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National Testing Agency

Question Paper Name :	BTECH E 3rd Sep 2020 Shift 1
Subject Name :	BTECH E
Creation Date :	2020-09-03 19:53:20
Duration :	180
Total Marks :	300
Display Marks:	Yes
Share Answer Key With Delivery Engine :	Yes
Actual Answer Key :	Yes

BTECH

Group Number :	1
Group Id :	405036118
Group Maximum Duration :	0
Group Minimum Duration :	180
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	300
Is this Group for Examiner? :	No

Physics

Section Id :	405036394
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	25

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Number of Questions to be attempted : 25
Section Marks : 100
Display Number Panel : Yes
Group All Questions : Yes
Mark As Answered Required? : Yes
Sub-Section Number : 1
Sub-Section Id : 405036755
Question Shuffling Allowed : Yes

Question Number : 1 Question Id : 40503610856 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

Using screw gauge of pitch 0.1 cm and 50 divisions on its circular scale, the thickness of an object is measured. It should correctly be recorded as :

Options :

40503639501. 2.123 cm

40503639502. 2.124 cm

40503639503. 2.125 cm

40503639504. 2.121 cm

Question Number : 1 Question Id : 40503610856 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

स्क्रू गेज का प्रयोग करके एक वस्तु की मोटाई नापी जाती है। यदि स्क्रू गेज की पिच 0.1 cm हो और इसके वृत्तीय स्केल पर 50 भाग हों तो वस्तु की माटोई को इस प्रकार से सही लिखा जायेगा :

Options :

40503639501. 2.123 cm

40503639502. 2.124 cm

40503639503. 2.125 cm

40503639504. 2.121 cm

Question Number : 2 Question Id : 40503610857 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A charged particle carrying charge 1 μC is moving with velocity $\left(2\hat{i}+3\hat{j}+4\hat{k}\right)$ ms^{-1}. If an external magnetic field of $\left(5\hat{i}+3\hat{j}-6\hat{k}\right)\times10^{-3}$ T exists in the region where the particle is moving then the force on the particle is $\vec{F}\times10^{-9}$ N. The vector $\vec{F}$ is :

Options :

40503639505. $-0.30\hat{i} + 0.32\hat{j} - 0.09\hat{k}$

40503639506. $-3.0\hat{i} + 3.2\hat{j} - 0.9\hat{k}$

40503639507. $-30\hat{i} + 32\hat{j} - 9\hat{k}$

40503639508. $-300\hat{i} + 320\hat{j} - 90\hat{k}$

Question Number : 2 Question Id : 40503610857 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक आवेशित कण जिस पर 1 μC का आवेश है $\left(2\hat{i} + 3\hat{j} + 4\hat{k}\right)$ ms^{-1} वेग से चल रहा है। यदि कण के आस पास $\left(5\hat{i} + 3\hat{j} - 6\hat{k}\right) \times 10^{-3}$ T का चुम्बकीय क्षेत्र हो तो कण पर लगने वाला बल $\vec{F} \times 10^{-9}$ N है। $\vec{F}$ वेक्टर है :

Options :

40503639505. $-0.30\hat{i} + 0.32\hat{j} - 0.09\hat{k}$

40503639506. $-3.0\hat{i} + 3.2\hat{j} - 0.9\hat{k}$

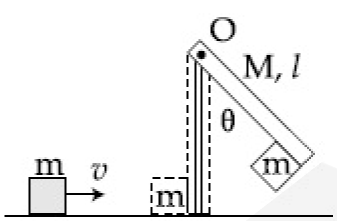
40503639507. $-30\hat{i} + 32\hat{j} - 9\hat{k}$

40503639508. $-300\hat{i} + 320\hat{j} - 90\hat{k}$

Question Number : 3 Question Id : 40503610858 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A block of mass m = 1 kg slides with velocity $v = 6$ m/s on a frictionless horizontal surface and collides with a uniform vertical rod and sticks to it as shown. The rod is pivoted about O and swings as a result of the collision making angle θ before momentarily coming to rest. If the rod has mass M = 2 kg, and length $l = 1$ m, the value of θ is approximately : (take $g = 10\ m/s^2$)



Options :

40503639509. 49°

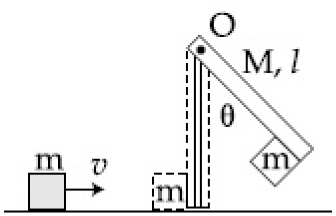
40503639510. 55°

40503639511. 63°

40503639512. 69°

Question Number : 3 Question Id : 40503610858 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

1 kg द्रव्यमान का एक छोटा खण्ड $v = 6$ m/s वेग से एक घर्षण-रहित क्षैतिज सतह पर चलते हुए एक एकसमान ऊर्ध्वाधर छड़ से टकराता है और इस पर चिपक जाता है (चित्र देखें)। छड़ O पर टंगी हुई है और इस टक्कर के कारण घूमकर चलते हुए क्षणभर के लिये रुकने से पहले θ कोण बनाती है। यदि छड़ का द्रव्यमान 2 kg और लम्बाई 1 m हो तो θ का मान लगभग होगा : ($g = 10$ m/s^2)



Options :

40503639509. 49°

40503639510. 55°

40503639511. 63°

40503639512. 69°

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Question Number : 4 Question Id : 40503610859 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Moment of inertia of a cylinder of mass M, length L and radius R about an axis passing through its centre and perpendicular to the axis of the cylinder is $I = M\left(\frac{R^2}{4} + \frac{L^2}{12}\right)$. If such a cylinder is to be made for a given mass of a material, the ratio L/R for it to have minimum possible I is :

Options :

40503639513. $\sqrt{\frac{3}{2}}$

40503639514. $\frac{2}{3}$

40503639515. $\sqrt{\frac{2}{3}}$

40503639516. $\frac{3}{2}$

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Question Number : 4 Question Id : 40503610859 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक बेलन (cylinder) केन्द्र से होकर जाने वाले और बेलन के अक्ष के लम्बवत् एक अक्ष के लिये बेलन का जड़त्वाघूर्ण $I = M\left(\frac{R^2}{4} + \frac{L^2}{12}\right)$ है, जहाँ M बेलन का द्रव्यमान, R इसकी त्रिज्या और L इसकी लम्बाई है। यदि एक दिये हुए द्रव्यमान के किसी पदार्थ से एक बेलन बनाया जाय तो इसके जड़त्वाघूर्ण के न्यूनतम मान के लिये L/R का अनुपात होगा :

Options :

40503639513. $\sqrt{\frac{3}{2}}$

40503639514. $\frac{2}{3}$

40503639515. $\sqrt{\frac{2}{3}}$

40503639516. $\frac{3}{2}$

Question Number : 5 Question Id : 40503610860 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A satellite is moving in a low nearly circular orbit around the earth. Its radius is roughly equal to that of the earth's radius R_e. By firing rockets attached to it, its speed is instantaneously increased in the direction of its motion so that it become $\sqrt{\frac{3}{2}}$ times larger. Due to this the farthest distance from the centre of the earth that the satellite reaches is R. Value of R is :

Options :

40503639517. $3R_e$

40503639518. $2R_e$

40503639519. $4R_e$

40503639520. $2.5R_e$

Question Number : 5 Question Id : 40503610860 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक उपग्रह पृथ्वी के चारों ओर लगभग वृत्ताकार कम ऊँचाई की एक कक्षा में चल रहा है। कक्षा की त्रिज्या लगभग पृथ्वी की त्रिज्या R_e के बराबर है। किसी एक क्षण पर उपग्रह पर लगे राकेटों को दागकर इसकी तात्कालिक गति इसके वेग की दिशा में $\sqrt{\frac{3}{2}}$ गुना बढ़ा दी जाती है। इसके कारण पृथ्वी के केन्द्र से उपग्रह की अधिकतम दूरी R हो जाती है। R का मान है :

Options :

40503639517. $3R_e$

40503639518. $2R_e$

40503639519. $4R_e$

40503639520. $2.5R_e$

Question Number : 6 Question Id : 40503610861 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Pressure inside two soap bubbles are 1.01 and 1.02 atmosphere, respectively. The ratio of their volumes is :

Options :

40503639521. 0.8 : 1

40503639522. 2 : 1

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40503639523. 4 : 1

40503639524. 8 : 1

Question Number : 6 Question Id : 40503610861 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

साबुन के पानी से बने दो बुलबुलों के अन्दर का दबाव वायुमण्डल के दबाव से क्रमशः 1.01 और 1.02 गुना ज्यादा है। इन बुलबुलों के आयतन का अनुपात होगा :

Options :

40503639521. 0.8 : 1

40503639522. 2 : 1

40503639523. 4 : 1

40503639524. 8 : 1

Question Number : 7 Question Id : 40503610862 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

A balloon filled with helium (32°C and 1.7 atm.) bursts. Immediately afterwards the expansion of helium can be considered as :

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Options :

40503639525. reversible adiabatic

40503639526. reversible isothermal

40503639527. irreversible adiabatic

40503639528. irreversible isothermal

Question Number : 7 Question Id : 40503610862 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक गुब्बारे में भरी हुई हीलियम का तापमान 32°C, दबाव 1.7 वायुमण्डल दबाव के बराबर है। जब यह गुब्बारा फूटता है तो फूटने के तुरन्त बाद इसमें भरी हीलियम गैस फैलती है। यह फैलाव :

Options :

40503639525. प्रतिवर्ती रुद्धोष्म (reversible adiabatic) है।

40503639526. प्रतिवर्ती समतापीय (reversible isothermal) है।

40503639527. अविपर्येय रुद्धोष्म (irreversible adiabatic) है।

40503639528. अविपर्येय समतापीय (irreversible isothermal) है।

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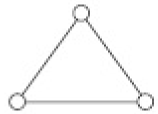
Question Number : 8 Question Id : 40503610863 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



Consider a gas of triatomic molecules. The molecules are assumed to be triangular and made of massless rigid rods whose vertices are occupied by atoms. The internal energy of a mole of the gas at temperature T is :

Options :

40503639529. 3RT

40503639530. $\frac{5}{2}RT$

40503639531. $\frac{9}{2}RT$

40503639532. $\frac{3}{2}RT$

Question Number : 8 Question Id : 40503610863 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

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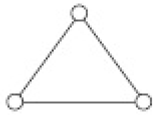

त्रिपरमाणुक अणुओं की एक गैस लीजिये। ये अणु त्रिकोणीय आकार के हैं और यह माना जा सकता है कि इसके परमाणु द्रव्यमान रहित अनम्य (rigid) छड़ों से जोड़े गये हैं। इस गैस की तापमान T पर एक मोल की आन्तरिक ऊर्जा होगी :

Options :

40503639529. $3RT$

40503639530. $\frac{5}{2}RT$

40503639531. $\frac{9}{2}RT$

40503639532. $\frac{3}{2}RT$

Question Number : 9 Question Id : 40503610864 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A uniform thin rope of length 12 m and mass 6 kg hangs vertically from a rigid support and a block of mass 2 kg is attached to its free end. A transverse short wave-train of wavelength 6 cm is produced at the lower end of the rope. What is the wavelength of the wavetrain (in cm) when it reaches the top of the rope ?

Options :

40503639533. 6

40503639534. 3

40503639535. 9

40503639536. 12

Question Number : 9 Question Id : 40503610864 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक एकसमान पतली रस्सी जिसकी लम्बाई 12 m और द्रव्यमान 6 kg है ऊर्ध्वाधर लटकी हुई है और इसके निचले सिरे पर 2 kg द्रव्यमान का एक खण्ड लटका हुआ है। इसके निचले सिरे पर 6 cm तरंगदैर्ध्य की एक अनुप्रस्थ तरंगावलि (wavetrain) बनायी जाती है। जब यह रस्सी के ऊपरी छोर पर पहुँचेगी तो इस तरंगावलि का तरंगदैर्ध्य (cm में) होगा :

Options :

40503639533. 6

40503639534. 3

40503639535. 9

40503639536. 12

Question Number : 10 Question Id : 40503610865 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Two isolated conducting spheres S_1 and S_2 of radius $\frac{2}{3}R$ and $\frac{1}{3}R$ have 12 μC and -3 μC charges, respectively, and are at a large distance from each other. They are now connected by a conducting wire. A long time after this is done the charges on S_1 and S_2 are respectively :

Options :

40503639537. 6 μC and 3 μC

40503639538. 3 μC and 6 μC

40503639539. 4.5 μC on both

40503639540. $+4.5$ μC and -4.5 μC

Question Number : 10 Question Id : 40503610865 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

सुचालकों से बने हुए दो पृथक गोलों S_1 तथा S_2, जिनकी त्रिज्याएँ क्रमश: $\frac{2}{3}R$ और $\frac{1}{3}R$ हैं, पर $12\ \mu C$ और $-3\ \mu C$ आवेश हैं। ये गोले एक दूसरे से बहुत दूरी पर हैं। यदि इन गोलों को एक सुचालक तार से जोड़ दिया जाय तो जोड़ने के लम्बे समय के पश्चात् S_1 और S_2 पर आवेशों का मान क्रमश: होगा :

Options :

40503639537. $6\ \mu C$ और $3\ \mu C$

40503639538. $3\ \mu C$ और $6\ \mu C$

40503639539. $4.5\ \mu C$ दोनों गोलों पर

40503639540. $+4.5\ \mu C$ और $-4.5\ \mu C$

Question Number : 11 Question Id : 40503610866 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

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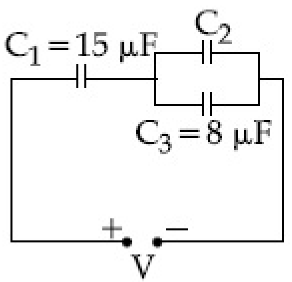
In the circuit shown in the figure, the total charge is 750 μC and the voltage across capacitor C_2 is 20 V. Then the charge on capacitor C_2 is :



Options :

40503639541. 160 μC

40503639542. 450 μC

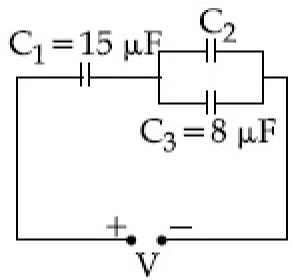
40503639543. 590 μC

40503639544. 650 μC

Question Number : 11 Question Id : 40503610866 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

चित्र में दिखाये गये परिपथ में कुल आवेश का मान 750 μC है और संधारित्र C_2 पर वोल्टता 20 V हैं। इस स्थिति में संधारित्र (capacitor) C_2 पर आवेश है :



Options :

40503639541. 160 μC

40503639542. 450 μC

40503639543. 590 μC

40503639544. 650 μC

Question Number : 12 Question Id : 40503610867 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

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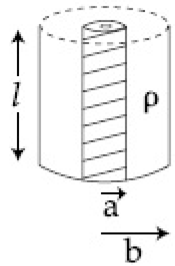
Model a torch battery of length l to be made up of a thin cylindrical bar of radius 'a' and a concentric thin cylindrical shell of radius 'b' filled in between with an electrolyte of resistivity ρ (see figure). If the battery is connected to a resistance of value R, the maximum Joule heating in R will take place for :



Options :

40503639545. $R = \frac{\rho}{2\pi l}\left(\frac{b}{a}\right)$

40503639546. $R = \frac{\rho}{2\pi l} \ln\left(\frac{b}{a}\right)$

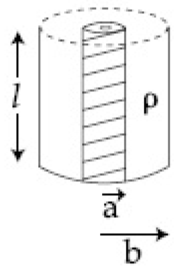
40503639547. $R = \frac{\rho}{\pi l} \ln\left(\frac{b}{a}\right)$

40503639548. $R = \frac{2\rho}{\pi l} \ln\left(\frac{b}{a}\right)$

Question Number : 12 Question Id : 40503610867 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

टार्च में प्रयोग आने वाली l लम्बाई की एक बैटरी को इस प्रकार बना मानिये कि इसमें 'a' त्रिज्या की एक बेलनाकार छड़ समअक्षीय 'b' त्रिज्या के एक बेलनाकार खोल (shell) के अन्दर है और इनके बीच का स्थान ρ प्रतिरोधकता (resistivity) के एक इलैक्ट्रोलाइट से भरा हुआ है। (चित्र देखें)। यदि बैटरी R मान के एक प्रतिरोध (resistance) से जोड़ा जाता है तो प्रतिरोध में अधिकतम जूल हीटिंग के लिये :



Options :

40503639545. $R = \frac{\rho}{2\pi l}\left(\frac{b}{a}\right)$

40503639546. $R = \frac{\rho}{2\pi l} \ln\left(\frac{b}{a}\right)$

40503639547. $R = \frac{\rho}{\pi l} \ln\left(\frac{b}{a}\right)$

40503639548. $R = \frac{2\rho}{\pi l} \ln\left(\frac{b}{a}\right)$

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Question Number : 13 Question Id : 40503610868 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Magnitude of magnetic field (in SI units) at the centre of a hexagonal shape coil of side 10 cm, 50 turns and carrying current I (Ampere) in units of $\frac{\mu_0 I}{\pi}$ is :

Options :

40503639549. $5\sqrt{3}$

40503639550. $50\sqrt{3}$

40503639551. $250\sqrt{3}$

40503639552. $500\sqrt{3}$

Question Number : 13 Question Id : 40503610868 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

षट्कोण आकार की एक कुण्डली के एक सिरे की लम्बाई 10 cm है और इसमें 50 चक्कर (turns) हैं। यदि इसमें I एम्पीयर मान की एक विद्युत धारा बहती है तो इसके केन्द्र पर पैदा होने वाले चुम्बकीय क्षेत्र (SI units में) का मान, $\left(\frac{\mu_0 I}{\pi}\right)$ के यूनिट में होगा :

Options :

40503639549. $5\sqrt{3}$

40503639550. $50\sqrt{3}$

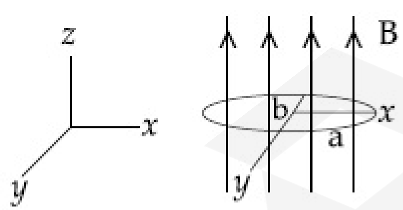
40503639551. $250\sqrt{3}$

40503639552. $500\sqrt{3}$

Question Number : 14 Question Id : 40503610869 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

An elliptical loop having resistance R, of semi major axis a, and semi minor axis b is placed in a magnetic field as shown in the figure. If the loop is rotated about the x-axis with angular frequency ω, the average power loss in the loop due to Joule heating is :



Options :

40503639553. $\frac{\pi^2 a^2 b^2 B^2 \omega^2}{2R}$

40503639554. $\frac{\pi abB\omega}{R}$

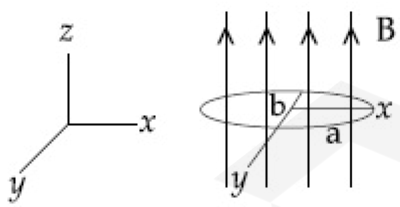
40503639555. $\frac{\pi^2a^2b^2B^2\omega^2}{R}$

40503639556. zero

Question Number : 14 Question Id : 40503610869 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

अण्डाकार आकार की एक कुण्डली के अर्धप्रमुख (semi major) अक्ष की लम्बाई a तथा अर्धलघु (semi minor) अक्ष की लम्बाई b है तथा इसका प्रतिरोध R है। इसे एक चुम्बकीय क्षेत्र में चित्रानुसार रखा गया है। यदि x-अक्ष के चारों ओर इसे ω कोणीय वेग से घुमाया जाता है तो कुण्डली में होने वाली जूल हीटिंग से इसमें शक्ति की औसत क्षति होगी :



Options :

40503639553. $\frac{\pi^2a^2b^2B^2\omega^2}{2R}$

40503639554. $\frac{\pi abB\omega}{R}$

40503639555. $\frac{\pi^2 a^2 b^2 B^2 \omega^2}{R}$

40503639556. शून्य

Question Number : 15 Question Id : 40503610870 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A 750 Hz, 20 V (rms) source is connected to a resistance of 100 Ω, an inductance of 0.1803 H and a capacitance of 10 μF all in series. The time in which the resistance (heat capacity 2 J/°C) will get heated by 10°C. (assume no loss of heat to the surroundings) is close to :

Options :

40503639557. 348 s

40503639558. 245 s

40503639559. 365 s

40503639560. 418 s

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Question Number : 15 Question Id : 40503610870 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

750 Hz एवं 20 V (rms) के एक स्रोत को श्रेणी में जुड़े हुए 100 Ω के प्रतिरोध, 0.1803 H के एक प्रेरित्र एवं 10 μF धारिता के एक संधारित्र से जोड़ा गया है। यह मानते हुए कि कोई ऊष्मा की क्षति आस-पास के वातावरण को नहीं होती है, वह समय अन्तराल, जब प्रतिरोध का तापमान 10°C से बढ़ जायेगा, लगभग होगा : (प्रतिरोध की तापीय धारिता 2 J/°C है)

Options :

40503639557. 348 s

40503639558. 245 s

40503639559. 365 s

40503639560. 418 s

Question Number : 16 Question Id : 40503610871 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The magnetic field of a plane electromagnetic wave is

$$\vec{B} = 3 \times 10^{-8} \sin[200\pi (y + ct)] \hat{i} \text{ T}$$

where $c = 3 \times 10^8 \text{ ms}^{-1}$ is the speed of light.

The corresponding electric field is :

Options :

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40503639561. $\vec{E} = 3 \times 10^{-8} \sin[200\pi(y + ct)]\hat{k}$ V/m

40503639562. $\vec{E} = -9 \sin[200\pi(y + ct)]\hat{k}$ V/m

40503639563. $\vec{E} = 9 \sin[200\pi(y + ct)]\hat{k}$ V/m

40503639564. $\vec{E} = -10^{-6} \sin[200\pi(y + ct)]\hat{k}$ V/m

Question Number : 16 Question Id : 40503610871 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक समतलीय विद्युत–चुम्बकीय तरंग का चुम्बकीय क्षेत्र $\vec{B} = 3 \times 10^{-8} \sin[200\pi(y + ct)]\hat{i}$ T है।

यहाँ $c = 3 \times 10^8$ ms^{-1} प्रकाश की गति का मान है।

इस तरंग का विद्युत क्षेत्र होगा :

Options :

40503639561. $\vec{E} = 3 \times 10^{-8} \sin[200\pi(y + ct)]\hat{k}$ V/m

40503639562. $\vec{E} = -9 \sin[200\pi(y + ct)]\hat{k}$ V/m

40503639563. $\vec{E} = 9 \sin[200\pi(y + ct)]\hat{k}$ V/m

40503639564. $\vec{E} = -10^{-6}\sin[200\pi(y+ct)]\hat{k}$ V/m

Question Number : 17 Question Id : 40503610872 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

In a Young's double slit experiment, light of 500 nm is used to produce an interference pattern. When the distance between the slits is 0.05 mm, the angular width (in degree) of the fringes formed on the distance screen is close to :

Options :

40503639565. $0.57°$

40503639566. $1.7°$

40503639567. $0.07°$

40503639568. $0.17°$

Question Number : 17 Question Id : 40503610872 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

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यंग के एक द्वि-झिरी प्रयोग में 500 nm का प्रकाश इन्टरफेयरेन्स फ्रिन्जेस बनाता है। यदि झिर्रियों के बीच की दूरी 0.05 mm हो तो बनने वाली फ्रिन्जेस के बीच की कोणीय दूरी (डिग्री में) निम्न में से किसके निकटतम होगी ?

Options :

40503639565. 0.57°

40503639566. 1.7°

40503639567. 0.07°

40503639568. 0.17°

Question Number : 18 Question Id : 40503610873 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

When the wavelength of radiation falling on a metal is changed from 500 nm to 200 nm, the maximum kinetic energy of the photoelectrons becomes three times larger. The work function of the metal is close to :

Options :

40503639569. 0.52 eV

40503639570. 0.61 eV

40503639571. 0.81 eV

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40503639572. 1.02 eV

Question Number : 18 Question Id : 40503610873 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक धातु पर पड़ने वाले विकीरण की तरंगदैर्ध्य जब 500 nm से बदलकर 200 nm की जाती है, तो इससे उत्सर्जित होने वाले फोटोइलैक्ट्रॉन्स की अधिकतम गतिज ऊर्जा तीन गुना हो जाती है। ऐसी स्थिति में धातु का कार्यफलन निम्न में से किसके निकटतम है?

Options :

40503639569. 0.52 eV

40503639570. 0.61 eV

40503639571. 0.81 eV

40503639572. 1.02 eV

Question Number : 19 Question Id : 40503610874 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

In a radioactive material, fraction of active material remaining after time t is 9/16. The fraction that was remaining after t/2 is :

Options :

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40503639573. $\frac{3}{5}$

40503639574. $\frac{3}{4}$

40503639575. $\frac{4}{5}$

40503639576. $\frac{7}{8}$

Question Number : 19 Question Id : 40503610874 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक रेडियोधर्मी पदार्थ में t समय बाद बचा हुआ सक्रिय पदार्थ आरम्भ में उपस्थित सक्रिय पदार्थ का 9/16 भाग है। तब t/2 समय में बचा हुआ पदार्थ आरम्भिक पदार्थ का कौन सा भाग होगा?

Options :

40503639573. $\frac{3}{5}$

40503639574. $\frac{3}{4}$

40503639575. $\frac{4}{5}$

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40503639576. $\frac{7}{8}$

Question Number : 20 Question Id : 40503610875 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

When a diode is forward biased, it has a voltage drop of 0.5 V. The safe limit of current through the diode is 10 mA. If a battery of emf 1.5 V is used in the circuit, the value of minimum resistance to be connected in series with the diode so that the current does not exceed the safe limit is :

Options :

40503639577. 200 Ω

40503639578. 100 Ω

40503639579. 50 Ω

40503639580. 300 Ω

Question Number : 20 Question Id : 40503610875 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

जब एक डायोड को फॉरवर्ड बायस पर लगाया जाता है तो इसमें 0.5 V का विभवान्तर होता है। डायोड को सुरक्षित रखते हुए इसमें से अधिकतम विद्युत धारा का मान 10 mA है। यदि एक परिपथ में 1.5 V की बैटरी को लगाया है, तो डायोड के साथ कितने न्यूनतम मान का प्रतिरोध लगाया जाय जिससे परिपथ में बहने वाली धारा से डायोड खराब न हो ?

Options :

40503639577. 200 Ω

40503639578. 100 Ω

40503639579. 50 Ω

40503639580. 300 Ω

Sub-Section Number :	2
Sub-Section Id :	405036756
Question Shuffling Allowed :	Yes

Question Number : 21 Question Id : 40503610876 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

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A cricket ball of mass 0.15 kg is thrown vertically up by a bowling machine so that it rises to a maximum height of 20 m after leaving the machine. If the part pushing the ball applies a constant force F on the ball and moves horizontally a distance of 0.2 m while launching the ball, the value of F (in N) is $(g = 10\ ms^{-2})$ ________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 21 Question Id : 40503610876 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

0.15 kg द्रव्यमान की एक क्रिकेट की गेंद एक बॉलिंग मशीन के द्वारा ऊर्ध्वाधर दिशा में फेंकी जाती है। मशीन से निकलने के पश्चात् यह 20 m अधिकतम ऊँचाई तक जाती है। यदि मशीन में गेंद को धकेलने वाले भाग ने इस पर एक स्थिर बल F लगाया हो और यह गेंद को धकेलते समय क्षैतिज दिशा में 0.2 m दूरी चला हो तो F का मान (N में) होगा $(g = 10\ ms^{-2})$ ________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range

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Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 22 Question Id : 40503610877 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

A person of 80 kg mass is standing on the rim of a circular platform of mass 200 kg rotating about its axis at 5 revolutions per minute (rpm). The person now starts moving towards the centre of the platform. What will be the rotational speed (in rpm) of the platform when the person reaches its centre ________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 22 Question Id : 40503610877 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

200 kg द्रव्यमान के एक वृत्ताकार प्लेटफार्म के किनारे पर 80 kg द्रव्यमान का एक व्यक्ति खड़ा है। यह प्लेटफार्म अपने अक्ष पर प्रति मिनट 5 चक्कर कर रहा है। यह व्यक्ति अब प्लेटफार्म के केन्द्र की ओर चलता है। जब व्यक्ति प्लेटफार्म के केन्द्र पर पहुँचता है तो प्लेटफार्म की कोणीय गति प्रति मिनट कितने चक्कर के बराबर होगी ________।

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

5 to 5.002

Question Number : 23 Question Id : 40503610878 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

A bakelite beaker has volume capacity of 500 cc at 30°C. When it is partially filled with V_m volume (at 30°C) of mercury, it is found that the unfilled volume of the beaker remains constant as temperature is varied. If $\gamma_{(beaker)} = 6 \times 10^{-6}\ °C^{-1}$ and $\gamma_{(mercury)} = 1.5 \times 10^{-4}\ °C^{-1}$, where γ is the coefficient of volume expansion, then V_m (in cc) is close to ________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range

Text Areas : PlainText
Possible Answers :
5 to 5.002

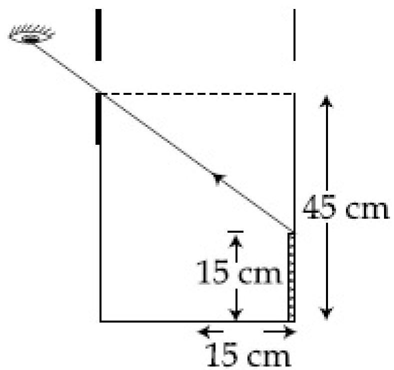
Question Number : 23 Question Id : 40503610878 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

बैकेलाइट से बने एक बीकर का 30°C पर आयतन क्षमता 500 cc है। जब इसमें 30°C पर V_m आयतन का पारा भरा हो तो यह पाया जाता है कि तापमान बदलने पर इस बीकर के खाली भाग का आयतन नहीं बदलता है। यदि बीकर के आयतन का तापीय प्रसार गुणांक $\gamma_{(\text{बीकर})} = 6 \times 10^{-6}\ °C^{-1}$ और पारे का आयतन तापीय प्रसार गुणांक $\gamma_{(\text{पारा})} = 1.5 \times 10^{-4}\ °C^{-1}$ हो तो (cc में) V_m का मान होगा __________ ।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 24 Question Id : 40503610879 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

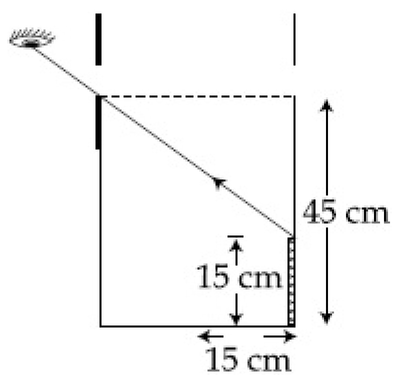
An observer can see through a small hole on the side of a jar (radius 15 cm) at a point at height of 15 cm from the bottom (see figure). The hole is at a height of 45 cm. When the jar is filled with a liquid up to a height of 30 cm the same observer can see the edge at the bottom of the jar. If the refractive index of the liquid is N/100, where N is an integer, the value of N is ________.



Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 24 Question Id : 40503610879 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

एक प्रेक्षक (observer) एक जार (त्रिज्या 15 cm) पर बने छेद से दूसरी ओर बने एक बिन्दु को देख सकता है। जार की निचली सतह से छेद की ऊँचाई 45 cm है तथा दिखने वाली बिन्दु की ऊँचाई 15 cm है। (चित्र देखें)। जब जार में 30 cm ऊँचाई तक एक द्रव पदार्थ भरा जाता है तो वही प्रेक्षक नीचली सतह की कगार (edge) देख सकता है। यदि इस द्रव का अपवर्तनांक N/100 हो (N पूर्णांक) तो N का मान है ________ ।



Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 25 Question Id : 40503610880 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

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When a long glass capillary tube of radius 0.015 cm is dipped in a liquid, the liquid rises to a height of 15 cm within it. If the contact angle between the liquid and glass to close to 0°, the surface tension of the liquid, in milliNewton m^{-1}, is [$\rho_{(liquid)} = 900\ kgm^{-3}$, $g = 10\ ms^{-2}$] (Give answer in closest integer) ________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 25 Question Id : 40503610880 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

काँच की बनी हुई एक लम्बी केशिका की त्रिज्या 0.015 cm है। जब इसे एक द्रव में डुबोया जाता है तो इसमें द्रव 15 cm ऊँचाई तक चढ़ जाता है। यदि द्रव और काँच के बीच का संपर्क कोण लगभग 0° हो तो द्रव का पृष्ठ तनाव, milliNewton m^{-1} में, कितना होगा? [$\rho_{(द्रव)}$ का घनत्व $= 900\ kgm^{-3}$, $g = 10\ ms^{-2}$] (उत्तर निकटतम पूर्णांक में दें) ________।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes

Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Chemistry

Section Id :	405036395
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	25
Number of Questions to be attempted :	25
Section Marks :	100
Display Number Panel :	Yes
Group All Questions :	Yes
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	405036757
Question Shuffling Allowed :	Yes

Question Number : 26 Question Id : 40503610881 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

It is true that :

Options :

40503639586. A zero order reaction is a single step reaction

40503639587. A zero order reaction is a multistep reaction

40503639588. A first order reaction is always a single step reaction

40503639589. A second order reaction is always a multistep reaction

Question Number : 26 Question Id : 40503610881 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यह सत्य है कि :

Options :

40503639586. एक शून्य कोटि की अभिक्रिया एक एकल पद अभिक्रिया है।

40503639587. एक शून्य कोटि अभिक्रिया एक बहुपदीय अभिक्रिया है।

40503639588. एक प्रथम कोटि की अभिक्रिया सदैव एक एकल पद अभिक्रिया है।

40503639589. एक द्वितीय कोटि की अभिक्रिया सदैव एक बहुपदीय अभिक्रिया है।

Question Number : 27 Question Id : 40503610882 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

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Of the species, NO, NO^+, NO^{2+} and NO^-, the one with minimum bond strength is :

Options :

40503639590. NO

40503639591. NO^{2+}

40503639592. NO^-

40503639593. NO^+

Question Number : 27 Question Id : 40503610882 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

स्पीशीज़ NO, NO^+, NO^{2+} तथा NO^- में, वह एक जिसकी आबन्ध सामर्थ्य अल्पतम है, होगी :

Options :

40503639590. NO

40503639591. NO^{2+}

40503639592. NO^-

40503639593. NO^+

Question Number : 28 Question Id : 40503610883 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Henry's constant (in kbar) for four gases α, β, γ and δ in water at 298 K is given below :

	α	β	γ	δ
K_H	50	2	2×10^{-5}	0.5

(density of water $= 10^3$ kg m^{-3} at 298 K)

This table implies that :

Options :

40503639594. α has the highest solubility in water at a given pressure

40503639595. solubility of γ at 308 K is lower than at 298 K

40503639596. The pressure of a 55.5 molal solution of γ is 1 bar

40503639597. The pressure of a 55.5 molal solution of δ is 250 bar

Question Number : 28 Question Id : 40503610883 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

298 K पर जल में चार गैसों α, β, γ तथा δ के लिए हेनरी स्थिरांक (kbar में) नीचे दिये गये हैं :

	α	β	γ	δ
K_H	50	2	2×10^{-5}	0.5

(298 K पर पानी का घनत्व $=10^3$ kg m^{-3})

सारणी से तात्पर्य निकलता है कि :

Options :

40503639594. दिये हुए दाब पर α की पानी में घुलनशीलता उच्चतम है।

40503639595. γ की घुलनशीलता 308 K की तुलना में 298 K पर निम्नतर है।

40503639596. γ के एक 55.5 मोलल विलयन का दाब 1 बार है।

40503639597. δ के एक 55.5 मोलल विलयन का दाब 250 बार है।

Question Number : 29 Question Id : 40503610884 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

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Let C_{NaCl} and C_{BaSO_4} be the conductances (in S) measured for saturated aqueous solutions of NaCl and $BaSO_4$, respectively, at a temperature T.

Which of the following is false ?

Options :

40503639598. $C_{NaCl} >> C_{BaSO_4}$ at a given T

40503639599. $C_{BaSO_4}(T_2) > C_{BaSO_4}(T_1)$ for $T_2 > T_1$

40503639600. $C_{NaCl}(T_2) > C_{NaCl}(T_1)$ for $T_2 > T_1$

40503639601. Ionic mobilities of ions from both salts increase with T.

Question Number : 29 Question Id : 40503610884 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि ताप T पर, NaCl तथा $BaSO_4$ के संतृप्त जलीय विलयन के लिए मापी गई चालकताएँ (S में) C_{NaCl} तथा C_{BaSO_4} हों तो निम्न में से कौन सा गलत है?

Options :

40503639598. $C_{NaCl} >> C_{BaSO_4}$, दिये गये ताप T पर

40503639599. $C_{BaSO_4}(T_2) > C_{BaSO_4}(T_1)$, $T_2 > T_1$ के लिए

40503639600. $C_{NaCl}(T_2) > C_{NaCl}(T_1), T_2 > T_1$ के लिए

40503639601. दोनों लवणों से आयनों की आयनिक गतिशीलताएँ T के साथ बढ़ती है

Question Number : 30 Question Id : 40503610885 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

An acidic buffer is obtained on mixing :

Options :

40503639602. 100 mL of 0.1 M HCl and 200 mL of 0.1 M NaCl

40503639603. 100 mL of 0.1 M HCl and 200 mL of 0.1 M CH_3COONa

40503639604. 100 mL of 0.1 M CH_3COOH and 200 mL of 0.1 M NaOH

40503639605. 100 mL of 0.1 M CH_3COOH and 100 mL of 0.1 M NaOH

Question Number : 30 Question Id : 40503610885 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक अम्लीय बफ़र इनके मिलाने से प्राप्त होता है :

Options :

40503639602. 0.1 M HCl का 100 mL तथा 0.1 M NaCl का 200 mL

40503639603. 0.1 M HCl का 100 mL तथा 0.1 M CH_3COONa का 200 mL

40503639604. 0.1 M CH_3COOH का 100 mL तथा 0.1 M NaOH का 200 mL

40503639605. 0.1 M CH_3COOH का 100 mL तथा 0.1 M NaOH का 100 mL

Question Number : 31 Question Id : 40503610886 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Tyndall effect is observed when :

Options :

40503639606. The diameter of dispersed particles is much smaller than the wavelength of light used.

40503639607. The diameter of dispersed particles is much larger than the wavelength of light used.

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40503639608. The diameter of dispersed particles is similar to the wavelength of light used.

40503639609. The refractive index of dispersed phase is greater than that of the dispersion medium.

Question Number : 31 Question Id : 40503610886 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

टिन्डल प्रभाव तब प्रेक्षित किया जाता है जब :

Options :

40503639606. प्रयुक्त प्रकाश के तरंगदैर्घ्य की तुलना में परिक्षिप्त कणों का व्यास बहुत छोटा हो।

40503639607. प्रयुक्त प्रकाश के तरंगदैर्घ्य की तुलना में परिक्षिप्त कणों का व्यास बहुत बड़ा हो।

40503639608. प्रयुक्त प्रकाश का तरंगदैर्घ्य परिक्षिप्त कणों के व्यास के ही समान हो।

40503639609. परिक्षेपण माध्यक की तुलना में परिक्षिप्त प्रावस्था का अपवर्तनांक अधिक हो।

Question Number : 32 Question Id : 40503610887 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

The atomic number of the element unnilennium is :

Options :

40503639610. 102

40503639611. 109

40503639612. 108

40503639613. 119

Question Number : 32 Question Id : 40503610887 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

अननिलएनियम तत्व की परमाणु संख्या है :

Options :

40503639610. 102

40503639611. 109

40503639612. 108

40503639613. 119

Question Number : 33 Question Id : 40503610888 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

If the boiling point of H_2O is 373 K, the boiling point of H_2S will be :

Options :

40503639614. less than 300 K

40503639615. more than 373 K

40503639616. equal to 373 K

40503639617. greater than 300 K but less than 373 K

Question Number : 33 Question Id : 40503610888 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

यदि H_2O का क्वथनांक 373 K है तो H_2S का क्वथनांक होगा :

Options :

40503639614. 300 K से कम

40503639615. 373 K से ज्यादा

40503639616. 373 K के बराबर

40503639617. 300 K से ज्यादा परन्तु 373 K से कम

Question Number : 34 Question Id : 40503610889 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

In a molecule of pyrophosphoric acid, the number of P–OH, P=O and P–O–P bonds/moiety(ies) respectively are :

Options :

40503639618. 4, 2 and 0

40503639619. 3, 3 and 3

40503639620. 2, 4 and 1

40503639621. 4, 2 and 1

Question Number : 34 Question Id : 40503610889 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

पायरोफास्फोरिक एसिड के अणु में P–OH, P=O तथा P–O–P आबन्धों/अर्धांश (अर्धांशों) की संख्या क्रमश: हैं :

Options :

40503639618. 4, 2 तथा 0

40503639619. 3, 3 तथा 3

40503639620. 2, 4 तथा 1

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40503639621. 4, 2 तथा 1

Question Number : 35 Question Id : 40503610890 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Aqua regia is used for dissolving noble metals (Au, Pt, etc.). The gas evolved in this process is :

Options :

40503639622. N_2O_3

40503639623. NO

40503639624. N_2O_5

40503639625. N_2

Question Number : 35 Question Id : 40503610890 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

नोबल धातुओं (Au, Pt, आदि) को घोलने के लिए एक्वा रेजिआ काम में लाई जाती है। इस प्रक्रम में निकलने वाली गैस है :

Options :

40503639622. N_2O_3

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40503639623. NO

40503639624. N_2O_5

40503639625. N_2

Question Number : 36 Question Id : 40503610891 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The complex that can show optical activity is :

Options :

40503639626. *cis*-$[Fe(NH_3)_2(CN)_4]^-$

40503639627. *cis*-$[CrCl_2(ox)_2]^{3-}$ (ox = oxalate)

40503639628. *trans*-$[Fe(NH_3)_2(CN)_4]^-$

40503639629. *trans*-$[Cr(Cl_2)(ox)_2]^{3-}$

Question Number : 36 Question Id : 40503610891 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

वह संकर जो ध्रुवण घूर्णकता प्रदर्शित कर सकता है, होगा :

Options :

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40503639626. सिस-$[Fe(NH_3)_2(CN)_4]^-$

40503639627. सिस-$[CrCl_2(ox)_2]^{3-}$ (ox = oxalate)

40503639628. ट्रांस-$[Fe(NH_3)_2(CN)_4]^-$

40503639629. ट्रांस-$[Cr(Cl_2)(ox)_2]^{3-}$

Question Number : 37 Question Id : 40503610892 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The electronic spectrum of $[Ti(H_2O)_6]^{3+}$ shows a single broad peak with a maximum at 20,300 cm^{-1}. The crystal field stabilization energy (CFSE) of the complex ion, in kJ mol^{-1}, is :

(1 kJ mol^{-1} = 83.7 cm^{-1})

Options :

40503639630. 145.5

40503639631. 83.7

40503639632. 242.5

40503639633. 97

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Question Number : 37 Question Id : 40503610892 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$[Ti(H_2O)_6]^{3+}$ का इलेक्ट्रॉनिक स्पेक्ट्रम एक विस्तृत पीक (ब्रॉड पीक) प्रदर्शित करता है जिसका उच्चतम 20,300 cm^{-1} पर है। संकुल की क्रिस्टल क्षेत्र स्थायीकरण ऊर्जा (CFSE) (kJ mol^{-1} में) होगी :

(1 kJ mol^{-1} = 83.7 cm^{-1})

Options :

40503639630. 145.5

40503639631. 83.7

40503639632. 242.5

40503639633. 97

Question Number : 38 Question Id : 40503610893 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Thermal power plants can lead to :

Options :

40503639634. Acid rain

40503639635. Eutrophication

40503639636. Blue baby syndrome

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40503639637. Ozone layer depletion

Question Number : 38 Question Id : 40503610893 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

तापीय विद्युत संयंत्रों से यह हो सकता है :

Options :

40503639634. अम्ल वर्षा

40503639635. सुपोषण

40503639636. ब्लू बेबी सिन्ड्रोम

40503639637. ओज़ोन परत अवक्षय

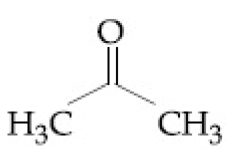
Question Number : 39 Question Id : 40503610894 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Which one of the following compounds possesses the most acidic hydrogen ?

Options :

40503639638. $H_3C-C\equiv C-H$

40503639639. 

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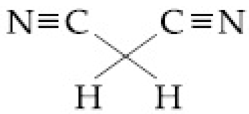
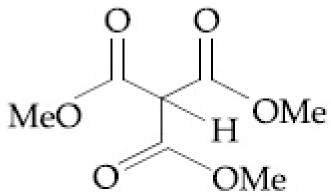
40503639640. 

40503639641. 

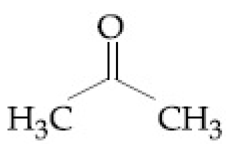
Question Number : 39 Question Id : 40503610894 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

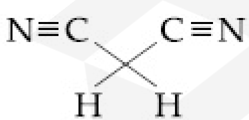
Correct Marks : 4 Wrong Marks : 1

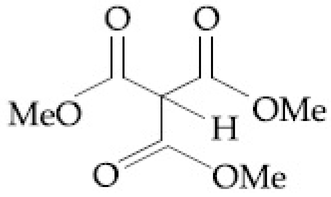
निम्न यौगिकों में से किस में सर्वाधिक अम्लीय हाइड्रोजन
है ?

Options :

40503639638. $H_3C{-}C{\equiv}C{-}H$

40503639639. 

40503639640. 

40503639641. 

Question Number : 40 Question Id : 40503610895 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Glycerol is separated in soap industries by :

Options :

40503639642. Differential extraction

40503639643. Fractional distillation

40503639644. Distillation under reduced pressure

40503639645. Steam distillation

Question Number : 40 Question Id : 40503610895 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

सोप उद्योग में ग्लिसरॉल निम्न में से किसके द्वारा प्रथक किया जाता है?

Options :

40503639642. विभेदी निष्कर्षण

40503639643. प्रभाजी आसवन

40503639644. कम दाब पर आसवन

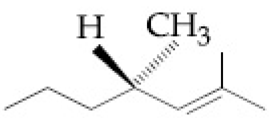
40503639645. वाष्प आसवन

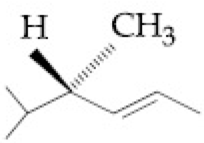
Question Number : 41 Question Id : 40503610896 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

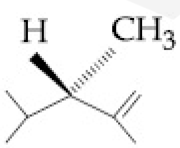
Which of the following compounds produces an optically inactive compound on hydrogenation ?

Options :

40503639646. 

40503639647. 

40503639648.

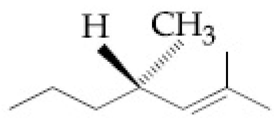
40503639649. 

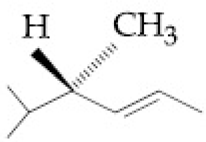
Question Number : 41 Question Id : 40503610896 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

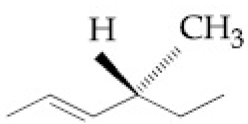
Correct Marks : 4 Wrong Marks : 1

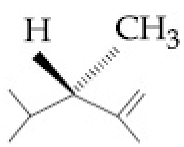
हाइड्रोजनीकरण पर निम्न में से कौन सा यौगिक ध्रुवण अघूर्णक यौगिक उत्पन्न करता है ?

Options :

40503639646. 

40503639647. 

40503639648. 

40503639649. 

Question Number : 42 Question Id : 40503610897 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The antifertility drug "Novestrol" can react with :

Options :

40503639650. Br_2/water; $ZnCl_2$/HCl ; NaOCl

40503639651. Br_2/water; $ZnCl_2$/HCl; $FeCl_3$

40503639652. $ZnCl_2$/HCl; $FeCl_3$; Alcoholic HCN

40503639653. Alcoholic HCN; NaOCl; $ZnCl_2$/HCl

Question Number : 42 Question Id : 40503610897 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

प्रतिजनन औषध 'नोवेस्ट्रॉल' जिनसे अभिक्रिया कर सकता है वे हैं :

Options :

40503639650. Br_2/जल; $ZnCl_2$/HCl ; NaOCl

40503639651. Br_2/जल; $ZnCl_2$/HCl; $FeCl_3$

40503639652. $ZnCl_2$/HCl; $FeCl_3$; ऐल्कोहॉलिक HCN

40503639653. ऐल्कोहॉलिक HCN; NaOCl; $ZnCl_2$/HCl

Question Number : 43 Question Id : 40503610898 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

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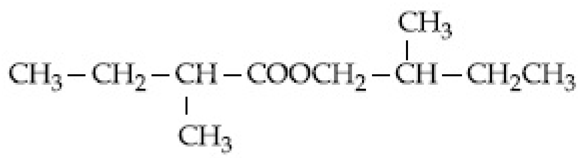
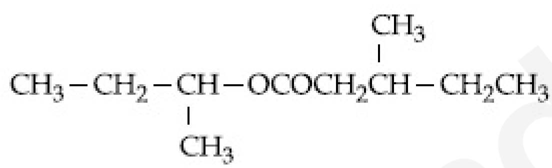
An organic compound [A], molecular formula $C_{10}H_{20}O_2$ was hydrolyzed with dilute sulphuric acid to give a carboxylic acid [B] and an alcohol [C]. Oxidation of [C] with $CrO_3-H_2SO_4$ produced [B]. Which of the following structures are not possible for [A] ?

Options :

40503639654. $CH_3CH_2CH_2COOCH_2CH_2CH_2CH_3$

40503639655. 

40503639656. 

40503639657. $(CH_3)_3-C-COOCH_2C(CH_3)_3$

Question Number : 43 Question Id : 40503610898 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

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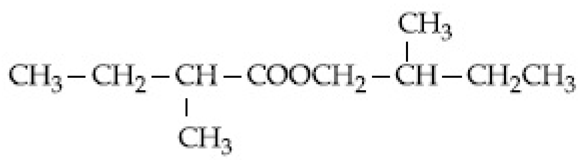
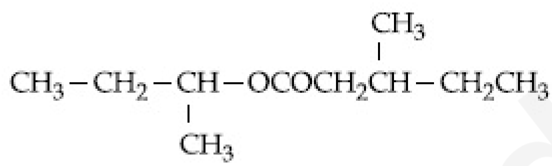
एक कार्बनिक यौगिक [A] जिसका अणुसूत्र $C_{10}H_{20}O_2$ है तनु सल्फ्यूरिक अम्ल के साथ जल अपघटित करने पर एक कार्बोक्सिलिक अम्ल [B] तथा एक ऐल्कोहॉल [C] देता है। [C] का $CrO_3 - H_2SO_4$ के साथ ऑक्सीकरण [B] उत्पन्न किया। निम्न संरचनाओं में से कौन [A] के लिये संभव **नहीं** हैं?

Options :

40503639654. $CH_3CH_2CH_2COOCH_2CH_2CH_2CH_3$

40503639655. 

40503639656. 

40503639657. $(CH_3)_3-C-COOCH_2C(CH_3)_3$

Question Number : 44 Question Id : 40503610899 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

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The mechanism of S_N1 reaction is given as :

$$R-X \longrightarrow \underset{\text{Ion pair}}{R^{\oplus}X^{\ominus}} \longrightarrow \underset{\text{Solvent Separated ion pair}}{R^{\oplus}\|X^{\ominus}} \xrightarrow{Y^{\ominus}} R-Y+X^{\ominus}$$

A student writes general characteristics based on the given mechanism as :

(a) The reaction is favoured by weak nucleophiles.

(b) $R^{\oplus}$ would be easily formed if the substituents are bulky.

(c) The reaction is accompanied by racemization.

(d) The reaction is favoured by non-polar solvents.

Which observations are correct ?

Options :

40503639658. (a) and (b)

40503639659. (b) and (d)

40503639660. (a), (b) and (c)

40503639661. (a) and (c)

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Question Number : 44 Question Id : 40503610899 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

S_N1अभिक्रिया की क्रियाविधि इस प्रकार दी जाती है

$$R-X \longrightarrow R^{\oplus}X^{\ominus} \longrightarrow R^{\oplus}\|X^{\ominus} \xrightarrow{Y^{\ominus}} R-Y+X^{\ominus}$$

आयन युग्म   विलायक द्वारा प्रथक आयन युग्म

दी हुई क्रियाविधि के आधार पर एक विद्यार्थी सामान्य गुण-धर्म इस प्रकार लिखता है :

(a) अभिक्रिया दुर्बल नाभिकस्नेहियों से समर्थित होती है।

(b) $R^{\oplus}$ आसानी से बन जायेंगे यदि प्रतिस्थापी स्थूल हैं।

(c) अभिक्रिया रेसिमीकरण के साथ होती है।

(d) अभिक्रिया अध्रुवी विलायकों द्वारा अनुकूल पड़ती है।

कौन-से प्रेक्षण **सही** हैं ?

Options :

40503639658. (a) तथा (b)

40503639659. (b) तथा (d)

40503639660. (a), (b) तथा (c)

40503639661. (a) तथा (c)

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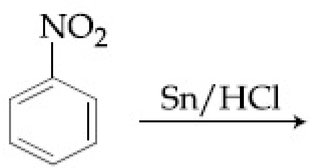
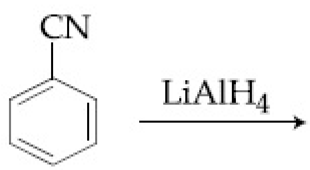
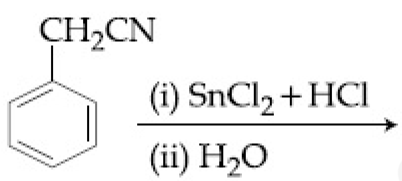
Question Number : 45 Question Id : 40503610900 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

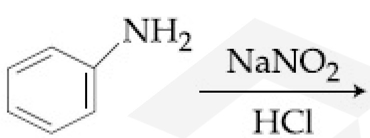
Correct Marks : 4 Wrong Marks : 1

The Kjeldahl method of Nitrogen estimation fails for which of the following reaction products ?

(a) 

(b) 

(c) 

(d) 

Options :

40503639662. (a) and (d)

40503639663. (c) and (d)

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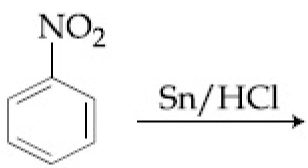
40503639664. (b) and (c)

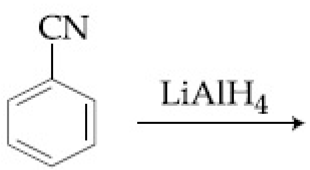
40503639665. (a), (c) and (d)

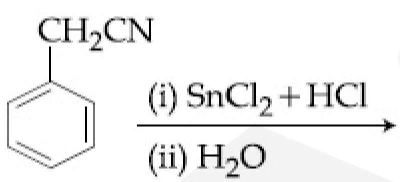
Question Number : 45 Question Id : 40503610900 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

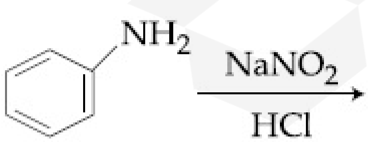
Correct Marks : 4 Wrong Marks : 1

निम्नांकित किन अभिक्रिया उत्पादों के लिए नाइट्रोजन
आकलन की केल्डाल विधि असफल रहती है?

(a) 

(b) 

(c) 

(d) 

Options :

40503639662. (a) तथा (d)

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40503639663. (c) तथा (d)

40503639664. (b) तथा (c)

40503639665. (a), (c) तथा (d)

Sub-Section Number : 2
Sub-Section Id : 405036758
Question Shuffling Allowed : Yes

Question Number : 46 Question Id : 40503610901 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

The mole fraction of glucose ($C_6H_{12}O_6$) in an aqueous binary solution is 0.1. The mass percentage of water in it, to the nearest integer, is ________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 46 Question Id : 40503610901 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

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एक जलीय द्विआधारी विलयन में ग्लूकोस ($C_6H_{12}O_6$) का मोल प्रभांश (मोल फ्रैक्शन) 0.1 है। इसमें पानी की द्रव्यमान प्रतिशतता (निकटतम पूर्णांक), में होगी ________ ।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 47 Question Id : 40503610902 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

An element with molar mass 2.7×10^{-2} kg mol^{-1} forms a cubic unit cell with edge length 405 pm. If its density is 2.7×10^{3} kg m^{-3}, the radius of the element is approximately ________ $\times 10^{-12}$ m (to the nearest integer).

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 47 Question Id : 40503610902 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

एक तत्व, जिसका मोलर द्रव्यमान 2.7×10^{-2} kg mol^{-1} है, 405 pm कोर लम्बाई का एक घन एकक सेल बनाता है। यदि इसका (तत्व का) घनत्व 2.7×10^{3} kg m^{-3} है, तो तत्व की त्रिज्या लगभग होगी ________ $\times 10^{-12}$ m (निकटतम पूर्णांक में)।

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

5 to 5.002

Question Number : 48 Question Id : 40503610903 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

The photoelectric current from Na (work function, $w_0 = 2.3$ eV) is stopped by the output voltage of the cell

$Pt(s)|H_2(g, 1\text{ bar})|HCl(aq., pH = 1)|AgCl(s)|Ag(s)$.

The pH of aq. HCl required to stop the photoelectric current from K($w_0 = 2.25$ eV), all other conditions remaining the same, is ________ $\times 10^{-2}$ (to the nearest integer).

Given,

$$2.303 \frac{RT}{F} = 0.06\text{ V}; E^0_{AgCl|Ag|Cl^-} = 0.22\text{ V}$$

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

5 to 5.002

Question Number : 48 Question Id : 40503610903 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

Na (कार्य फलन $w_0 = 2.3$ eV) से निकली प्रकाश विद्युत धारा सेल $Pt(s)|H_2(g, 1 \text{ बार})|HCl(aq., pH = 1)|AgCl(s)|Ag(s)$ से उत्पन्न वोल्टेज द्वारा रोक दी जाती है। यदि सभी शर्तें वही रहें, तो K($w_0 = 2.25$ eV) से प्रकाश विद्युत धारा को रोकने के लिए HCl का pH होगा __________ $\times 10^{-2}$ (निकटतम पूर्णांक में) दिया गया है,

$$2.303 \frac{RT}{F} = 0.06 \text{ V}; E^0_{AgCl|Ag|Cl^-} = 0.22 \text{ V}$$

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

5 to 5.002

Question Number : 49 Question Id : 40503610904 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

The volume strength of 8.9 M H_2O_2 solution calculated at 273 K and 1 atm is __________. ($R = 0.0821$ L atm K^{-1} mol^{-1}) (rounded off to the nearest integer)

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range

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Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 49 Question Id : 40503610904 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

273 K तथा 1 atm पर परिकलित 8.9 M H_2O_2 विलयन की आयतन सामर्थ्य है ________ (निकटतम पूर्णांक में)।
$(R = 0.0821\ L\ atm\ K^{-1}\ mol^{-1})$

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 50 Question Id : 40503610905 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

The total number of monohalogenated organic products in the following (including stereoisomers) reaction is ________.

$$A \xrightarrow[\text{(ii) } X_2/\Delta]{\text{(i) } H_2/Ni/\Delta}$$

(Simplest optically active alkene)

Response Type : Numeric
Evaluation Required For SA : Yes

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Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 50 Question Id : 40503610905 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

निम्न अभिक्रिया में एकहैलोजनीकृत कार्बनिक उत्पादों (त्रिविम समावयवियों को मिलाकर) की कुल संख्या होगी ________ ।

$$\text{A} \xrightarrow[\text{(ii) } X_2/\Delta]{\text{(i) } H_2/Ni/\Delta}$$

(एक सरलतम ध्रुवण घूर्णक
एल्कीन)

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Mathematics

Section Id :	405036396
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	25
Number of Questions to be attempted :	25

Section Marks : 100
Display Number Panel : Yes
Group All Questions : Yes
Mark As Answered Required? : Yes
Sub-Section Number : 1
Sub-Section Id : 405036759
Question Shuffling Allowed : Yes

Question Number : 51 Question Id : 40503610906 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Consider the two sets :

$A = \{m \in \mathbf{R}$: both the roots of $x^2 - (m+1)x + m + 4 = 0$ are real$\}$ and

$B = [-3, 5)$.

Which of the following is not true ?

Options :

40503639671. $A \cup B = \mathbf{R}$

40503639672. $A \cap B = \{-3\}$

40503639673. $A - B = (-\infty, -3) \cup (5, \infty)$

40503639674. $B - A = (-3, 5)$

Question Number : 51 Question Id : 40503610906 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

निम्न दो समुच्चयों पर विचार कीजिए :

A = {m ∈ **R** : $x^2-(m+1)x+m+4=0$ के दोनों मूल वास्तविक हैं }, तथा $B=[-3, 5)$.

निम्न में से कौन सा सत्य **नहीं** है?

Options :

40503639671. $A \cup B = \mathbf{R}$

40503639672. $A \cap B = \{-3\}$

40503639673. $A-B=(-\infty, -3) \cup (5, \infty)$

40503639674. $B-A=(-3, 5)$

Question Number : 52 Question Id : 40503610907 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If α and β are the roots of the equation $x^2+px+2=0$ and $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ are the roots of the equation $2x^2+2qx+1=0$, then $\left(\alpha-\frac{1}{\alpha}\right)\left(\beta-\frac{1}{\beta}\right)\left(\alpha+\frac{1}{\beta}\right)\left(\beta+\frac{1}{\alpha}\right)$ is equal to :

Options :

40503639675. $\frac{9}{4}(9-p^2)$

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40503639676. $\frac{9}{4}(9+p^2)$

40503639677. $\frac{9}{4}(9+q^2)$

40503639678. $\frac{9}{4}(9-q^2)$

Question Number : 52 Question Id : 40503610907 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि α तथा β, समीकरण $x^2+px+2=0$ के मूल हैं तथा $\frac{1}{\alpha}$ तथा $\frac{1}{\beta}$, समीकरण $2x^2+2qx+1=0$ के मूल हैं, तो $\left(\alpha-\frac{1}{\alpha}\right)\left(\beta-\frac{1}{\beta}\right)\left(\alpha+\frac{1}{\beta}\right)\left(\beta+\frac{1}{\alpha}\right)$ बराबर है :

Options :

40503639675. $\frac{9}{4}(9-p^2)$

40503639676. $\frac{9}{4}(9+p^2)$

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40503639677. $\frac{9}{4}(9+q^2)$

40503639678. $\frac{9}{4}(9-q^2)$

Question Number : 53 Question Id : 40503610908 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The value of $(2\cdot{}^1P_0 - 3\cdot{}^2P_1 + 4\cdot{}^3P_2 -$ ... up to 51^{th} term$) + (1! - 2! + 3! -$ ... up to 51^{th} term) is equal to :

Options :

40503639679. $1+(52)!$

40503639680. 1

40503639681. $1+(51)!$

40503639682. $1-51(51)!$

Question Number : 53 Question Id : 40503610908 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$(2\cdot{}^1P_0 - 3\cdot{}^2P_1 + 4\cdot{}^3P_2 -$ ... 51वें पद तक) $+ (1! - 2! + 3! -$ ... 51वें पद तक) का मान बराबर है :

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Options :

40503639679. $1+(52)!$

40503639680. 1

40503639681. $1+(51)!$

40503639682. $1-51(51)!$

Question Number : 54 Question Id : 40503610909 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If $\Delta = \begin{vmatrix} x-2 & 2x-3 & 3x-4 \\ 2x-3 & 3x-4 & 4x-5 \\ 3x-5 & 5x-8 & 10x-17 \end{vmatrix} =$

$Ax^3 + Bx^2 + Cx + D$, then $B+C$ is equal to :

Options :

40503639683. -3

40503639684. -1

40503639685. 1

40503639686. 9

Question Number : 54 Question Id : 40503610909 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि $\Delta = \begin{vmatrix} x-2 & 2x-3 & 3x-4 \\ 2x-3 & 3x-4 & 4x-5 \\ 3x-5 & 5x-8 & 10x-17 \end{vmatrix} =$

$Ax^3 + Bx^2 + Cx + D$ है, तो $B+C$ बराबर है :

Options :

40503639683. -3

40503639684. -1

40503639685. 1

40503639686. 9

Question Number : 55 Question Id : 40503610910 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If the number of integral terms in the expansion of $\left(3^{\frac{1}{2}} + 5^{\frac{1}{8}}\right)^n$ is exactly 33, then the least value of n is :

Options :

40503639687. 128

40503639688. 248

40503639689. 256

40503639690. 264

Question Number : 55 Question Id : 40503610910 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि $\left(3^{\frac{1}{2}} + 5^{\frac{1}{8}}\right)^{n}$ के प्रसार में पूर्णांकीय पदों की संख्या मात्र 33 है, तो n का न्यूनतम मान है :

Options :

40503639687. 128

40503639688. 248

40503639689. 256

40503639690. 264

Question Number : 56 Question Id : 40503610911 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If the first term of an A.P. is 3 and the sum of its first 25 terms is equal to the sum of its next 15 terms, then the common difference of this A.P. is :

Options :

40503639691. $\frac{1}{6}$

40503639692. $\frac{1}{4}$

40503639693. $\frac{1}{7}$

40503639694. $\frac{1}{5}$

Question Number : 56 Question Id : 40503610911 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि एक समांतर श्रेढ़ी का प्रथम पद 3 है तथा इसके प्रथम 25 पदों का योग, इसके अगले 15 पदों के योग के बराबर है, तो इस समांतर श्रेढ़ी का सार्वअंतर है :

Options :

40503639691. $\frac{1}{6}$

40503639692. $\frac{1}{4}$

40503639693. $\frac{1}{7}$

40503639694. $\frac{1}{5}$

Question Number : 57 Question Id : 40503610912 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

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Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

If $y^2 + \log_e(\cos^2 x) = y, \quad x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$,

then :

Options :

40503639695. $|y'(0)| + |y''(0)| = 3$

40503639696. $y''(0) = 0$

40503639697. $|y'(0)| + |y''(0)| = 1$

40503639698. $|y''(0)| = 2$

Question Number : 57 Question Id : 40503610912 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

यदि $y^2 + \log_e(\cos^2 x) = y, \quad x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ है,

तो :

Options :

40503639695. $|y'(0)| + |y''(0)| = 3$

40503639696. $y''(0) = 0$

40503639697. $|y'(0)| + |y''(0)| = 1$

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40503639698. $|y''(0)| = 2$

Question Number : 58 Question Id : 40503610913 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let [t] denote the greatest integer ≤ t. If for some $\lambda \in \mathbf{R} - \{0, 1\}$,

$$\lim_{x \to 0} \left| \frac{1 - x + |x|}{\lambda - x + [x]} \right| = L$$, then L is equal to :

Options :

40503639699. 2

40503639700. 1

40503639701. $\frac{1}{2}$

40503639702. 0

Question Number : 58 Question Id : 40503610913 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना [t] महत्तम पूर्णांक ≤ t को दर्शाता है। यदि किसी $\lambda \in \mathbf{R} - \{0, 1\}$ के लिए

$$\lim_{x \to 0} \left| \frac{1 - x + |x|}{\lambda - x + [x]} \right| = L$$ है, तो L का मान है :

Options :

40503639699. 2

40503639700. 1

40503639701. $\frac{1}{2}$

40503639702. 0

Question Number : 59 Question Id : 40503610914 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The function, $f(x) = (3x-7)x^{2/3}$, $x \in \mathbf{R}$, is increasing for all x lying in :

Options :

40503639703. $\left(-\infty, \frac{14}{15}\right)$

40503639704. $\left(-\infty, -\frac{14}{15}\right) \cup (0, \infty)$

40503639705. $(-\infty, 0) \cup \left(\frac{14}{15}, \infty\right)$

40503639706. $(-\infty, 0) \cup \left(\frac{3}{7}, \infty\right)$

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Question Number : 59 Question Id : 40503610914 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

फलन $f(x) = (3x - 7)x^{2/3}$, $x \in \mathbf{R}$, के वर्धमान होने के लिए, सभी x निम्नलिखित में से किस में स्थित है?

Options :

40503639703. $\left(-\infty, \frac{14}{15}\right)$

40503639704. $\left(-\infty, -\frac{14}{15}\right) \cup (0, \infty)$

40503639705. $(-\infty, 0) \cup \left(\frac{14}{15}, \infty\right)$

40503639706. $(-\infty, 0) \cup \left(\frac{3}{7}, \infty\right)$

Question Number : 60 Question Id : 40503610915 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$\int_{-\pi}^{\pi} \left|\pi - |x|\right| dx$ is equal to :

Options :

40503639707. $\frac{\pi^2}{2}$

40503639708. $2\pi^2$

40503639709. π^2

40503639710. $\sqrt{2}\pi^2$

Question Number : 60 Question Id : 40503610915 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$\int_{-\pi}^{\pi} |\pi - |x|| dx$ का मान है :

Options :

40503639707. $\frac{\pi^2}{2}$

40503639708. $2\pi^2$

40503639709. π^2

40503639710. $\sqrt{2}\pi^2$

Question Number : 61 Question Id : 40503610916 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The area (in sq. units) of the region $\{(x, y) : 0 \le y \le x^2+1,\ 0 \le y \le x+1,\ \frac{1}{2} \le x \le 2\}$ is :

Options :

40503639711. $\frac{23}{6}$

40503639712. $\frac{23}{16}$

40503639713. $\frac{79}{16}$

40503639714. $\frac{79}{24}$

Question Number : 61 Question Id : 40503610916 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

क्षेत्र $\{(x, y) : 0 \le y \le x^2+1,\ 0 \le y \le x+1,\ \frac{1}{2} \le x \le 2\}$ का क्षेत्रफल (वर्ग इकाइयों में) है :

Options :

40503639711. $\frac{23}{6}$

40503639712. $\frac{23}{16}$

40503639713. $\frac{79}{16}$

40503639714. $\frac{79}{24}$

Question Number : 62 Question Id : 40503610917 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The solution curve of the differential equation, $(1+e^{-x})(1+y^2)\frac{dy}{dx}=y^2$, which passes through the point (0, 1), is :

Options :

40503639715. $y^2=1+y\log_e\left(\frac{1+e^x}{2}\right)$

40503639716. $y^2+1=y\left(\log_e\left(\frac{1+e^x}{2}\right)+2\right)$

40503639717. $y^2=1+y\log_e\left(\frac{1+e^{-x}}{2}\right)$

$$y^2 + 1 = y\left(\log_e\left(\frac{1+e^{-x}}{2}\right) + 2\right)$$
40503639718.

Question Number : 62 Question Id : 40503610917 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

अवकल समीकरण $(1 + e^{-x})(1 + y^2)\frac{dy}{dx} = y^2$

का हल वक्र, जो बिन्दु (0, 1) से होकर जाता है, है :

Options :

$$y^2 = 1 + y\log_e\left(\frac{1+e^{x}}{2}\right)$$
40503639715.

$$y^2 + 1 = y\left(\log_e\left(\frac{1+e^{x}}{2}\right) + 2\right)$$
40503639716.

$$y^2 = 1 + y\log_e\left(\frac{1+e^{-x}}{2}\right)$$
40503639717.

$$y^2 + 1 = y\left(\log_e\left(\frac{1+e^{-x}}{2}\right) + 2\right)$$
40503639718.

Question Number : 63 Question Id : 40503610918 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

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Let P be a point on the parabola, $y^2 = 12x$ and N be the foot of the perpendicular drawn from P on the axis of the parabola. A line is now drawn through the mid-point M of PN, parallel to its axis which meets the parabola at Q. If the y-intercept of the line NQ is $\frac{4}{3}$, then :

Options :

40503639719. $MQ = \frac{1}{3}$

40503639720. $MQ = \frac{1}{4}$

40503639721. $PN = 3$

40503639722. $PN = 4$

Question Number : 63 Question Id : 40503610918 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना P परवलय, $y^2=12x$ पर एक बिन्दु है और P से परवलय के अक्ष पर डाले गए लम्ब का पाद N है। अब PN के मध्य-बिंदु M से एक सरल रेखा परवलय के अक्ष के समान्तर खींची जाती है जो परवलय को बिन्दु Q पर मिलती है। यदि रेखा NQ का y-अंतखंड $\frac{4}{3}$ है, तो :

Options :

40503639719. $MQ=\frac{1}{3}$

40503639720. $MQ=\frac{1}{4}$

40503639721. $PN=3$

40503639722. $PN=4$

Question Number : 64 Question Id : 40503610919 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A hyperbola having the transverse axis of length $\sqrt{2}$ has the same foci as that of the ellipse $3x^2+4y^2=12$, then this hyperbola does **not** pass through which of the following points ?

Options :

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40503639723. $\left(\frac{1}{\sqrt{2}}, 0\right)$

40503639724. $\left(1, -\frac{1}{\sqrt{2}}\right)$

40503639725. $\left(\sqrt{\frac{3}{2}}, \frac{1}{\sqrt{2}}\right)$

40503639726. $\left(-\sqrt{\frac{3}{2}}, 1\right)$

Question Number : 64 Question Id : 40503610919 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक अतिपरवलय जिसके अनुप्रस्थ (transverse) अक्ष की लम्बाई $\sqrt{2}$ है और उसके नाभिकेन्द्र, दीर्घवृत्त $3x^2+4y^2=12$ के नाभिकेन्द्रों के बराबर हैं। तो अतिपरवलय निम्न में से किस बिन्दु से होकर **नहीं** जाता ?

Options :

40503639723. $\left(\frac{1}{\sqrt{2}}, 0\right)$

40503639724. $\left(1, -\frac{1}{\sqrt{2}}\right)$

40503639725. $\left(\sqrt{\frac{3}{2}}, \frac{1}{\sqrt{2}}\right)$

40503639726. $\left(-\sqrt{\frac{3}{2}}, 1\right)$

Question Number : 65 Question Id : 40503610920 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The foot of the perpendicular drawn from the point (4, 2, 3) to the line joining the points (1, −2, 3) and (1, 1, 0) lies on the plane :

Options :

40503639727. $x+2y-z=1$

40503639728. $x-2y+z=1$

40503639729. $x-y-2z=1$

40503639730. $2x+y-z=1$

Question Number : 65 Question Id : 40503610920 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

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बिन्दुओं (1, −2, 3) और (1, 1, 0) से होकर जाने वाली सरल रेखा पर बिन्दु (4, 2, 3) से डाले गए लम्ब का पाद जिस समतल पर है, वह है :

Options :

40503639727. $x+2y-z=1$

40503639728. $x-2y+z=1$

40503639729. $x-y-2z=1$

40503639730. $2x+y-z=1$

Question Number : 66 Question Id : 40503610921 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The lines

$\vec{r} = (\hat{i} - \hat{j}) + l(2\hat{i} + \hat{k})$ and

$\vec{r} = (2\hat{i} - \hat{j}) + m(\hat{i} + \hat{j} - \hat{k})$

Options :

40503639731. intersect when $l=1$ and $m=2$

40503639732. intersect when $l=2$ and $m=\frac{1}{2}$

40503639733. intersect for all values of l and m

40503639734. do not intersect for any values of l and m

Question Number : 66 Question Id : 40503610921 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

सरल रेखाएँ

$\vec{r} = (\hat{i} - \hat{j}) + l(2\hat{i} + \hat{k})$ तथा

$\vec{r} = (2\hat{i} - \hat{j}) + m(\hat{i} + \hat{j} - \hat{k})$

Options :

40503639731. काटती हैं जब $l=1$ तथा $m=2$

40503639732. काटती हैं जब $l=2$ तथा $m = \frac{1}{2}$

40503639733. l तथा m के सभी मानों के लिए काटती है

40503639734. l तथा m के किसी भी मानों के लिए नहीं काटती

Question Number : 67 Question Id : 40503610922 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

For the frequency distribution :

Variate (x) : x_1 x_2 $x_3 \dots x_{15}$

Frequency (f) : f_1 f_2 $f_3 \dots f_{15}$

where $0 < x_1 < x_2 < x_3 < \dots < x_{15} = 10$ and

$\sum_{i=1}^{15} f_i > 0$, the standard deviation cannot

be :

Options :

40503639735. 6

40503639736. 4

40503639737. 2

40503639738. 1

Question Number : 67 Question Id : 40503610922 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

बारंबारता बंटन

चर (x) : x_1 x_2 $x_3 \dots x_{15}$

बारंबारता (f) : f_1 f_2 $f_3 \dots f_{15}$

जहाँ $0 < x_1 < x_2 < x_3 < \dots < x_{15} = 10$ तथा

$\sum_{i=1}^{15} f_i > 0$ है, का मानक विचलन, निम्न में से

कौन-सा **नहीं** हो सकता ?

Options :

40503639735. 6

40503639736. 4

40503639737. 2

40503639738. 1

Question Number : 68 Question Id : 40503610923 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A die is thrown two times and the sum of the scores appearing on the die is observed to be a multiple of 4. Then the conditional probability that the score 4 has appeared atleast once is :

Options :

40503639739. $\frac{1}{3}$

40503639740. $\frac{1}{9}$

40503639741. $\frac{1}{8}$

40503639742. $\frac{1}{4}$

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Question Number : 68 Question Id : 40503610923 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक पासा दो बार फेंका जाता है तथा पासों पर आयी संख्याओं का योगफल 4 का एक गुणज है। तो संख्या 4 के कम से कम एक बार आने की सप्रतिबंध प्रायिकता है :

Options :

40503639739. $\frac{1}{3}$

40503639740. $\frac{1}{9}$

40503639741. $\frac{1}{8}$

40503639742. $\frac{1}{4}$

Question Number : 69 Question Id : 40503610924 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$2\pi - \left(\sin^{-1}\frac{4}{5} + \sin^{-1}\frac{5}{13} + \sin^{-1}\frac{16}{65}\right)$ is

equal to :

Options :

40503639743. $\frac{5\pi}{4}$

40503639744. $\frac{3\pi}{2}$

40503639745. $\frac{7\pi}{4}$

40503639746. $\frac{\pi}{2}$

Question Number : 69 Question Id : 40503610924 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$$2\pi - \left(\sin^{-1}\frac{4}{5} + \sin^{-1}\frac{5}{13} + \sin^{-1}\frac{16}{65}\right)$$

बराबर है :

Options :

40503639743. $\frac{5\pi}{4}$

40503639744. $\frac{3\pi}{2}$

40503639745. $\frac{7\pi}{4}$

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40503639746. $\frac{\pi}{2}$

Question Number : 70 Question Id : 40503610925 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The proposition $p \rightarrow \sim(p \wedge \sim q)$ is equivalent to :

Options :

40503639747. q

40503639748. $(\sim p) \vee (\sim q)$

40503639749. $(\sim p) \vee q$

40503639750. $(\sim p) \wedge q$

Question Number : 70 Question Id : 40503610925 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

साध्य (proposition) $p \rightarrow \sim(p \wedge \sim q)$ निम्न में से किसके तुल्य है ?

Options :

40503639747. q

40503639748. $(\sim p) \vee (\sim q)$

40503639749. $(\sim p) \vee q$

40503639750. $(\sim p) \wedge q$

Sub-Section Number : 2
Sub-Section Id : 405036760
Question Shuffling Allowed : Yes

Question Number : 71 Question Id : 40503610926 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

If $\left(\frac{1+i}{1-i}\right)^{m/2} = \left(\frac{1+i}{i-1}\right)^{n/3} = 1$, $(m,\ n \in N)$

then the greatest common divisor of the least values of m and n is ________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 71 Question Id : 40503610926 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

यदि $\left(\frac{1+i}{1-i}\right)^{m/2} = \left(\frac{1+i}{i-1}\right)^{n/3} = 1$ है, $(m, n \in N)$

तो m तथा n के न्यूनतम मानों का महत्तम उभयनिष्ठ भाजक है ________ ।

Response Type : Numeric

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Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 72 Question Id : 40503610927 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

Let $A = \begin{bmatrix} x & 1 \\ 1 & 0 \end{bmatrix}$, $x \in \mathbf{R}$ and $A^4 = [a_{ij}]$. If $a_{11} = 109$, then a_{22} is equal to ________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.002

Question Number : 72 Question Id : 40503610927 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

माना $A = \begin{bmatrix} x & 1 \\ 1 & 0 \end{bmatrix}$, $x \in \mathbf{R}$ तथा $A^4 = [a_{ij}]$ है।
यदि $a_{11} = 109$ है, तो a_{22} बराबर है ________ ।

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

Possible Answers :

5 to 5.002

Question Number : 73 Question Id : 40503610928 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

The value of

$(0.16)^{\log_{2.5}\left(\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+\ldots \text{ to } \infty\right)}$ is equal to

________.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002

Question Number : 73 Question Id : 40503610928 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

$(0.16)^{\log_{2.5}\left(\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+\ldots \text{ to } \infty\right)}$ का मान है

________।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002

Question Number : 74 Question Id : 40503610929 Question Type : SA Display Question Number : Yes

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Correct Marks : 4 Wrong Marks : 0

If $\lim_{x\to 0}\left\{\frac{1}{x^8}\left(1-\cos\frac{x^2}{2}-\cos\frac{x^2}{4}+\cos\frac{x^2}{2}\cos\frac{x^2}{4}\right)\right\}=2^{-k}$, then the value of k is __________.

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

5 to 5.002

Question Number : 74 Question Id : 40503610929 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

यदि $\lim_{x\to 0}\left\{\frac{1}{x^8}\left(1-\cos\frac{x^2}{2}-\cos\frac{x^2}{4}+\cos\frac{x^2}{2}\cos\frac{x^2}{4}\right)\right\}=2^{-k}$, तो k का मान है __________।

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

5 to 5.002

Question Number : 75 Question Id : 40503610930 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

The diameter of the circle, whose centre lies on the line $x+y=2$ in the first quadrant and which touches both the lines $x=3$ and $y=2$, is ________.

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

5 to 5.002

Question Number : 75 Question Id : 40503610930 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

वृत्त, जिसका केन्द्र प्रथम चतुर्थांश में रेखा $x+y=2$ पर है तथा जो दोनों रेखाओं $x=3$ तथा $y=2$ को स्पर्श करता है, का व्यास है ________ ।

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

5 to 5.002