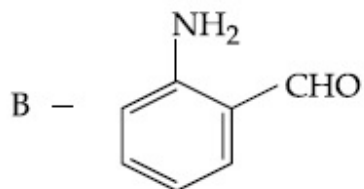
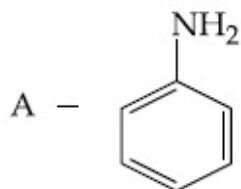


86435110412.





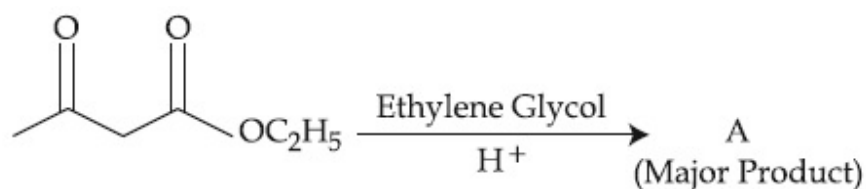
86435110413.



86435110414.

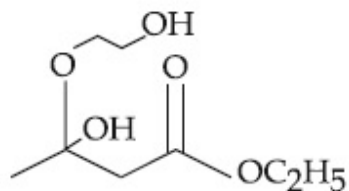
Question Number : 47 Question Id : 8643513467 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

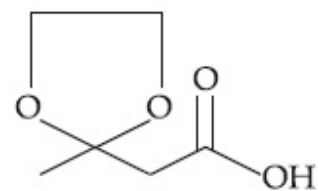


The product "A" in the above reaction is :

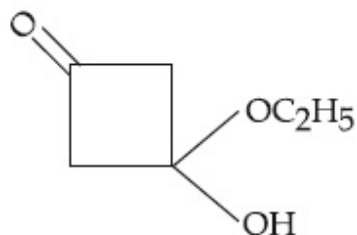
Options :



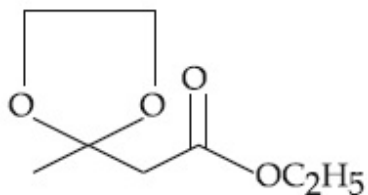
86435110415.



86435110416.



86435110417.

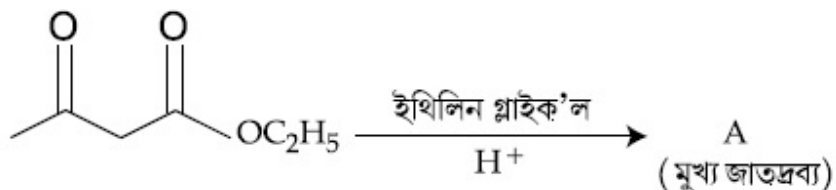


86435110418.

Question Number : 47 Question Id : 8643513467 Question Type : MCQ Option Shuffling : Yes Is

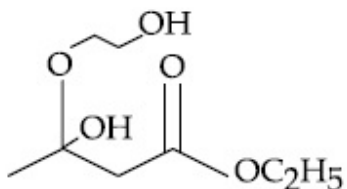
Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

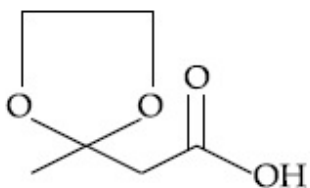


ওপৰৰ বিক্ৰিয়াত জাতদ্রব্য "A" হ'ল :

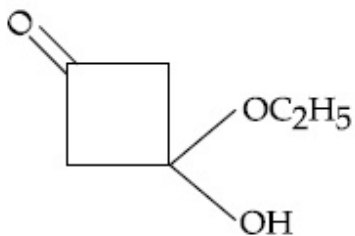
Options :



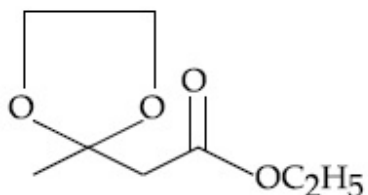
86435110415.



86435110416.



86435110417.



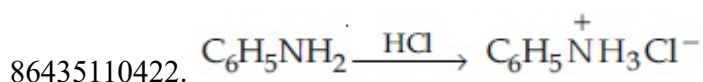
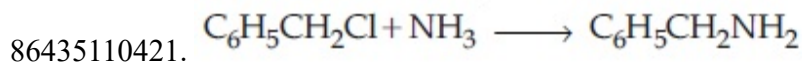
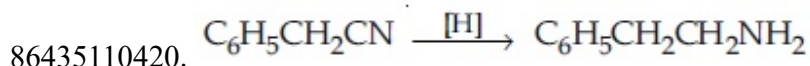
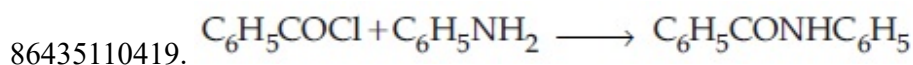
86435110418.

Question Number : 48 Question Id : 8643513468 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following reaction is an example of ammonolysis ?

Options :

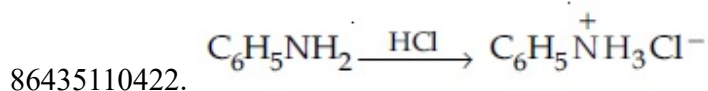
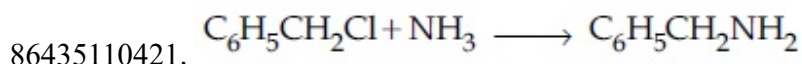
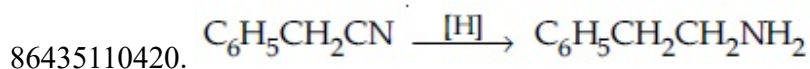
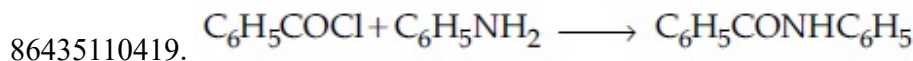


Question Number : 48 Question Id : 8643513468 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

নিম্নলিখিত কোনটো বিক্রিয়া এম'ন'লাইছিংৰ উদাহৰণ ?

Options :



Question Number : 49 Question Id : 8643513469 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

With respect to drug-enzyme interaction, identify the wrong statement.

Options :

86435110423. Competitive inhibitor binds to the enzyme's active site

86435110424. Allosteric inhibitor changes the enzyme's active site

86435110425. Allosteric inhibitor competes with the enzyme's active site

86435110426. Non-Competitive inhibitor binds to the allosteric site

Question Number : 49 Question Id : 8643513469 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ঔষধ এনজাইম আন্তঃক্রিয়া অনুসৰি, অশুদ্ধ উক্তিতো চিনাক্ত কৰা :

Options :

86435110423. প্রতিযোগিতামূলক দমনকাৰী এনজাইমৰ সক্ৰিয় স্থানত যোজিত হয়।

86435110424. এল'ষ্টেৰিক দমনকাৰীয়ে এনজাইমৰ সক্ৰিয় স্থানৰ পৰিবৰ্তন ঘটায়।

86435110425. এল'ষ্টেৰিক দমনকাৰীয়ে এনজাইমৰ সক্ৰিয় স্থানৰ লগত প্রতিযোগিতা কৰে।

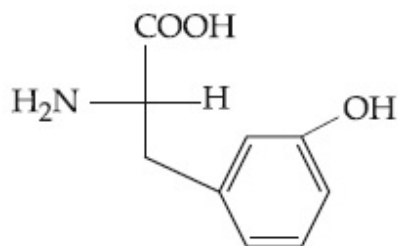
86435110426. অনা-প্রতিযোগিতামূলক দমনকাৰীয়ে এল'ষ্টেৰিক স্থানত বান্ধ খায়।

Question Number : 50 Question Id : 8643513470 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

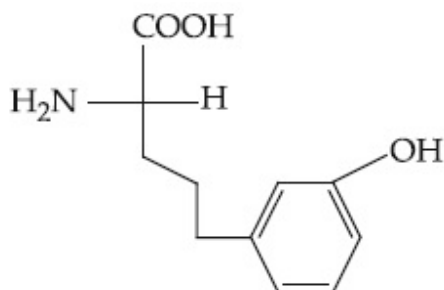
Correct Marks : 4 Wrong Marks : 1

Which of the following is correct structure of tyrosine ?

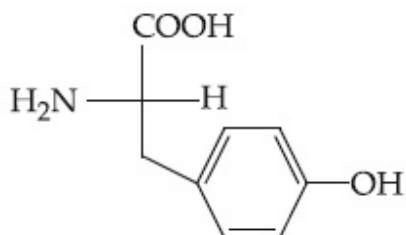
Options :



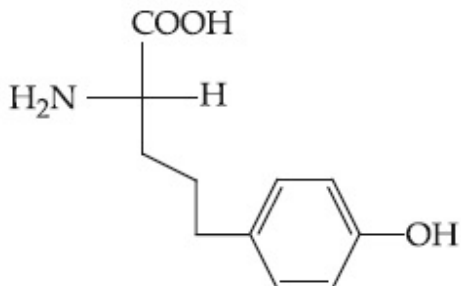
86435110427.



86435110428.



86435110429.



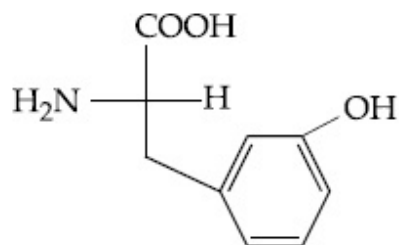
86435110430.

Question Number : 50 Question Id : 8643513470 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

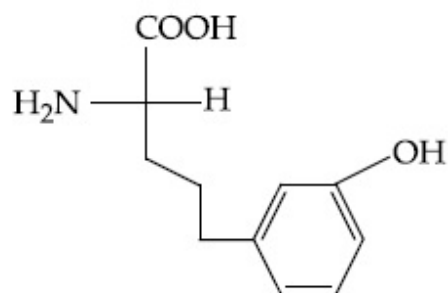
Correct Marks : 4 Wrong Marks : 1

তলত দিয়া কোনটো টাইৰ'ছিনৰ শুদ্ধ গঠন ?

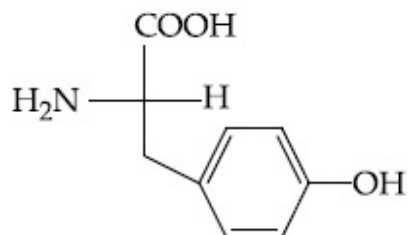
Options :



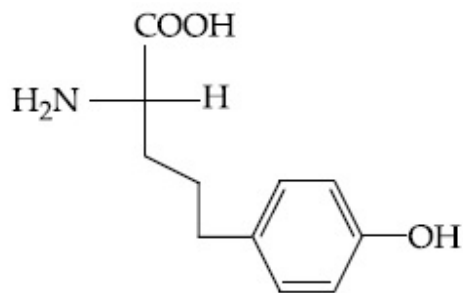
86435110427.



86435110428.



86435110429.



86435110430.

Chemistry Section B

Section Id :	864351232
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 :	864351232
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 8643513471 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The mole fraction of a solute in a 100 molal aqueous solution is _____ $\times 10^{-2}$.
(Round off to the Nearest Integer).

[Given : Atomic masses : H : 1.0 u, O : 16.0 u]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 51 Question Id : 8643513471 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

100 ম'লাল জলীয় দ্ৰৱত, এটা দ্ৰাৱ্যৰ ম'ল ভগ্নাংশ হ'ল _____ $\times 10^{-2}$ ।

(নিকটতম অখণ্ড সংখ্যাত)।

[দিয়া আছে : পাৰমাণৱিক ভৰ : H : 1.0 u, O : 16.0 u]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 52 **Question Id :** 8643513472 **Question Type :** SA

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

The pressure exerted by a non-reactive gaseous mixture of 6.4 g of methane and 8.8 g of carbon dioxide in a 10 L vessel at 27°C is _____ kPa.

(Round off to the Nearest Integer).

[Assume gases are ideal, $R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$

Atomic masses : C : 12.0 u, H : 1.0 u, O : 16.0 u]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 52 **Question Id :** 8643513472 **Question Type :** SA

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

27°C ত 10 L পাত্ৰ এটাত 6.4 g মিঠেন আৰু 8.8 g কাৰ্বন ডাই অক্সাইডৰ এটা অসক্ৰিয় গেছীয় মিশ্ৰই কৰা চাপৰ মান _____ kPa।

(নিকটতম অখণ্ড সংখ্যাত)।

[ধৰি লোৱা, গেছবোৰ আদৰ্শ, $R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$

পাৰমাণৱিক ভৰ : C : 12.0 u, H : 1.0 u, O : 16.0 u]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 53 Question Id : 8643513473 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

A certain orbital has $n=4$ and $m_l = -3$. The number of radial nodes in this orbital is _____. (Round off to the Nearest Integer).

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

100

Question Number : 53 Question Id : 8643513473 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

এটা অৰবিটেলৰ $n=4$ আৰু $m_l = -3$ । এই অৰবিটেলটোত ৰেডিয়েল ন'ডৰ সংখ্যা _____।
(নিকটতম অখণ্ড সংখ্যাত)।

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

100

Question Number : 54 Question Id : 8643513474 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

The standard enthalpies of formation of Al_2O_3 and CaO are $-1675 \text{ kJ mol}^{-1}$ and -635 kJ mol^{-1} respectively.

For the reaction

$$3\text{CaO} + 2\text{Al} \rightarrow 3\text{Ca} + \text{Al}_2\text{O}_3$$
 the standard reaction enthalpy $\Delta_r H^0 =$ _____ kJ.

(Round off to the Nearest Integer).

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

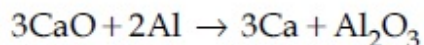
100

Question Number : 54 Question Id : 8643513474 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

প্ৰমাণ গঠন এনথালপী Al_2O_3 আৰু CaO ৰ মান হ'ল যথাক্ৰমে $-1675 \text{ kJ mol}^{-1}$ আৰু -635 kJ mol^{-1}

বিক্ৰিয়াটোৰ বাবে,



প্ৰমাণ বিক্ৰিয়া এনথালপী $\Delta_r H^\circ = \text{_____ kJ}$.

(নিকটতম অখণ্ড সংখ্যাত)।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 55 Question Id : 8643513475 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The oxygen dissolved in water exerts a partial pressure of 20 kPa in the vapour above water.

The molar solubility of oxygen in water is $\text{_____} \times 10^{-5} \text{ mol dm}^{-3}$.

(Round off to the Nearest Integer).

[Given : Henry's law constant = $K_H = 8.0 \times 10^4 \text{ kPa}$ for O_2 .

Density of water with dissolved oxygen = 1.0 kg dm^{-3}]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 55 Question Id : 8643513475 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

পানীত মিহলি হৈ থকা অক্সিজেন পানীৰ ওপৰত থকা ভাপত আংশিক চাপ 20 kPa উৎপন্ন কৰে। পানীত অক্সিজেনৰ ম'লাৰ দ্রৱণীয়তা হ'ল _____ $\times 10^{-5}$ mol dm⁻³।

(নিকটতম অখণ্ড সংখ্যাত)।

[দিয়া আছে : হেনৰিৰ সূত্র ধ্রুৱক = $K_H = 8.0 \times 10^4$ kPa, O₂ ৰ বাবে।

দ্রৱীভূত অক্সিজেনৰ সৈতে পানীৰ ঘনত্ব = 1.0 kg dm⁻³]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 56 **Question Id :** 8643513476 **Question Type :** SA

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

0.01 moles of a weak acid HA ($K_a = 2.0 \times 10^{-6}$) is dissolved in 1.0 L of 0.1 M HCl solution.

The degree of dissociation of HA is _____ $\times 10^{-5}$ (Round off to the Nearest Integer).

[Neglect volume change on adding HA.

Assume degree of dissociation $\ll 1$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 56 **Question Id :** 8643513476 **Question Type :** SA

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

1.0 L, 0.1 M HCl দ্রৱত 0.01 ম'লৰ এটা মৃদু এছিড HA ($K_a = 2.0 \times 10^{-6}$) মিহলোৱা হ'ল। HA ৰ বিয়োজন

মাত্রা _____ $\times 10^{-5}$ । (নিকটতম অখণ্ড সংখ্যাত)।

[HA যোগ কৰাত হোৱা আয়তন পৰিবৰ্তনক অৱহেলা কৰি।

ধৰিলোৱা বিয়োজনৰ মাত্রা $\ll 1$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 57 Question Id : 8643513477 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

15 mL of aqueous solution of Fe^{2+} in acidic medium completely reacted with 20 mL of 0.03 M aqueous $\text{Cr}_2\text{O}_7^{2-}$. The molarity of the Fe^{2+} solution is _____ $\times 10^{-2}$ M. (Round off to the Nearest Integer).

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

100

Question Number : 57 Question Id : 8643513477 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

0.03 M বা 20 mL জলীয় $\text{Cr}_2\text{O}_7^{2-}$ কে 15 mL Fe^{2+} বা জলীয় দ্রব অল্প মাধ্যমত সম্পূর্ণভাবে বিক্রিয়া কৰে। Fe^{2+} দ্রবৰ ম'লাৰিটি হ'ল _____ $\times 10^{-2}$ M। (নিকটতম অখণ্ড সংখ্যাত)।

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

100

Question Number : 58 Question Id : 8643513478 Question Type : SA**Correct Marks : 4 Wrong Marks : 0**

For a certain first order reaction 32% of the reactant is left after 570 s. The rate constant of this reaction is _____ $\times 10^{-3}$ s^{-1} . (Round off to the Nearest Integer).

[Given : $\log_{10}2 = 0.301$, $\ln 10 = 2.303$]**Response Type : Numeric****Evaluation Required For SA : Yes****Show Word Count : Yes****Answers Type : Equal****Text Areas : PlainText****Possible Answers :**

100

Question Number : 58 Question Id : 8643513478 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

এটা প্রথম ক্রমৰ বিক্রিয়াত 570 s ৰ পাছত 32% বিক্রিয়ক বৈ যায়। এই বিক্রিয়াটোৰ গতি ধ্রুবকৰ মান _____ $\times 10^{-3} \text{ s}^{-1}$ । (নিকটতম অখণ্ড সংখ্যাত)।

[দিয়া আছে : $\log_{10}2 = 0.301$, $\ln 10 = 2.303$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 59 Question Id : 8643513479 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The reaction of white phosphorus on boiling with alkali in inert atmosphere resulted in the formation of product 'A'. The reaction of 1 mol of 'A' with excess of AgNO_3 in aqueous medium gives _____ mol(s) of Ag. (Round off to the Nearest Integer).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 59 Question Id : 8643513479 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

বগা ফছফৰাছক ফ্ৰাৰৰ লগত নিষ্ক্ৰিয় বায়ুমণ্ডলত গৰম কৰিলে বিক্রিয়াত বিক্রিয়াজাত পদার্থ 'A' উৎপন্ন হয়। 1 mol 'A' ৰ অতিৰিক্ত AgNO_3 ৰ লগত জলীয় মাধ্যমত বিক্রিয়া কৰিলে দিয়ে _____ mol(s) Ag। (নিকটতম অখণ্ড সংখ্যাত)।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

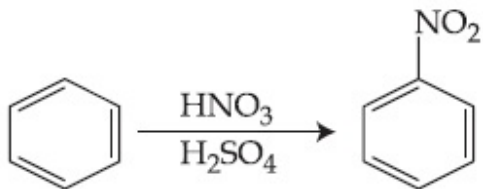
Text Areas : PlainText

Possible Answers :

100

Question Number : 60 Question Id : 8643513480 Question Type : SA

Correct Marks : 4 Wrong Marks : 0



In the above reaction, 3.9 g of benzene on nitration gives 4.92 g of nitrobenzene. The percentage yield of nitrobenzene in the above reaction is _____%. (Round off to the Nearest Integer).

(Given atomic mass : C : 12.0 u, H : 1.0 u, O : 16.0 u, N : 14.0 u)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

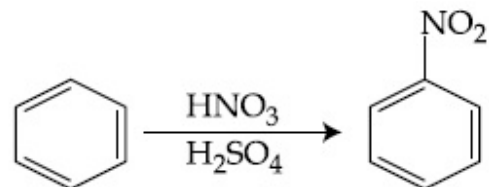
Text Areas : PlainText

Possible Answers :

100

Question Number : 60 Question Id : 8643513480 Question Type : SA

Correct Marks : 4 Wrong Marks : 0



ওপৰৰ বিক্ৰিয়াত, 3.9 g বেনজিনে নাইট্ৰেছনত দিয়ে 4.92 g নাইট্ৰবেনজিন। ওপৰৰ বিক্ৰিয়াত শতকৰা উৎপাদন নাইট্ৰবেনজিনৰ _____%।

(নিকটতম অখণ্ড সংখ্যাত)।

(দিয়া আছে : পাৰমাণৱিক ভৰ : C : 12.0 u, H : 1.0 u, O : 16.0 u, N : 14.0 u)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

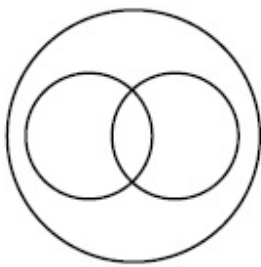
Section Id :	864351233
Section Number :	5
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	864351233
Question Shuffling Allowed :	Yes

Question Number : 61 Question Id : 8643513481 Question Type : MCQ Option Shuffling : Yes Is

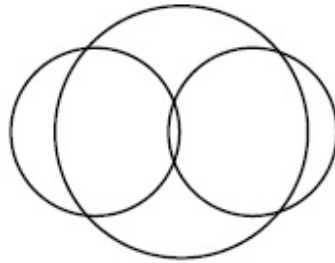
Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

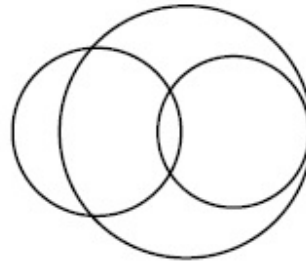
In a school, there are three types of games to be played. Some of the students play two types of games, but none play all the three games. Which Venn diagrams can justify the above statement ?



P



Q



R

Options :

86435110441. P and Q

86435110442. P and R

86435110443. Q and R

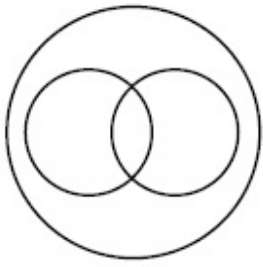
86435110444. None of these

Question Number : 61 Question Id : 8643513481 Question Type : MCQ Option Shuffling : Yes Is

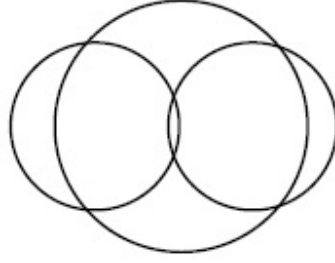
Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

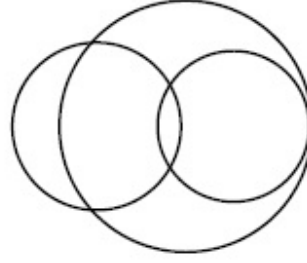
এখন বিদ্যালয়ত খেলিব পৰা তিনিবিধ খেল আছে। কিছুমান ছাত্ৰই দুই ধৰণৰ খেল খেলে, কিন্তু কোনেও তিনিবিধ খেল নেখেলে। কোনটো ভেনচিত্ৰই ওপৰোক্ত উক্তিটো সত্যাপিত কৰিব :



P



Q



R

Options :

86435110441. P আৰু Q

86435110442. P আৰু R

86435110443. Q আৰু R

86435110444. ওপৰৰ এটাও নহয়

Question Number : 62 Question Id : 8643513482 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The area of the triangle with vertices $A(z)$, $B(iz)$ and $C(z + iz)$ is :

Options :

86435110445. $\frac{1}{2} |z + iz|^2$

86435110446. $\frac{1}{2} |z|^2$

86435110447. $\frac{1}{2}$

86435110448. 1

Question Number : 62 Question Id : 8643513482 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$A(z)$, $B(iz)$ আৰু $C(z + iz)$ শীৰ্ষবিন্দু বিশিষ্ট ত্ৰিভুজৰ কালি হ'ব :

Options :

86435110445. $\frac{1}{2} |z + iz|^2$

86435110446. $\frac{1}{2} |z|^2$

86435110447. $\frac{1}{2}$

86435110448. 1

Question Number : 63 Question Id : 8643513483 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If $A = \begin{pmatrix} 0 & \sin\alpha \\ \sin\alpha & 0 \end{pmatrix}$ and $\det\left(A^2 - \frac{1}{2}I\right) = 0$, then a possible value of α is :

Options :

86435110449. $\frac{\pi}{4}$

86435110450. $\frac{\pi}{3}$

86435110451. $\frac{\pi}{6}$

86435110452. $\frac{\pi}{2}$

Question Number : 63 Question Id : 8643513483 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

যদি $A = \begin{pmatrix} 0 & \sin\alpha \\ \sin\alpha & 0 \end{pmatrix}$ আৰু $\det\left(A^2 - \frac{1}{2}I\right) = 0$, তেন্তে α ৰ সম্ভাৰ্য মান হ'ব:

Options :

$$86435110449. \frac{\pi}{4}$$

$$86435110450. \frac{\pi}{3}$$

$$86435110451. \frac{\pi}{6}$$

$$86435110452. \frac{\pi}{2}$$

Question Number : 64 Question Id : 8643513484 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The system of equations $kx + y + z = 1$, $x + ky + z = k$ and $x + y + zk = k^2$ has no solution if k is equal to :

Options :

$$86435110453. 0$$

$$86435110454. 1$$

$$86435110455. -1$$

$$86435110456. -2$$

Question Number : 64 Question Id : 8643513484 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$kx + y + z = 1$, $x + ky + z = k$ আৰু $x + y + zk = k^2$ সমীকৰণ প্ৰণালীটোৰ সমাধান নাথাকে যদি k সমান হয় :

Options :

$$86435110453. 0$$

$$86435110454. 1$$

$$86435110455. -1$$

86435110456. - 2

Question Number : 65 Question Id : 8643513485 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Team 'A' consists of 7 boys and n girls and Team 'B' has 4 boys and 6 girls. If a total of 52 single matches can be arranged between these two teams when a boy plays against a boy and a girl plays against a girl, then n is equal to :

Options :

86435110457. 2

86435110458. 4

86435110459. 5

86435110460. 6

Question Number : 65 Question Id : 8643513485 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

'A' দলটো 7 জন ল'ৰা আৰু n সংখ্যক ছোৱালীৰে গঠিত আৰু 'B' দলটো 4 জন ল'ৰা আৰু 6 জনী ছোৱালীৰে গঠিত। যদি এই দলদুটাৰ মাজত মুঠ 52 টা খেল পতা হয় যেতিয়া ল'ৰাই ল'ৰাৰ বিৰুদ্ধে আৰু ছোৱালীয়ে ছোৱালীৰ বিপক্ষে খেলে, তেন্তে n সমান হ'ব :

Options :

86435110457. 2

86435110458. 4

86435110459. 5

86435110460. 6

Question Number : 66 Question Id : 8643513486 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the fourth term in the expansion of $(x + x^{\log_2 x})^7$ is 4480, then the value of x where $x \in \mathbb{N}$ is equal to :

Options :

86435110461. 1

86435110462. 2

86435110463. 3

86435110464. 4

Question Number : 66 Question Id : 8643513486 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

যদি $(x + x^{\log_2 x})^7$ ৰ বিস্তাৰত চতুৰ্থ পদটো 4480 হয়, তেন্তে x ৰ মান সমান হ'ব য'ত $x \in \mathbb{N}$:

Options :

86435110461. 1

86435110462. 2

86435110463. 3

86435110464. 4

Question Number : 67 Question Id : 8643513487 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The value of $4 + \frac{1}{5 + \frac{1}{4 + \frac{1}{5 + \frac{1}{4 + \dots \infty}}}}$ is :

Options :

86435110465. $2 + \frac{2}{5}\sqrt{30}$

$$2 + \frac{4}{\sqrt{5}}\sqrt{30}$$

86435110466.

$$5 + \frac{2}{5}\sqrt{30}$$

86435110467.

$$4 + \frac{4}{\sqrt{5}}\sqrt{30}$$

86435110468.

Question Number : 67 Question Id : 8643513487 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

$$4 + \frac{1}{5 + \frac{1}{4 + \frac{1}{5 + \frac{1}{4 + \dots \infty}}}} \text{ ব মান হ'ব :}$$

Options :

$$2 + \frac{2}{5}\sqrt{30}$$

86435110465.

$$2 + \frac{4}{\sqrt{5}}\sqrt{30}$$

86435110466.

$$5 + \frac{2}{5}\sqrt{30}$$

86435110467.

$$4 + \frac{4}{\sqrt{5}}\sqrt{30}$$

86435110468.

Question Number : 68 Question Id : 8643513488 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If $\cot^{-1}(\alpha) = \cot^{-1}2 + \cot^{-1}8 + \cot^{-1}18 + \cot^{-1}32 + \dots$ upto 100 terms, then α is :

Options :

86435110469. 1.00

86435110470. 1.01

86435110471. 1.02

86435110472. 1.03

Question Number : 68 Question Id : 8643513488 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

যদি $\cot^{-1}(\alpha) = \cot^{-1}2 + \cot^{-1}8 + \cot^{-1}18 + \cot^{-1}32 + \dots$ 100 তম পদলৈ, তেন্তে α হ'ব :

Options :

86435110469. 1.00

86435110470. 1.01

86435110471. 1.02

86435110472. 1.03

Question Number : 69 Question Id : 8643513489 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The inverse of $y = 5^{\log x}$ is :

Options :

86435110473. $x = 5^{\frac{1}{\log y}}$ 86435110474. $x = y^{\frac{1}{\log 5}}$ 86435110475. $x = 5^{\log y}$ 86435110476. $x = y^{\log 5}$

Question Number : 69 Question Id : 8643513489 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$y = 5^{\log x}$ ৰ প্ৰতিলোম হ'ব :

Options :

$$x = 5^{\frac{1}{\log y}}$$

86435110473.

$$x = y^{\frac{1}{\log 5}}$$

86435110474.

$$x = 5^{\log y}$$

86435110475.

$$x = y^{\log 5}$$

86435110476.

Question Number : 70 Question Id : 8643513490 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The value of $\lim_{x \rightarrow 0^+} \frac{\cos^{-1}(x - [x]^2) \cdot \sin^{-1}(x - [x]^2)}{x - x^3}$, where $[x]$ denotes the greatest

integer $\leq x$ is :

Options :

$$\frac{\pi}{4}$$

86435110477.

$$0$$

86435110478.

$$\frac{\pi}{2}$$

86435110479.

$$\pi$$

86435110480.

Question Number : 70 Question Id : 8643513490 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$\lim_{x \rightarrow 0^+} \frac{\cos^{-1}(x - [x]^2) \cdot \sin^{-1}(x - [x]^2)}{x - x^3}, \text{ ব মান হ'ব :}$$

যত $[x] = x$ ব সমান বা x তকৈ সৰু গৰিষ্ঠ অখণ্ড সংখ্যা বুজাইছে।

Options :

86435110477. $\frac{\pi}{4}$

86435110478. 0

86435110479. $\frac{\pi}{2}$

86435110480. π

Question Number : 71 Question Id : 8643513491 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following statements is incorrect for the function $g(\alpha)$ for $\alpha \in \mathbb{R}$ such that

$$g(\alpha) = \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin^\alpha x}{\cos^\alpha x + \sin^\alpha x} dx$$

Options :

86435110481. $g(\alpha)$ is a strictly increasing function

86435110482. $g(\alpha)$ is a strictly decreasing function

86435110483. $g(\alpha)$ has an inflection point at $\alpha = -\frac{1}{2}$

86435110484. $g(\alpha)$ is an even function

Question Number : 71 Question Id : 8643513491 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$g(\alpha) = \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin^\alpha x}{\cos^\alpha x + \sin^\alpha x} dx, \text{ ত } g(\alpha) \text{ ফলনৰ } \alpha \in \mathbb{R} \text{ ৰ বাবে তলৰ কোনটো উক্তি অশুদ্ধ :}$$

Options :

86435110481. $g(\alpha)$ একদিষ্ট বৰ্ধমান ফলন

86435110482. $g(\alpha)$ একদিষ্ট হ্রাসমান ফলন

86435110483. $g(\alpha)$ ৰ $\alpha = -\frac{1}{2}$ বিন্দুত inflection বিন্দু আছে

86435110484. $g(\alpha)$ যুগ্ম ফলন

Question Number : 72 Question Id : 8643513492 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following is true for $y(x)$ that satisfies the differential equation

$$\frac{dy}{dx} = xy - 1 + x - y; y(0) = 0 :$$

Options :

86435110485. $y(1) = e^{-\frac{1}{2}} - 1$

86435110486. $y(1) = e^{\frac{1}{2}} - 1$

86435110487. $y(1) = e^{\frac{1}{2}} - e^{-\frac{1}{2}}$

86435110488. $y(1) = 1$

Question Number : 72 Question Id : 8643513492 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$\frac{dy}{dx} = xy - 1 + x - y; y(0) = 0 \text{ অৱকলন সমীকৰণটোক সিদ্ধ কৰাকৈ } y(x) \text{ ৰ বাবে তলৰ কোনটো সত্য :}$$

Options :

86435110485. $y(1) = e^{-\frac{1}{2}} - 1$

86435110486. $y(1) = e^{\frac{1}{2}} - 1$

86435110487. $y(1) = e^{\frac{1}{2}} - e^{-\frac{1}{2}}$

86435110488. $y(1) = 1$

Question Number : 73 Question Id : 8643513493 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In a triangle PQR, the co-ordinates of the points P and Q are $(-2, 4)$ and $(4, -2)$ respectively. If the equation of the perpendicular bisector of PR is $2x - y + 2 = 0$, then the centre of the circumcircle of the ΔPQR is :

Options :

86435110489. $(1, 4)$

86435110490. $(0, 2)$

86435110491. $(-1, 0)$

86435110492. $(-2, -2)$

Question Number : 73 Question Id : 8643513493 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

PQR ত্রিভুজত P আৰু Q বিন্দু দুটাৰ স্থানাংক ক্ৰমে $(-2, 4)$ আৰু $(4, -2)$ । যদি PR ৰ লম্ব সমদ্বিখণ্ডকৰ সমীকৰণ $2x - y + 2 = 0$ হয়, তেন্তে ΔPQR ত্রিভুজৰ পৰিকেন্দ্ৰৰ স্থানাংক হ'ব :

Options :

86435110489. $(1, 4)$

86435110490. $(0, 2)$

86435110491. $(-1, 0)$ 86435110492. $(-2, -2)$

Question Number : 74 Question Id : 8643513494 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The line $2x - y + 1 = 0$ is a tangent to the circle at the point $(2, 5)$ and the centre of the circle lies on $x - 2y = 4$. Then, the radius of the circle is :

Options :

86435110493. $5\sqrt{3}$ 86435110494. $5\sqrt{4}$ 86435110495. $4\sqrt{5}$ 86435110496. $3\sqrt{5}$

Question Number : 74 Question Id : 8643513494 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$2x - y + 1 = 0$ ৰেখাটো বৃত্ত এটাৰ $(2, 5)$ বিন্দুত এডাল স্পৰ্শক আৰু বৃত্তৰ কেন্দ্ৰটো $x - 2y = 4$ ৰেখাৰ ওপৰত থাকে। তেন্তে বৃত্তটোৰ কেন্দ্ৰ হ'ব :

Options :

86435110493. $5\sqrt{3}$ 86435110494. $5\sqrt{4}$ 86435110495. $4\sqrt{5}$ 86435110496. $3\sqrt{5}$

Question Number : 75 Question Id : 8643513495 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Choose the incorrect statement about the two circles whose equations are given below :

$$x^2 + y^2 - 10x - 10y + 41 = 0 \text{ and}$$

$$x^2 + y^2 - 16x - 10y + 80 = 0$$

Options :

86435110497. Circles have two intersection points.
86435110498. Both circles pass through the centre of each other.
86435110499. Both circles' centres lie inside region of one another.
86435110500. Distance between two centres is the average of radii of both the circles.

Question Number : 75 Question Id : 8643513495 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$x^2 + y^2 - 10x - 10y + 41 = 0$ আৰু $x^2 + y^2 - 16x - 10y + 80 = 0$ নিম্ন প্ৰদত্ত বৃত্ত দুটাৰ বাবে অশুদ্ধ উক্তিটো বাছি উলিওৱা :

Options :

86435110497. বৃত্ত দুটাৰ দুটা ছেদবিন্দু আছে।
86435110498. উভয় বৃত্ত দুটাই এটা আনটোৰ কেন্দ্ৰৰে পাৰ হয়।
86435110499. উভয় বৃত্তৰ কেন্দ্ৰবোৰ এটা আনটোৰ অন্তঃ অঞ্চলত থাকে।
86435110500. কেন্দ্ৰ দুটাৰ মাজৰ দূৰত্ব দুয়ো বৃত্তৰ ব্যাসাৰ্ধৰ গড়ৰ সমান।

Question Number : 76 Question Id : 8643513496 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The equation of the plane which contains the y -axis and passes through the point $(1, 2, 3)$ is :

Options :

86435110501. $3x + z = 6$
86435110502. $x + 3z = 10$

86435110503. $x + 3z = 0$

86435110504. $3x - z = 0$

Question Number : 76 Question Id : 8643513496 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

y - অক্ষক বখাকৈ (1, 2, 3) বিন্দুবে যোৱা সমতলৰ সমীকৰণ হ'ব :

Options :

86435110501. $3x + z = 6$

86435110502. $x + 3z = 10$

86435110503. $x + 3z = 0$

86435110504. $3x - z = 0$

Question Number : 77 Question Id : 8643513497 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the Boolean expression $(p \Rightarrow q) \Leftrightarrow (q * (\sim p))$ is a tautology, then the Boolean expression $p * (\sim q)$ is equivalent to :

Options :

86435110505. $P \Rightarrow q$

86435110506. $P \Rightarrow \sim q$

86435110507. $q \Rightarrow P$

86435110508. $\sim q \Rightarrow P$

Question Number : 77 Question Id : 8643513497 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

যদি $(p \Rightarrow q) \Leftrightarrow (q * (\sim p))$ বুলিন বাশিটো এটা পুনৰুক্তি হয়, তেন্তে $p * (\sim q)$ বুলিন বাশিটো সমতুল্য হ'ব :

Options :

86435110505. $P \Rightarrow Q$

86435110506. $P \Rightarrow \sim Q$

86435110507. $Q \Rightarrow P$

86435110508. $\sim Q \Rightarrow P$

Question Number : 78 Question Id : 8643513498 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $\vec{a} = 2\hat{i} - 3\hat{j} + 4\hat{k}$ and $\vec{b} = 7\hat{i} + \hat{j} - 6\hat{k}$.

If $\vec{r} \times \vec{a} = \vec{r} \times \vec{b}$, $\vec{r} \cdot (\hat{i} + 2\hat{j} + \hat{k}) = -3$, then $\vec{r} \cdot (2\hat{i} - 3\hat{j} + \hat{k})$ is equal to :

Options :

86435110509. 8

86435110510. 10

86435110511. 12

86435110512. 13

Question Number : 78 Question Id : 8643513498 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ধৰা হ'ল $\vec{a} = 2\hat{i} - 3\hat{j} + 4\hat{k}$ আৰু $\vec{b} = 7\hat{i} + \hat{j} - 6\hat{k}$ । যদি $\vec{r} \times \vec{a} = \vec{r} \times \vec{b}$,

$\vec{r} \cdot (\hat{i} + 2\hat{j} + \hat{k}) = -3$ তেন্তে $\vec{r} \cdot (2\hat{i} - 3\hat{j} + \hat{k})$ সমান হ'ব :

Options :

86435110509. 8

86435110510. 10

86435110511. 12

86435110512. $\frac{13}{12}$

Question Number : 79 Question Id : 8643513499 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two dices are rolled. If both dices have six faces numbered 1, 2, 3, 5, 7 and 11, then the probability that the sum of the numbers on the top faces is less than or equal to 8 is :

Options :

86435110513. $\frac{5}{12}$ 86435110514. $\frac{4}{9}$ 86435110515. $\frac{17}{36}$ 86435110516. $\frac{1}{2}$

Question Number : 79 Question Id : 8643513499 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

দুটা পাশতি দলিওৱা হ'ল। যদি দুয়োটা পাশতিৰ ছয়টা মুখ (face) আছে যাৰ সংখ্যাবোৰ 1, 2, 3, 5, 7 আৰু 11 তেন্তে শীৰ্ষ মুখত সংখ্যাবোৰৰ যোগফল 8 ৰ সমান বা 8 তকৈ কম থকা সংখ্যাৰ সম্ভাৱিতা হ'ব :

Options :

86435110513. $\frac{5}{12}$ 86435110514. $\frac{4}{9}$ 86435110515. $\frac{17}{36}$

$$\frac{1}{2}$$

86435110516.

Question Number : 80 Question Id : 8643513500 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The sum of possible values of x for $\tan^{-1}(x + 1) + \cot^{-1}\left(\frac{1}{x - 1}\right) = \tan^{-1}\left(\frac{8}{31}\right)$ is :

Options :

$$-\frac{33}{4}$$

86435110517.

$$-\frac{32}{4}$$

86435110518.

$$-\frac{31}{4}$$

86435110519.

$$-\frac{30}{4}$$

86435110520.

Question Number : 80 Question Id : 8643513500 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\tan^{-1}(x + 1) + \cot^{-1}\left(\frac{1}{x - 1}\right) = \tan^{-1}\left(\frac{8}{31}\right)$ ৰ বাবে x ৰ সম্ভাৱ্য মানৰ যোগফল হ'ব :

Options :

$$-\frac{33}{4}$$

86435110517.

$$-\frac{32}{4}$$

86435110518.

$$-\frac{31}{4}$$

86435110519.

$$-\frac{30}{4}$$

86435110520.

Mathematics Section B

Section Id :	864351234
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 :	864351234
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 8643513501 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The maximum value of z in the following equation $z = 6xy + y^2$, where $3x + 4y \leq 100$ and $4x + 3y \leq 75$ for $x \geq 0$ and $y \geq 0$ is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 81 Question Id : 8643513501 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$z = 6xy + y^2$, সমীকরণটোত z ব সর্বোচ্চ মান হ'ব :

যত $3x + 4y \leq 100$ আৰু

$4x + 3y \leq 75$,

$x \geq 0$

$y \geq 0$ ব বাবে _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 82 Question Id : 8643513502 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If $A = \begin{bmatrix} 2 & 3 \\ 0 & -1 \end{bmatrix}$, then the value of $\det(A^4) + \det(A^{10} - (\text{Adj}(2A))^{10})$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 82 Question Id : 8643513502 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

যদি $A = \begin{bmatrix} 2 & 3 \\ 0 & -1 \end{bmatrix}$, তেন্তে $\det(A^4) + \det(A^{10} - (\text{Adj}(2A))^{10})$ ৰ মান সমান হ'ব _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 83 Question Id : 8643513503 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If $(2021)^{3762}$ is divided by 17, then the remainder is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 83 Question Id : 8643513503 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

যদি $(2021)^{3762}$ ক 17 বে ভাগ করা হয়, তেন্তে ভাগশেষ হ'ব _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 84 Question Id : 8643513504 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the function $f(x) = \frac{\cos(\sin x) - \cos x}{x^4}$ is continuous at each point in its domain and

$f(0) = \frac{1}{k}$, then k is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 84 Question Id : 8643513504 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

যদি $f(x) = \frac{\cos(\sin x) - \cos x}{x^4}$ ফলনটো আদিক্ষেত্রৰ প্রতিটো বিন্দুত অবিচ্ছিন্ন আৰু $f(0) = \frac{1}{k}$, তেন্তে k

_____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 85 Question Id : 8643513505 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If $[\cdot]$ represents the greatest integer function, then the value of

$$\left| \int_0^{\sqrt{\frac{\pi}{2}}} [x^2] - \cos x \, dx \right| \text{ is } \underline{\hspace{2cm}}.$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 85 **Question Id :** 8643513505 **Question Type :** SA

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

যদি $[\cdot]$ এটা গরিষ্ঠ অখণ্ড ফলন বুজায়, তেন্তে $\left| \int_0^{\sqrt{\frac{\pi}{2}}} [x^2] - \cos x \, dx \right|$ ৰ মান হ'ব _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 86 **Question Id :** 8643513506 **Question Type :** SA

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

The minimum distance between any two points P_1 and P_2 while considering point P_1 on one circle and point P_2 on the other circle for the given circles' equations

$$x^2 + y^2 - 10x - 10y + 41 = 0$$

$$x^2 + y^2 - 24x - 10y + 160 = 0 \text{ is } \underline{\hspace{2cm}}.$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 86 Question Id : 8643513506 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

প্রদত্ত বৃত্তৰ সমীকৰণ

$$x^2 + y^2 - 10x - 10y + 41 = 0$$

$$x^2 + y^2 - 24x - 10y + 160 = 0$$

দুটাৰ বাবে P_1 আৰু P_2 বিন্দু দুটা এটা আৰু আনটো বৃত্তৰ ওপৰত থকা বিন্দু বুলি বিবেচনা কৰিলে P_1 আৰু P_2 বিন্দু দুটাৰ মাজত হ্রস্বতম/নিম্নতম দূৰত্ব হ'ব _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 87 Question Id : 8643513507 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the equation of the plane passing through the line of intersection of the planes $2x - 7y + 4z - 3 = 0$, $3x - 5y + 4z + 11 = 0$ and the point $(-2, 1, 3)$ is $ax + by + cz - 7 = 0$, then the value of $2a + b + c - 7$ is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 87 Question Id : 8643513507 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$(-2, 1, 3)$ বিন্দু আৰু $2x - 7y + 4z - 3 = 0$, $3x - 5y + 4z + 11 = 0$ সমতল দুডালৰ ছেদবিন্দুৰে যোৱা সমতলৰ সমীকৰণটো যদি $ax + by + cz - 7 = 0$ হয়, তেন্তে $2a + b + c - 7$ হ'ব _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 88 Question Id : 8643513508 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let there be three independent events E_1, E_2 and E_3 . The probability that only E_1 occurs is α , only E_2 occurs is β and only E_3 occurs is γ . Let 'p' denote the probability of none of events occurs that satisfies the equations $(\alpha - 2\beta)p = \alpha\beta$ and $(\beta - 3\gamma)p = 2\beta\gamma$. All the given probabilities are assumed to lie in the interval $(0, 1)$.

Then, $\frac{\text{Probability of occurrence of } E_1}{\text{Probability of occurrence of } E_3}$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 88 Question Id : 8643513508 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ধৰা হ'ল E_1, E_2 আৰু E_3 তিনিটা স্বতন্ত্ৰ ঘটনা। E_1 ঘটনাৰ সম্ভাৱিতা α , E_2 ঘটনাৰ সম্ভাৱিতা β আৰু E_3 ঘটনাৰ সম্ভাৱিতা γ । যদি কোনো এটা ঘটনা নঘটাৰ সম্ভাৱিতা 'p' হয় যিয়ে $(\alpha - 2\beta)p = \alpha\beta$ আৰু $(\beta - 3\gamma)p = 2\beta\gamma$ ক সিদ্ধ কৰে। সকলোবোৰ সম্ভাৱিতা $(0, 1)$ অন্তৰালত থকা বুলি ধৰা হৈছে।

তেন্তে $\frac{E_1 \text{ ঘটনাৰ সম্ভাৱিতা}}{E_3 \text{ ঘটনাৰ সম্ভাৱিতা}}$ সমান হ'ব _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 89 Question Id : 8643513509 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If $f(x) = \sin\left(\cos^{-1}\left(\frac{1 - 2^{2x}}{1 + 2^{2x}}\right)\right)$ and its first derivative with respect to x is $-\frac{b}{a}\log_e 2$ when

$x = 1$, where a and b are integers, then the minimum value of $|a^2 - b^2|$ is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 89 Question Id : 8643513509 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

যদি $f(x) = \sin\left(\cos^{-1}\left(\frac{1-2^{2x}}{1+2^{2x}}\right)\right)$ আৰু x সাপেক্ষে ফলনটোৰ ১ম অৱকলজ $-\frac{b}{a}\log_e 2$ যেতিয়া $x=1$, যত

a আৰু b অখণ্ড সংখ্যা। তেন্তে $|a^2 - b^2|$ ৰ নিম্নতম মান হ'ব _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 90 Question Id : 8643513510 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If $\vec{a} = \alpha \hat{i} + \beta \hat{j} + 3\hat{k}$,

$\vec{b} = -\beta \hat{i} - \alpha \hat{j} - \hat{k}$ and

$\vec{c} = \hat{i} - 2\hat{j} - \hat{k}$

such that $\vec{a} \cdot \vec{b} = 1$ and $\vec{b} \cdot \vec{c} = -3$, then $\frac{1}{3}((\vec{a} \times \vec{b}) \cdot \vec{c})$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 90 Question Id : 8643513510 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$$\text{যদি } \vec{a} = \alpha \hat{i} + \beta \hat{j} + 3\hat{k},$$

$$\vec{b} = -\beta \hat{i} - \alpha \hat{j} - \hat{k} \text{ আৰু}$$

$$\vec{c} = \hat{i} - 2\hat{j} - \hat{k},$$

$$\text{যাতে } \vec{a} \cdot \vec{b} = 1 \text{ আৰু}$$

$$\vec{b} \cdot \vec{c} = -3, \text{ তেন্তে}$$

$$\frac{1}{3}((\vec{a} \times \vec{b}) \cdot \vec{c}) \text{ সমান হ'ব } \underline{\hspace{2cm}}।$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100