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Physics

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Question Number : 1 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The dimension of $\frac{B^2}{2\mu_0}$, where B is magnetic field and μ_0 is the magnetic permeability of vacuum, is :

Options :

1. ML^2T^{-2}

2. MLT^{-2}

3. ML^2T^{-1}

4. $ML^{-1}T^{-2}$

Question Number : 1 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

$\frac{B^2}{2\mu_0}$, जहाँ B चुम्बकीय क्षेत्र है और μ_0 निर्वात की चुम्बकीय पारगम्यता है, की विमायें हैं :

Options :

1. ML^2T^{-2}

2. MLT^{-2}

3. ML^2T^{-1}

4. $ML^{-1}T^{-2}$

Question Number : 1 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

$\frac{B^2}{2\mu_0}$ નું પરિમાણ, જ્યાં B એ ચુંબકીય ક્ષેત્ર અને μ_0 એ શૂન્યાવકાશની ચુંબકીય પારગમ્યતા (પર્મિએબીલીટી) છે, _____ થશે.

Options :

1. ML^2T^{-2}

2. MLT^{-2}

3. ML^2T^{-1}

4. $ML^{-1}T^{-2}$

Question Number : 2 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

A mass of 10 kg is suspended by a rope of length 4 m, from the ceiling. A force F is applied horizontally at the mid-point of the rope such that the top half of the rope makes an angle of 45° with the vertical. Then F equals : (Take $g = 10\ ms^{-2}$ and the rope to be massless)

Options :

1. 90 N

2. 70 N

3. 100 N

4. 75 N

Question Number : 2 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

10 kg द्रव्यमान को 4 m लम्बी एक रस्सी द्वारा छत से लटकाया हुआ है। रस्सी के बीचोबीच क्षैतिज दिशा में एक बल F इस प्रकार लगाया जाता है कि रस्सी का ऊपरी आधा हिस्सा ऊर्ध्व दिशा से 45° का कोण बनाता है। F का मान है : (रस्सी का द्रव्यमान नगण्य माने तथा $g = 10\ ms^{-2}$ लें)

Options :

1. 90 N

2. 70 N

3. 100 N

4. 75 N

Question Number : 2 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

છતથી, 4 m લંબાઈ ધરાવતા દોરડા વડે એક 10 kg દળને લટકાવવામાં આવે છે. દોરડાના મધ્યબિંદુ આગળ એક સમક્ષિતિજ બળ F એવી રીતે લગાવવામાં આવે છે કે જેથી દોરીના ઉપરનો અડધો ભાગ શિરોલંબ સાથે 45° નો કોણ બનાવે તો F _____ ને બરાબર થશે. ($g = 10\ ms^{-2}$ અને દોરડું દળરહિત છે તેમ લો)

Options :

1. 90 N

2. 70 N

3. 100 N

4. 75 N

Question Number : 3 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

An elevator in a building can carry a maximum of 10 persons, with the average mass of each person being 68 kg. The mass of the elevator itself is 920 kg and it moves with a constant speed of 3 m/s. The frictional force opposing the motion is 6000 N. If the elevator is moving up with its full capacity, the power delivered by the motor to the elevator ($g = 10\,m/s^2$) must be at least :

Options :

1. 56300 W

2. 66000 W

3. 48000 W

4. 62360 W

Question Number : 3 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

એક ઈમારતમાંની લિફ્ટ દરેક માણસનું સરેરાશ દળ 68 kg હોય તેવા 10 માણસોને લઈ જઈ શકે છે. લિફ્ટનું પોતાનું દળ 920 kg છે. લિફ્ટ 3 m/s ની અચળ ઝડપે ગતિ કરે છે. ગતિને અવરોધનું ઘર્ષણબળ 6000 N છે. જો લિફ્ટ તેની મહત્તમક્ષમતાથી ઉપર તરફ ગતિ કરતી હોય તો લિફ્ટની મોટર દ્વારા લગાવવાતો પાવર (કાર્યત્વરા) નું મૂલ્ય ઓછામાં ઓછું _____ મળશે.
($g = 10\ m/s^2$)

Options :

1. 56300 W

2. 66000 W

3. 48000 W

4. 62360 W

Question Number : 3 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

एक इमारत में लगे हुए एलीवेटर में औसत द्रव्यमान 68 kg के अधिकतम 10 व्यक्ति जा सकते है। खाली एलीवेटर का द्रव्यमान 920 kg है और यह 3 m/s गति से चलता है। एलीवेटर पर लगने वाला घर्षण बल 6000 N है। यदि एलीवेटर अपनी अधिकतम क्षमता तक भरा हुआ ऊपर को उठ रहा हो तो इसको चलाने वाले मोटर द्वारा दी जाने वाली न्यूनतम शक्ति का मान है : $(g = 10\ m/s^2)$

Options :

1. 56300 W

2. 66000 W

3. 48000 W

4. 62360 W

Question Number : 4 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Mass per unit area of a circular disc of radius a depends on the distance r from its centre as $\sigma(r) = A + Br$. The moment of inertia of the disc about the axis, perpendicular to the plane and passing through its centre is :

Options :

1. $2\pi a^4 \left(\frac{A}{4} + \frac{aB}{5}\right)$

2. $\pi a^4 \left(\frac{A}{4} + \frac{aB}{5}\right)$

3. $2\pi a^4 \left(\frac{A}{4} + \frac{B}{5}\right)$

4. $2\pi a^4 \left(\frac{aA}{4} + \frac{B}{5}\right)$

Question Number : 4 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

त्रिज्या a की एक वृत्ताकार डिस्क के प्रति क्षेत्रफल इकाई का द्रव्यमान $\sigma(r)$ इसके केन्द्र से दूरी r पर इस प्रकार निर्भर करता है कि $\sigma(r) = A + Br$। डिस्क के केन्द्र से होकर जाने वाले और डिस्क के लम्बवत् अक्ष के सापेक्ष डिस्क का जड़त्व-आघूर्ण है :

Options :

1. $2\pi a^4 \left(\frac{A}{4} + \frac{aB}{5}\right)$

2. $\pi a^4 \left(\frac{A}{4} + \frac{aB}{5}\right)$

3. $2\pi a^4\left(\frac{A}{4}+\frac{B}{5}\right)$

4. $2\pi a^4\left(\frac{aA}{4}+\frac{B}{5}\right)$

Question Number : 4 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

a ત્રિજ્યા ધરાવતી વર્તુળાકાર તકિતનું એકમ ક્ષેત્રફળદીઠ દળ તેના કેન્દ્ર થી અંતર r પર $\sigma(r) = A + Br$ મુજબ આધાર રાખે છે. તકિતના કેન્દ્રમાંથી પસાર થતી અને સમતલને લંબ એવી અક્ષને અનુલક્ષીને જડત્વની ચાકમાત્રા _____ છે.

Options :

1. $2\pi a^4\left(\frac{A}{4}+\frac{aB}{5}\right)$

2. $\pi a^4\left(\frac{A}{4}+\frac{aB}{5}\right)$

3. $2\pi a^4\left(\frac{A}{4}+\frac{B}{5}\right)$

4. $2\pi a^4\left(\frac{aA}{4}+\frac{B}{5}\right)$

Question Number : 5 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

A box weighs 196 N on a spring balance at the north pole. Its weight recorded on the same balance if it is shifted to the equator is close to (Take $g = 10\ ms^{-2}$ at the north pole and the radius of the earth $= 6400\ km$) :

Options :

1. 194.32 N

2. 195.66 N

3. 195.32 N

4. 194.66 N

Question Number : 5 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

एक कमानीदार तुला द्वारा उत्तरी ध्रुव पर एक बक्से का भार 196 N नापा जाता है। इसी तुला द्वारा भूमध्य रेखा पर इस बक्से का भार निम्न में से किसके निकट होगा (उत्तरी ध्रुव पर g का मान $10\ ms^{-2}$ लें तथा पृथ्वी की त्रिज्या $= 6400\ km$ लें) ?

Options :

1. 194.32 N

2. 195.66 N

3. 195.32 N

4. 194.66 N

Question Number : 5 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ઉત્તરધ્રુવ પર રહેલ એક સ્પ્રિંગ બેલેન્સ (વજન કાંટો), એક બોક્ષનું વજન 196 N નોંધે છે. જો આ વજનકાંટાને વિષવવૃત્તની નજીક ખસેડીને વજન નોંધતા, બોક્ષનું વજન _____ ની નજીકનું થશે.
(ઉત્તરધ્રુવ આગળ $g = 10\,ms^{-2}$ અને પૃથ્વીની ત્રિજ્યા $= 6400\,km$ લો)

Options :

1. 194.32 N

2. 195.66 N

3. 195.32 N

4. 194.66 N

Question Number : 6 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

एक आदर्श द्रव बदलते हुए व्यास के एक पाइप से स्तरीय प्रवाह में बह रहा है। पाइप का अधिकतम व न्यूनतम व्यास क्रमशः 6.4 cm और 4.8 cm है। तब पाइप में बहने वाले द्रव की न्यूनतम और अधिकतम गति का अनुपात है :

Options :

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

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

3. $\frac{81}{256}$

4. $\frac{9}{16}$

Question Number : 6 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

An ideal fluid flows (laminar flow) through a pipe of non-uniform diameter. The maximum and minimum diameters of the pipes are 6.4 cm and 4.8 cm, respectively. The ratio of the minimum and the maximum velocities of fluid in this pipe is :

Options :

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

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

3. $\frac{81}{256}$

4. $\frac{9}{16}$

Question Number : 6 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

એક આદર્શ પ્રવાહી (સ્તરીય વહન) એ એક અસમાન વ્યાસ વાળી નળીમાંથી (પાઈપ) પસાર થાય છે. નળીનો (પાઈપનો) મહત્તમ અને ન્યૂનતમ વ્યાસ અનુક્રમે 6.4 cm અને 4.8 cm છે, તો આ પાઈપમાં પ્રવાહીના લઘુત્તમ અને મહત્તમ વેગનો ગુણોત્તર _____ છે.

Options :

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

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

3. $\frac{81}{256}$

4. $\frac{9}{16}$

Question Number : 7 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Two ideal Carnot engines operate in cascade (all heat given up by one engine is used by the other engine to produce work) between temperatures, T_1 and T_2. The temperature of the hot reservoir of the first engine is T_1 and the temperature of the cold reservoir of the second engine is T_2. T is temperature of the sink of first engine which is also the source for the second engine. How is T related to T_1 and T_2, if both the engines perform equal amount of work ?

Options :

1. $T = \frac{T_1 + T_2}{2}$

2. $T = \sqrt{T_1 T_2}$

3. $T = \frac{2T_1T_2}{T_1 + T_2}$

4. $T = 0$

Question Number : 7 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

दो आदर्श कार्नो इन्जन सोपानी संबंधन (एक इन्जन द्वारा छोड़ी गयी सम्पूर्ण ऊष्मा दूसरे इन्जन द्वारा कार्य करने में प्रयोग की जाती है) में T_1 और T_2 तापमान के दो ऊष्मा भंडारों के बीच लगे हुए हैं। पहले इन्जन के गर्म ऊष्मा भंडार का तापमान T_1 है तथा दूसरे इन्जन के ठण्डे ऊष्मा भंडार का तापमान T_2 है और पहले इन्जन के सिंक का तापमान तथा दूसरे इन्जन के स्रोत का तापमान दोनों T हैं। यदि दोनों इन्जन समान कार्य का उत्पादन करते हो तो T, T_1 और T_2 में सम्बन्ध है :

Options :

1. $T = \frac{T_1 + T_2}{2}$

2. $T = \sqrt{T_1T_2}$

3. $T = \frac{2T_1T_2}{T_1 + T_2}$

4. $T = 0$

Question Number : 7 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

બે આદર્શ કાર્નો એન્જિનો T_1 અને T_2 તાપમાન વચ્ચે ક્રમમાં કાર્યરત છે. (એક એન્જિન દ્વારા ઉત્પન્ન ઊષ્મા, બીજા એન્જિન દ્વારા કાર્ય કરવામાં ઉપયોગમાં લેવામાં આવે છે.) પ્રથમ એન્જિનનું ગરમ ઊષ્માપ્રાપ્તિ સ્થાનનું તાપમાન T_1 અને બીજા એન્જિનનું ઠારણ વ્યવસ્થાનું તાપમાન T_2 છે. અત્રે T એ પ્રથમ એન્જિનના સિંક (ઠારણ) નું અને બીજા એન્જિન માટેના ઊષ્મા ઉદ્‌ગમનું તાપમાન છે. જો બંને એન્જિનો સરખા પ્રમાણમાં કાર્ય કરેતો કેવી રીતે T એ T_1 અને T_2 સાથે સંકળાયેલ હશે?

Options :

1. $T = \frac{T_1 + T_2}{2}$

2. $T = \sqrt{T_1 T_2}$

3. $T = \frac{2T_1 T_2}{T_1 + T_2}$

4. $T = 0$

Question Number : 8 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Under an adiabatic process, the volume of an ideal gas gets doubled. Consequently the mean collision time between the gas molecule changes from τ_1 to τ_2. If $\frac{C_P}{C_v} = \gamma$ for this gas then a good estimate for $\frac{\tau_2}{\tau_1}$ is given by :

Options :

1. 2

2. $\left(\frac{1}{2}\right)^{\frac{\gamma+1}{2}}$

3. $\left(\frac{1}{2}\right)^{\gamma}$

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

Question Number : 8 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

એક સમોષ્મી પ્રક્રિયા દરમ્યાન આદર્શવાયનું કદ બમણું થાય છે. પરિણામે વાયુ અણુઓ વચ્ચેનો સરેરાશ અથડામણ સમય τ_1 થી બદલાઈને τ_2 થાય છે. જો વાયુ માટે $\frac{C_p}{C_v} = \gamma$ હોય તો $\frac{\tau_2}{\tau_1}$ નો _____ થી સાચીરીતે અંદાજ મળી શકે છે.

Options :

1. 2

2. $\left(\frac{1}{2}\right)^{\frac{\gamma+1}{2}}$

3. $\left(\frac{1}{2}\right)^{\gamma}$

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

Question Number : 8 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

एक ऊष्मारोधी प्रक्रिया में एक आदर्श गैस का आयतन दोगुना हो जाता है। इसके कारण उसके अणुओं में होने वाली टक्करों का औसत समय τ_1 से बदलकर τ_2 हो जाता है। यदि इस गैस के लिये $\frac{C_p}{C_v} = \gamma$ तो $\frac{\tau_2}{\tau_1}$ के लिये एक उत्तम आकलन है :

Options :

1. 2

2. $\left(\frac{1}{2}\right)^{\frac{\gamma+1}{2}}$

3. $\left(\frac{1}{2}\right)^{\gamma}$

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

Question Number : 9 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

A stationary observer receives sound from two identical tuning forks, one of which approaches and the other one recedes with the same speed (much less than the speed of sound). The observer hears 2 beats/sec. The oscillation frequency of each tuning fork is $v_0 = 1400$ Hz and the velocity of sound in air is 350 m/s. The speed of each tuning fork is close to :

Options :

1. 1 m/s

2. $\frac{1}{2}$ m/s

3. $\frac{1}{4}$ m/s

4. $\frac{1}{8}$ m/s

Question Number : 9 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

एक स्थिर प्रेक्षक दो एकसमान स्वरित्र द्विभुजों (tuning forks) से आनेवाली ध्वनि सुन रहा है। इन द्विभुजों में से एक प्रेक्षक की ओर चल रहा है जबकि दूसरा द्विभुज उसी गति (हवा में ध्वनि की गति से बहुत कम) से प्रेक्षक से दूर जा रहा है। यदि द्विभुजों की आवृत्ति $\nu_0 = 1400$ Hz, हवा में ध्वनि की गति 350 ms^{-1} हो और प्रेक्षक 2 विस्पंदन (beats) प्रति सेकंड सुन रहा हो तो द्विभुजों की गति का मान है :

Options :

1. 1 m/s

2. $\frac{1}{2}$ m/s

3. $\frac{1}{4}$ m/s

4. $\frac{1}{8}$ m/s

Question Number : 9 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

એક સ્થિર અવલોકનકરાને બે સમાન ધ્વનિ ચીપીયાથી ઉત્પન્ન ધ્વની સંભળાય છે, કે જેમાંનો એક અવલોકનાકર તરફ અને બીજો અવલોકારથી દૂર તરફ સમાન ઝડપ (ધ્વનિની ઝડપ કરતા ખૂબ ઓછી ઝડપથી)થી ગતિ કરે છે. અવલોકનકાર 2 સ્પંદ/સેકન્ડ સાંભળે છે. દરેક ધ્વનિ ચીપીયાની કંપન આવૃત્તિ $\nu_0 = 1400$ Hz અને હવામાં ધ્વનિની ઝડપ $350\ \text{ms}^{-1}$ છે. દરેક ચીપીયાની ઝડપનું મૂલ્ય _____ ની નજીક નું હશે.

Options :

1. 1 m/s

2. $\frac{1}{2}$ m/s

3. $\frac{1}{4}$ m/s

4. $\frac{1}{8}$ m/s

Question Number : 10 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

A particle of mass m and charge q has an initial velocity $\vec{v} = v_0\hat{j}$. If an electric field $\vec{E} = E_0\hat{i}$ and magnetic field $\vec{B} = B_0\hat{i}$ act on the particle, its speed will double after a time :

Options :

1. $\frac{2mv_0}{qE_0}$

2. $\frac{\sqrt{2}mv_0}{qE_0}$

3. $\frac{3mv_0}{qE_0}$

4. $\frac{\sqrt{3}mv_0}{qE_0}$

Question Number : 10 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

एक कण का द्रव्यमान m है तथा इस पर q आवेश है।

इसका आरम्भिक वेग $\vec{v} = v_0\hat{j}$ है। यदि इस पर

एक वैद्युत क्षेत्र $\vec{E} = E_0\hat{i}$ और चुम्बकीय क्षेत्र

$\vec{B} = B_0\hat{i}$ लगे हो तो कितने समय में इसकी गति दो

गुनी हो जायेगी?

Options :

1. $\frac{2mv_0}{qE_0}$

2. $\frac{\sqrt{2}mv_0}{qE_0}$

3. $\frac{3mv_0}{qE_0}$

4. $\frac{\sqrt{3}mv_0}{qE_0}$

Question Number : 10 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

એક m દળ અને q જેટલો વીજભાર ધરાવતા કણનો પ્રારંભિક વેગ $\vec{v} = v_0\hat{j}$ છે. જો કણ પર $\vec{E} = E_0\hat{i}$ જેટલું વિદ્યુતક્ષેત્ર અને $\vec{B} = B_0\hat{i}$ જેટલું ચુંબકીય ક્ષેત્ર લાગતું હોય તો તેની ઝડપ _____ સમયબાદ બમણી થશે.

Options :

1. $\frac{2mv_0}{qE_0}$

2. $\frac{\sqrt{2}mv_0}{qE_0}$

3. $\frac{3mv_0}{qE_0}$

4. $\frac{\sqrt{3}mv_0}{qE_0}$

Question Number : 11 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

In a building there are 15 bulbs of 45 W, 15 bulbs of 100 W, 15 small fans of 10 W and 2 heaters of 1 kW. The voltage of electric main is 220 V. The minimum fuse capacity (rated value) of the building will be :

Options :

1. 10 A

2. 20 A

3. 15 A

4. 25 A

Question Number : 11 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

एक इमारत में 45 W के 15 बल्ब, 100 W के 15 बल्ब, 10 W के 15 छोटे पंखे और 1 kW के दो हीटर है। इसमें आने वाली विद्युत धारा 220 V पर आती है। इस इमारत में लगने वाले फ्यूज की न्यूनतम रेटिंग होगी :

Options :

1. 10 A

2. 20 A

3. 15 A

4. 25 A

Question Number : 11 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

એક મકાનમાં 45 W ના 15 બલ્બો, 100 W ના 15 બલ્બો, 10 W ના 15 નાના પંખાઓ અને 1 kW ના 2 હીટર (તાપકો) છે. વિદ્યુત મેઈન્સનો વોલ્ટેજ 220 V છે. આ મકાનના મુખ્ય ફ્યુઝની લઘુત્તમ ફ્યૂઝ-ક્ષમતા (પીગળવાની ક્ષમતા નિર્ધારીત-મૂલ્ય) _____ છે.

Options :

1. 10 A

2. 20 A

3. 15 A

4. 25 A

Question Number : 12 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

A planar loop of wire rotates in a uniform magnetic field. Initially, at $t = 0$, the plane of the loop is perpendicular to the magnetic field. If it rotates with a period of 10 s about an axis in its plane then the magnitude of induced emf will be maximum and minimum, respectively at :

Options :

1. 2.5 s and 5.0 s

2. 5.0 s and 7.5 s

3. 5.0 s and 10.0 s

4. 2.5 s and 7.5 s

Question Number : 12 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

एक तार का बना हुआ समतलीय लूप एक एकसमान चुम्बकीय क्षेत्र में घूम रहा है। समय $t=0$ पर लूप का तल चुम्बकीय क्षेत्र के लम्बवत् है। यदि लूप 10 सेकंड के आवर्त काल से अपने तल से होकर जाने वाले एक अक्ष के चारों ओर घूम रहा है तो इसमें प्रेरित विद्युत-वाहक बल का मान निम्न में से किन समयों पर क्रमश: अधिकतम और न्यूनतम होगा?

Options :

1. 2.5 s और 5.0 s

2. 5.0 s और 7.5 s

3. 5.0 s और 10.0 s

4. 2.5 s और 7.5 s

Question Number : 12 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

તારનો એક સમતલીય ગાળો એકસમાન ચુંબકીયક્ષેત્રમાં ભ્રમણ કરે છે. પ્રારંભમાં, $t=0$ સમયે, ગાળાનું સમતલ ચુંબકીયક્ષેત્રને લંબ છે. તે જો તેના જ સમતલમાં રહેલી પોતાની અક્ષને અનુલક્ષીને 10 s ના આવર્ત સાથે પરિભ્રમણ કરતી હોય તો અનુક્રમે મહત્તમ અને ન્યૂનતમ પ્રેરિત e.m.f. _____ થશે.

Options :

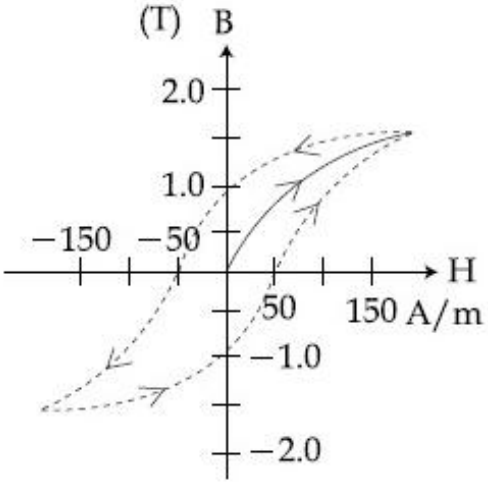
1. 2.5 s અને 5.0 s

2. 5.0 s અને 7.5 s

3. 5.0 s અને 10.0 s

4. 2.5 s અને 7.5 s

Question Number : 13 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1



The figure gives experimentally measured B vs. H variation in a ferromagnetic material. The retentivity, co-ercivity and saturation, respectively, of the material are :

Options :

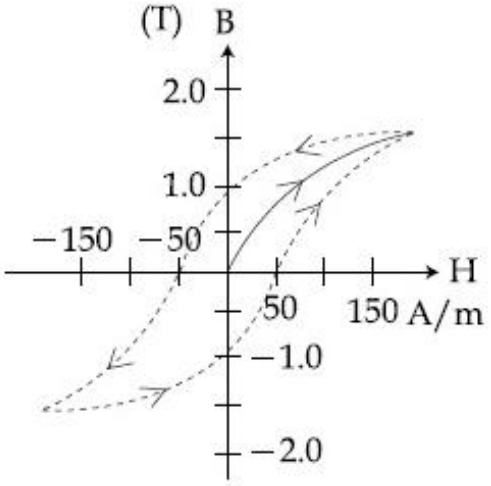
1. 1.0 T, 50 A/m and 1.5 T

2. 1.5 T, 50 A/m and 1.0 T

3. 150 A/m, 1.0 T and 1.5 T

4. 1.5 T, 50 A/m and 1.0 T

Question Number : 13 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1



चित्र में एक लौह-चुंबकीय (ferromagnetic) पदार्थ के लिये एक प्रयोग द्वारा नापे गये B vs. H का विचरण दिखाया गया है। इस पदार्थ की धारणशीलता, निग्राहिता व संतृप्तता का मान है क्रमश: –

Options :

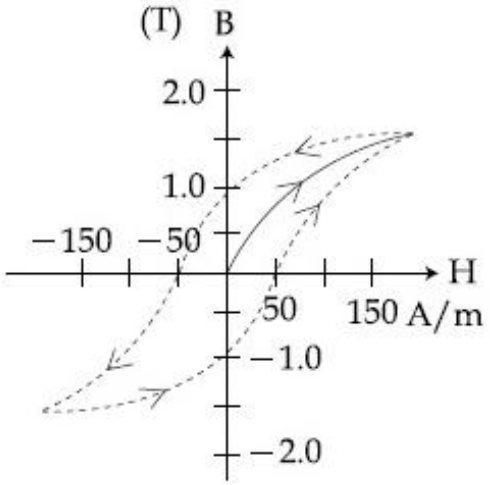
1. 1.0 T, 50 A/m तथा 1.5 T

2. 1.5 T, 50 A/m तथा 1.0 T

3. 150 A/m, 1.0 T तथा 1.5 T

4. 1.5 T, 50 A/m तथा 1.0 T

Question Number : 13 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1



આકૃતિ એક ફેરોમેગ્નેટીક (લૌહચુંબકત્વ) પદાર્થ માટે પ્રાયોગિક રીતે મપાયેલ B વિરૂધ્ધ H નો ફેરફાર દર્શાવે છે. આપેલ પદાર્થ માટે અનુક્રમે ધારણશીલતા (retentivity), નિગ્રાહીતા (coercivity) અને સંતૃપ્તતા (saturation) _____ થશે.

Options :

1. 1.0 T, 50 A/m અને 1.5 T

2. 1.5 T, 50 A/m અને 1.0 T

3. 150 A/m, 1.0 T અને 1.5 T

4. 1.5 T, 50 A/m અને 1.0 T

Question Number : 14 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

An emf of 20 V is applied at time $t = 0$ to a circuit containing in series 10 mH inductor and 5 Ω resistor. The ratio of the currents at time $t = \infty$ and at $t = 40$ s is close to : (Take $e^2 = 7.389$)

Options :

1. 1.46

2. 1.15

3. 0.84

4. 1.06

Question Number : 14 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

एक विद्युत परिपथ में 10 mH का एक प्रेरक और 5 Ω का एक प्रतिरोधक श्रेणी में लगे हुए हैं। इस पर 20 V का एक विद्युत-वाहक बल $t=0$ समय पर लगाया जाता है। इस स्थिति में $t=\infty$ और $t=40$ s पर इस परिपथ में बहने वाली विद्युत धाराओं के मान में अनुपात निम्न में से किसके निकट होगा?
(e^2 का मान 7.389 लें)

Options :

1. 1.46

2. 1.15

3. 0.84

4. 1.06

Question Number : 14 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

$t=0$ સમયે 10 mH જેટલું પ્રેરણ અને 5 Ω અવરોધ ધરાવતા શ્રેણી પરિપથને 20 V જેટલું emf લગાવડવામાં આવે છે, $t=\infty$ અને $t=40$ s સમયે વહેતા પ્રવાહ ઓનો ગુણોત્તર _____ ની નજીકનો થશે.
($e^2=7.389$ લો)

Options :

1. 1.46

2. 1.15

3. 0.84

4. 1.06

Question Number : 15 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The electric field of a plane electromagnetic wave is given by

$$\vec{E} = E_0 \frac{\hat{i} + \hat{j}}{\sqrt{2}} \cos(kz + \omega t)$$

At t=0, a positively charged particle is at the point $(x, y, z) = \left(0, 0, \frac{\pi}{k}\right)$. If its instantaneous velocity at (t=0) is $v_0 \hat{k}$, the force acting on it due to the wave is :

Options :

1. parallel to $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$

2. antiparallel to $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$

3. zero

4. parallel to $\hat{k}$

Question Number : 15 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

एक समतल विद्युत-चुम्बकीय तरंग का विद्युत क्षेत्र

$\vec{E} = E_0 \frac{\hat{i} + \hat{j}}{\sqrt{2}} \cos(kz + \omega t)$ है।

समय $t=0$ पर एक धनावेशित कण

$(x, y, z) = \left(0, 0, \frac{\pi}{k}\right)$ बिन्दु पर है। यदि इस समय

$(t=0)$ पर कण का वेग $v_0 \hat{k}$ हो तो तरंग के कारण

इस पर लगने वाला बल होगा :

Options :

1. $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$ के समान्तर

2. $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$ के प्रतिसमान्तर

3. शून्य

4. $\hat{k}$ के समान्तर

Question Number : 15 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

એક સમતલ વિદ્યુતચુંબકીય તરંગમાં વિદ્યુતક્ષેત્ર નીચે મુજબ આપી શકાય છે. $\vec{E} = E_0 \frac{\hat{i} + \hat{j}}{\sqrt{2}} \cos(kz + \omega t)$. $t=0$ સમયે, એક ધન વિદ્યુતભારિત કણ $(x, y, z) = \left(0, 0, \frac{\pi}{k}\right)$ બિંદુએ છે. જો તેનો ($t=0$ ક્ષણે) તાત્ક્ષણિક વેગ $v_0 \hat{k}$ હોય, તો તરંગોને લીધે તેના પર લાગતું બળ _____ થશે.

Options :

1. $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$ ને સમાંતર

2. $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$ ને પ્રતિસમાંતર

3. શૂન્ય

4. $\hat{k}$ ને સમાંતર

Question Number : 16 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

A thin lens made of glass (refractive index $= 1.5$) of focal length $f = 16$ cm is immersed in a liquid of refractive index 1.42. If its focal length in liquid is f_l, then the ratio f_l/f is closest to the integer :

Options :

1. 1

2. 5

3. 9

4. 17

Question Number : 16 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

જેની કેન્દ્રલંબાઈ $f = 16\,\text{cm}$ હોય તેવા ગ્લાસ (વક્રીભવનાંક $= 1.5$) માંથી બનાવેલા એક પાતળા લેન્સને 1.42 વક્રીભવનાંક ધરાવતા પ્રવાહીમાં ડૂબાડવામાં આવેલ છે. જો પ્રવાહીમાં કેન્દ્રલંબાઈ f_l હોય તો ગુણોત્તર f_l/f નું મૂલ્ય ની નજીકના પૂર્ણાંક જેટલું _____ હશે.

Options :

1. 1

2. 5

3. 9

4. 17

Question Number : 16 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

काँच (अपवर्तनांक $= 1.5$) के बने हुए एक पतले लैंस की फोकस दूरी $f = 16\,\text{cm}$ है। जब इसे 1.42 अपवर्तनांक के एक द्रव में डाला जाता है तो उस द्रव में इसकी फोकस दूरी f_l हो जाती है। अनुपात f_l/f निम्न में से किस पूर्णांक के निकटतम है?

Options :

1. 1

2. 5

3. 9

4. 17

Question Number : 17 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

यंग के द्विझिरी प्रयोग में दो झिरियों के बीच की दूरी 0.15 mm है। यदि इसमें 589 nm तरंगदैर्घ्य का प्रकाश प्रयोग में लाया जाय और बनने वाले व्यतिकरण पैटर्न को 1.5 मीटर दूर रखे एक पर्दे पर देखा जाय तो पर्दे पर दो उत्तरोत्तर फ्रिंजों के बीच की दूरी होगी :

Options :

1. 6.9 mm

2. 5.9 mm

3. 4.9 mm

4. 3.9 mm

Question Number : 17 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

યંગના ડબલ-સ્લિટના પ્રયોગમાં બે સ્લિટ વચ્ચેનું અંતર 0.15 mm છે. 589 nm તરંગલંબાઈ ધરાવતો પ્રકાશનો ઉપયોગ કરવામાં આવે છે અને 1.5 m અંતરે રાખેલ પડદા પર વ્યતિકરણભાત મેળવવામાં આવે છે. પડદા પર ક્રમિક પ્રકાશિત શાલાકાઓ વચ્ચેનું અંતર _____ છે.

Options :

1. 6.9 mm

2. 5.9 mm

3. 4.9 mm

4. 3.9 mm

Question Number : 17 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

In a Young's double slit experiment, the separation between the slits is 0.15 mm. In the experiment, a source of light of wavelength 589 nm is used and the interference pattern is observed on a screen kept 1.5 m away. The separation between the successive bright fringes on the screen is :

Options :

1. 6.9 mm

2. 5.9 mm

3. 4.9 mm

4. 3.9 mm

Question Number : 18 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

एक इलैक्ट्रॉन (द्रव्यमान m) और एक फोटोन की ऊर्जा E कुछ इलैक्ट्रॉन-वोल्ट है। इलैक्ट्रॉन की डी-ब्रोगली तरंगदैर्घ्य तथा फोटोन के तरंगदैर्घ्य का अनुपात होगा : (c= प्रकाश की निर्वात में गति)

Options :

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

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

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

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

Question Number : 18 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

m દળ ધરાવતા ઇલેક્ટ્રોન અને ફોટોન બંને અમુક eV ના ક્રમની સમાન ઊર્જા ધરાવે છે. ઇલેક્ટ્રોનની અને ફોટોનની ડી-બ્રોગ્લી તરંગલંબાઈઓનો ગુણોત્તર _____ છે. (c=શૂન્યાવકાશમાં પ્રકાશની ઝડપ છે.)

Options :

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

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

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

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

Question Number : 18 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

An electron (of mass m) and a photon have the same energy E in the range of a few eV. The ratio of the de-Broglie wavelength associated with the electron and the wavelength of the photon is (c = speed of light in vacuum)

Options :

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

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

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

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

Question Number : 19 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

रेडियोधर्मी पदार्थ के एक नमूने की सक्रियता 30 मिनटों में $700\ s^{-1}$ से $500\ s^{-1}$ तक कम हो जाती है। इस पदार्थ की अर्ध आयु निम्न में से किसके निकट है ?

Options :

1. 52 मिनट

2. 62 मिनट

3. 66 मिनट

4. 72 मिनट

Question Number : 19 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

એક રેડીયો એક્ટિવ નમૂનાની એક્ટિવીટી 30 મીનીટમાં $700\ s^{-1}$ થી ઘટીને $500\ s^{-1}$ થાય છે. તેનો અર્ધજીવનકાળનું મૂલ્ય _____ ની નજીકનું હશે.

Options :

1. 52 મીનીટ

2. 62 મીનીટ

3. 66 મીનીટ

4. 72 મીનીટ

Question Number : 19 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The activity of a radioactive sample falls from 700 s^{-1} to 500 s^{-1} in 30 minutes. Its half life is close to :

Options :

1. 52 min

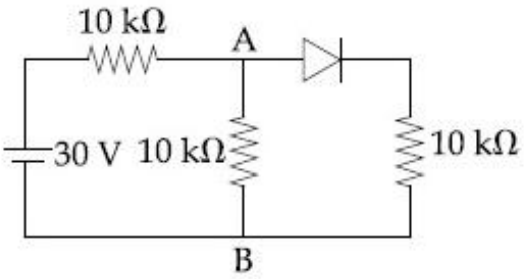
2. 62 min

3. 66 min

4. 72 min

Question Number : 20 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

In the figure, potential difference between A and B is :



Options :

1. zero

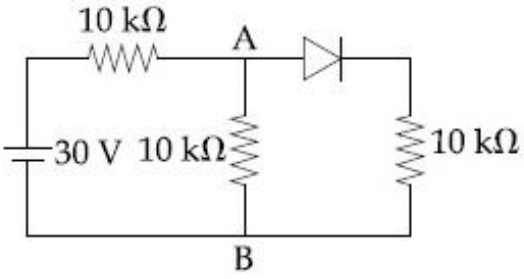
2. 5 V

3. 10 V

4. 15 V

Question Number : 20 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

दिये गये चित्र में A और B के बीच विभवान्तर होगा :



Options :

1. शून्य

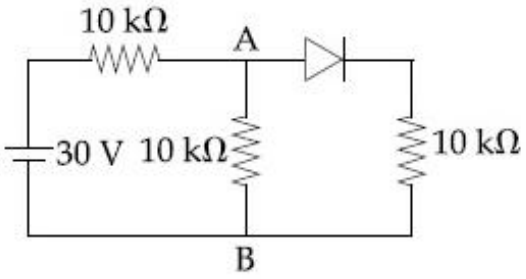
2. 5 V

3. 10 V

4. 15 V

Question Number : 20 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

આપેલ પરિપથમાં, A અને B વચ્ચે સ્થિતિમાન નો તફાવત _____ છે.



Options :

1. શૂન્ય

2. 5 V

3. 10 V

4. 15 V

Sub-Section Number: 2
Sub-Section Id: 40503669
Question Shuffling Allowed : Yes

Question Number : 21 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The sum of two forces $\vec{P}$ and $\vec{Q}$ is $\vec{R}$ such that $|\vec{R}| = |\vec{P}|$. The angle θ (in degrees) that the resultant of $2\vec{P}$ and $\vec{Q}$ will make with $\vec{Q}$ is, _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
90 to 90

Question Number : 21 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

બે બળો $\vec{P}$ અને $\vec{Q}$ સરવાળો $\vec{R}$ છે કે જ્યાં, $|\vec{R}| = |\vec{P}|$ છે. $2\vec{P}$ અને $\vec{Q}$ ના પરિણામી સદિશનો $\vec{Q}$ સાથેનો કોણ θ, ડીગ્રીમાં _____ છે.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
90 to 90

Question Number : 21 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

दो बलों $\vec{P}$ और $\vec{Q}$ को जोड़कर मिलने वाला बल $\vec{R}$ ऐसा है कि $|\vec{R}| = |\vec{P}|$ । यदि $2\vec{P}$ तथा $\vec{Q}$ को जोड़कर मिलने वाला परिणामी बल $\vec{Q}$ से θ कोण (डिग्री में) बनाता हो तो θ का मान होगा _____।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
90 to 90

Question Number : 22 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
M grams of steam at 100°C is mixed with 200 g of ice at its melting point in a thermally insulated container. If it produces liquid water at 40°C [heat of vaporization of water is 540 cal/g and heat of fusion of ice is 80 cal/g], the value of M is _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
40 to 40

Question Number : 22 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
100°C તાપમાને રહેલ વરાળના M ગ્રામને 200 g ધરાવતા અને તેના ગલનબિંદુ આગળ રહેલ બરફ સાથે એક ઊષ્મીય અવાહક પાત્રમાં ભેળવવામાં આવે છે. તે 40°C તાપમાને રહેલ પ્રવાહી પાણી બનાવે છે. (પાણીની ઊષ્મીય બાષ્પન (બાષ્પીય) ઊષ્મા 540 cal/g અને ઊષ્મીય ગલન-ઊષ્મા 80 cal/g છે.) તો M નું મૂલ્ય _____ છે.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
40 to 40

Question Number : 22 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

100°C तापमान की M ग्राम वाष्प को 200 ग्राम बर्फ में एक ऊष्मारोधी बर्तन में मिलाया जाता है। वाष्प मिलाने से पहले बर्फ का तापमान अपने गलनांक के बराबर था। यदि यह प्रक्रिया के अन्त में 40°C का जल मिलता हो तो M का मान है : (जल की वाष्पीकरण ऊष्मा 540 cal/g और बर्फ की संगलन ऊष्मा 80 cal/g है।) _____ ।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
40 to 40

Question Number : 23 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

60 pF धारिता के एक संधारित्र को 20 V के स्रोत से पूरा आवेशित किया जाता है। तत्पश्चात इसे स्रोत से हटाकर 60 pF के एक दूसरे अनावेशित संधारित्र से पार्श्व संबंधन (parallel connection) में जोड़ा जाता है। जब आवेश पूरी तरह से दोनों संधारित्रों में वितरित हो जाय तो इस प्रक्रिया में स्थिर वैद्युत ऊर्जा की क्षति nJ में होती है _____ ।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
6 to 6

Question Number : 23 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

એક 60 pF ના સંધારક (કેપેસીટર) ને 20 V ના ઉદ્ગમથી (વોલ્ટેજથી) સંપૂર્ણપણે વિદ્યુતભારીત કરવામાં આવે છે. તેને ત્યારબાદ વોલ્ટેજ ઉદ્ગમથી છૂટો કરી બીજા વિદ્યુતભાર રહિત 60 pF ના કેપેસીટર સાથે સમાંતરમાં જોડવામાં આવે છે. તેઓની વચ્ચે વિદ્યુતભાર વહેંચાય તે પ્રક્રિયાના સમય દરમ્યાન ગુમાવવાતી સ્થિતવિદ્યુત ઊર્જા (nJ માં) _____ છે.

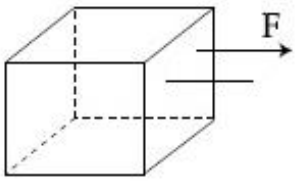
Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
6 to 6

Question Number : 23 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

A 60 pF capacitor is fully charged by a 20 V supply. It is then disconnected from the supply and is connected to another uncharged 60 pF capacitor in parallel. The electrostatic energy that is lost in this process by the time the charge is redistributed between them is (in nJ) _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
6 to 6

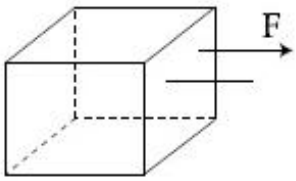
Question Number : 24 Question Type : SA
Correct Marks : 4 Wrong Marks : 0



Consider a uniform cubical box of side a on a rough floor that is to be moved by applying minimum possible force F at a point b above its centre of mass (see figure). If the coefficient of friction is $\mu = 0.4$, the maximum possible value of $100 \times \frac{b}{a}$ for box not to topple before moving is _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
75 to 75

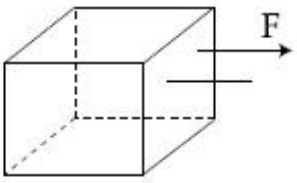
Question Number : 24 Question Type : SA
Correct Marks : 4 Wrong Marks : 0



एक एकसमान घनाकार बक्सा, जिसकी एक भुजा की लम्बाई a है, एक रूक्ष सतह पर रखा हुआ है। इस पर इसके केन्द्र से b ऊँचाई पर न्यूनतम संभव बल F लगाकर इसे खींचना है (चित्र देखें)। यदि घर्षण गुणांक का मान $\mu = 0.4$ हो तो $100 \times \frac{b}{a}$ का अधिकतम संभव मान कितना होगा जिससे खींचते समय खिसकने से पहले बक्सा पलटने न लगे_____।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
75 to 75

Question Number : 24 Question Type : SA
Correct Marks : 4 Wrong Marks : 0



એક ખરબચડી સપાટી પર રહેલ એક a બાજુ ધરાવતા એકરૂપ (એકસમાન) ઘનઆકારના બોક્ષને ધ્યાનમાં લો કે જેને તેના દ્રવ્યમાન કેન્દ્ર ની ઉપર b બિંદુ આગળ લઘુત્તમ શક્ય બળ F લગાડીને ગતિ કરાવવામાં આવે છે (જુઓ આકૃતિ). જો ઘર્ષણાંક $\mu = 0.4$ હોય તો બોક્ષ ગતિ ચાલુ કરતા પહેલાં ગબડી (ટોપલ) ના પડે તે માટે $100 \times \frac{b}{a}$ _____ થશે.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
75 to 75

Question Number : 25 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The balancing length for a cell is 560 cm in a potentiometer experiment. When an external resistance of 10 Ω is connected in parallel to the cell, the balancing length changes by 60 cm. If the internal resistance of the cell is $\frac{N}{10}\Omega$, where N is an integer then value of N is _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
12 to 12

Question Number : 25 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

एक पोटेन्शियोमीटर में एक सेल 560 cm लम्बाई पर संतुलित होता है। यदि सेल के समान्तर 10 Ω का एक प्रतिरोधक लगा दिया जाय तो संतुलन की लम्बाई 60 cm से बदल जाती है। यदि सेल का आंतरिक प्रतिरोध $\frac{N}{10}\Omega$ हो (यहाँ N एक पूर्णांक है) तो N का मान है _____।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
12 to 12

Question Number : 25 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

એક પોટેન્શીયોમીટરના પ્રયોગમાં આપેલ કોષ માટે તારની સંતુલન લંબાઈ 560 cm મળે છે. જ્યારે કોષને સમાંતર 10 Ω નો બાહ્ય અવરોધ જોડવામાં આવે છે ત્યારે સંતુલન લંબાઈ 60 cm જેટલી બદલાય છે. જો કોષનો આંતરિક અવરોધ $\frac{N}{10}\Omega$, જ્યાં N એ પૂર્ણાંક છે, તો N નું મૂલ્ય _____ છે.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
12 to 12

Chemistry

Section Id :	40503649
Section Number :	2
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	25
Number of Questions to be attempted:	25
Section Marks:	100

Sub-Section Number:	1
Sub-Section Id:	40503670
Question Shuffling Allowed :	Yes

Question Number : 26 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

For the reaction

$2H_2(g) + 2NO(g) \rightarrow N_2(g) + 2H_2O(g)$

the observed rate expression is, rate $= k_f[NO]^2[H_2]$. The rate expression for the reverse reaction is :

Options :

1. $k_b[N_2][H_2O]$

2. $k_b[N_2][H_2O]^2$

3. $k_b[N_2][H_2O]^2/[NO]$

4. $k_b[N_2][H_2O]^2/[H_2]$

Question Number : 26 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

अभिक्रिया

$2H_2(g) + 2NO(g) \rightarrow N_2(g) + 2H_2O(g)$

के लिए प्रेक्षित दर व्यंजक, दर $= k_f[NO]^2[H_2]$ है।

उत्क्रमित अभिक्रिया के लिए दर व्यंजक है :

Options :

1. $k_b[N_2][H_2O]$

2. $k_b[N_2][H_2O]^2$

3. $k_b[N_2][H_2O]^2/[NO]$

4. $k_b[N_2][H_2O]^2/[H_2]$

Question Number : 26 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

આપેલ પ્રક્રિયા,

$2H_2(g) + 2NO(g) \rightarrow N_2(g) + 2H_2O(g)$

માટે દર $= k_f[NO]^2\,[H_2]$ માલુમ પડે છે. પ્રતિવર્તી પ્રક્રિયા માટેનો દર શોધો.

Options :

1. $k_b[N_2][H_2O]$

2. $k_b[N_2][H_2O]^2$

3. $k_b[N_2][H_2O]^2/[NO]$

4. $k_b[N_2][H_2O]^2/[H_2]$

Question Number : 27 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

બે ખુલ્લા બીકરો જેમાંથી એક માં દ્રાવક અને બીજામાં એ જ દ્રાવક માં અબાષ્પશીલ દ્રાવ્યનું મિશ્રણ છે. તેઓને સાથે એકપાત્રમા બંધ કરવામાં આવે છે તો સમયાંતરે,

Options :

1. દ્રાવણનું કદ વધે છે અને દ્રાવકનું કદ ઘટે છે.

2. દ્રાવણનું કદ ઘટે છે અને દ્રાવકનું કદ વધે છે.

3. દ્રાવણનું કદમાં કોઈ ફેરફાર થતો નથી અને દ્રાવકનું કદ ઘટે છે.

4. દ્રાવણનું કદ અને દ્રાવકમાં કદમાં કોઈ ફેરફાર થતો નથી.

Question Number : 27 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Two open beakers one containing a solvent and the other containing a mixture of that solvent with a non volatile solute are together sealed in a container. Over time :

Options :

1. the volume of the solution increases and the volume of the solvent decreases

2. the volume of the solution decreases and the volume of the solvent increases

3. the volume of the solution does not change and the volume of the solvent decreases

4. the volume of the solution and the solvent does not change

Question Number : 27 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

दो खुले बीकर, एक जिसमें एक विलायक है तथा दूसरा जिसमें एक अवाष्पशील विलेय के साथ उस विलायक का मिश्रण है, को एकसाथ पात्र के अन्दर बन्द किया गया है, कुछ समय के बाद :

Options :

1. विलयन का आयतन बढ़ जाता है तथा विलायक का आयतन कम हो जाता है।

2. विलयन का आयतन कम हो जाता है तथा विलायक का आयतन बढ़ जाता है।

3. विलयन के आयतन में कोई परिवर्तन नहीं होता है तथा विलायक का आयतन कम हो जाता है।

4. विलयन तथा विलायक दोनों के आयतन में कोई परिवर्तन नहीं होता है।

Question Number : 28 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The equation that is incorrect is :

Options :

1. $\left(\Lambda_m^0\right)_{NaBr} - \left(\Lambda_m^0\right)_{NaCl} = \left(\Lambda_m^0\right)_{KBr} - \left(\Lambda_m^0\right)_{KCl}$

$(\Lambda_m^0)_{KCl} - (\Lambda_m^0)_{NaCl} = (\Lambda_m^0)_{KBr}$

2. $-(\Lambda_m^0)_{NaBr}$

$(\Lambda_m^0)_{NaBr} - (\Lambda_m^0)_{NaI} = (\Lambda_m^0)_{KBr}$

3. $-(\Lambda_m^0)_{NaBr}$

$(\Lambda_m^0)_{H_2O} = (\Lambda_m^0)_{HCl} + (\Lambda_m^0)_{NaOH}$

4. $-(\Lambda_m^0)_{NaCl}$

Question Number : 28 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

वह समीकरण जो **गलत** है, है :

Options :

$(\Lambda_m^0)_{NaBr} - (\Lambda_m^0)_{NaCl} = (\Lambda_m^0)_{KBr}$

1. $-(\Lambda_m^0)_{KCl}$

$(\Lambda_m^0)_{KCl} - (\Lambda_m^0)_{NaCl} = (\Lambda_m^0)_{KBr}$

2. $-(\Lambda_m^0)_{NaBr}$

$(\Lambda_m^0)_{NaBr} - (\Lambda_m^0)_{NaI} = (\Lambda_m^0)_{KBr}$

3. $-(\Lambda_m^0)_{NaBr}$

$(\Lambda_m^0)_{H_2O} = (\Lambda_m^0)_{HCl} + (\Lambda_m^0)_{NaOH}$

4. $-(\Lambda_m^0)_{NaCl}$

Question Number : 28 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

સમીકરણ જે સાચું નથી તે :

Options :

1. $(\Lambda_m^0)_{NaBr} - (\Lambda_m^0)_{NaCl} = (\Lambda_m^0)_{KBr} - (\Lambda_m^0)_{KCl}$

2. $(\Lambda_m^0)_{KCl} - (\Lambda_m^0)_{NaCl} = (\Lambda_m^0)_{KBr} - (\Lambda_m^0)_{NaBr}$

3. $(\Lambda_m^0)_{NaBr} - (\Lambda_m^0)_{NaI} = (\Lambda_m^0)_{KBr} - (\Lambda_m^0)_{NaBr}$

4. $(\Lambda_m^0)_{H_2O} = (\Lambda_m^0)_{HCl} + (\Lambda_m^0)_{NaOH} - (\Lambda_m^0)_{NaCl}$

Question Number : 29 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

0.6 g यूरिया (NH_2CONH_2) के सोडियम हाइड्रॉक्साइड (NaOH) के साथ एक मात्रात्मकत: अभिक्रिया से निकलने वाली अमोनिया (NH_3) को निम्न में से जिससे उदासीन किया जा सकता है, है :

Options :

1. 0.1 N HCl का 100 ml

2. 0.2 N HCl का 200 ml

3. 0.2 N HCl का 100 ml

4. 0.4 N HCl का 200 ml

Question Number : 29 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

0.6 g યુરિયા (NH_2CONH_2) સાથે સોડિયમ હાઇડ્રોક્સાઈડ (NaOH) ની જથ્થાત્મક પ્રક્રિયા થી ઉત્પન્ન થતા એમોનીયાનું (NH_3) તટસ્થીકરણ શેના દ્વારા થઈ શકે?

Options :

1. 0.1 N HCl નું 100 ml

2. 0.2 N HCl નું 200 ml

3. 0.2 N HCl નું 100 ml

4. 0.4 N HCl નું 200 ml

Question Number : 29 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The ammonia (NH_3) released on quantitative reaction of 0.6 g urea (NH_2CONH_2) with sodium hydroxide (NaOH) can be neutralized by :

Options :

1. 100 ml of 0.1 N HCl

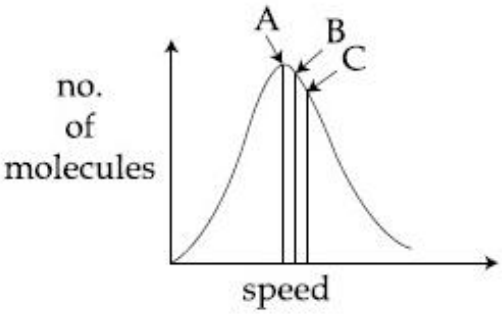
2. 200 ml of 0.2 N HCl

3. 100 ml of 0.2 N HCl

4. 200 ml of 0.4 N HCl

Question Number : 30 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Identify the correct labels of A, B and C in the following graph from the options given below :



Root mean square speed (V_{rms}); most probable speed (V_{mp}); Average speed (V_{av})

Options :

1. A - V_{rms}; B - V_{mp}; C - V_{av}

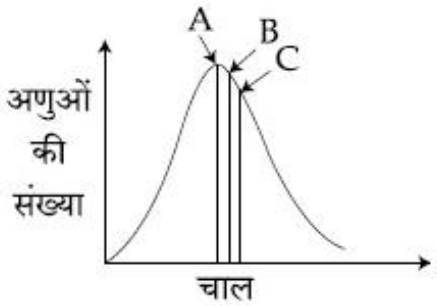
2. A - V_{mp}; B - V_{av}; C - V_{rms}

3. A - V_{av}; B - V_{rms}; C - V_{mp}

4. A - V_{mp}; B - V_{rms}; C - V_{av}

Question Number : 30 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

नीचे दिये गये विकल्पों में से निम्नलिखित आलेख में A, B तथा C के **सही** लेबल को पहचानिए :



वर्ग माध्य मूल चाल (V_{rms}); प्रायिकतम चाल (V_{mp}); औसत चाल (V_{av}) :

Options :

1. $A - V_{rms}; B - V_{mp}; C - V_{av}$

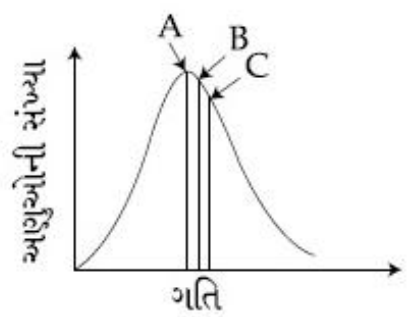
2. $A - V_{mp}; B - V_{av}; C - V_{rms}$

3. $A - V_{av}; B - V_{rms}; C - V_{mp}$

4. $A - V_{mp}; B - V_{rms}; C - V_{av}$

Question Number : 30 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

નીચે આપેલા આલેખમાં, આપેલા વિકલ્પો ઉપરથી A, B અને C નાં સાચા નિર્દેશનો શોધો :



સરેરાશ વર્ગમૂળ ગતિ (V_{rms}); મહત્તમ સંભવિત ગતિ (V_{mp}); સરેરાશ ગતિ (V_{av}) :

Options :

1. $A - V_{rms}; B - V_{mp}; C - V_{av}$

2. $A - V_{mp}; B - V_{av}; C - V_{rms}$

3. $A - V_{av}; B - V_{rms}; C - V_{mp}$

4. $A - V_{mp}; B - V_{rms}; C - V_{av}$

Question Number : 31 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The bond order and the magnetic characteristics of CN^- are :

Options :

1. $2\frac{1}{2}$, diamagnetic

2. 3, paramagnetic

3. $2\frac{1}{2}$, paramagnetic

4. 3, diamagnetic

Question Number : 31 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

CN^- के आबंध क्रम तथा चुम्बकीय अभिलक्षण हैं :

Options :

1. $2\frac{1}{2}$, प्रतिचुम्बकीय

2. 3, अनुचुम्बकीय

3. $2\frac{1}{2}$, अनुचुम्बकीय

4. 3, प्रतिचुम्बकीय

Question Number : 31 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

CN^-નો બંધક્રમાંક અને ચુંબકીય લાક્ષણિકતાઓ :

Options :

1. $2\frac{1}{2}$, પ્રતિચુંબકીય

2. 3, અનુચુંબકીય

3. $2\frac{1}{2}$, અનુચુંબકીય

4. 3, પ્રતિચુંબકીય

Question Number : 32 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Within each pair of elements F & Cl, S & Se, and Li & Na, respectively, the elements that release more energy upon an electron gain are :

Options :

1. Cl, Se and Na

2. F, S and Li

3. F, Se and Na

4. Cl, S and Li

Question Number : 32 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

तत्वों के प्रत्येक युग्म क्रमशः F & Cl, S & Se, तथा Li & Na में तत्व जो एक इलेक्ट्रॉन-लब्धि पर अधिक ऊर्जा विमोचित करते हैं, हैं :

Options :

1. Cl, Se तथा Na

2. F, S तथा Li

3. F, Se तथा Na

4. Cl, S तथा Li

Question Number : 32 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

આપેલી તત્વોની દરેક, જોડકી F & Cl, S & Se અને Li & Na મા, અનુક્રમે ઇલેક્ટ્રોન પ્રાપ્તી દરમ્યાન કયું તત્વ સૌથી વધુ ઊર્જા મુક્ત કરશે ?

Options :

1. Cl, Se અને Na

2. F, S અને Li

3. F, Se અને Na

4. Cl, S અને Li

Question Number : 33 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The refining method used when the metal and the impurities have low and high melting temperatures, respectively, is :

Options :

1. distillation

2. liquation

3. vapour phase refining

4. zone refining

Question Number : 33 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

जब धातु तथा अपद्रव्यों के गलन ताप क्रमशः निम्न तथा उच्च होते हैं, तो निम्नलिखित में से किस परिष्करण विधि का उपयोग किया जाता है?

Options :

1. आसवन

2. गलनिक पृथक्करण

3. वाष्प प्रावस्था परिष्करण

4. मंडल परिष्करण

Question Number : 33 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

જ્યારે ધાતુ અને અશુદ્ધિ અનુક્રમે નીચું અને ઊંચું ગલન તાપમાન ધરાવે ત્યારે, શુદ્ધિકરણ ની પદ્ધતિ નીચેનામાંથી શોધો.

Options :

1. નિસ્યંદન

2. પ્રવાહીકરણ

3. બાષ્પ અવસ્થા શુદ્ધિકરણ

4. ઝોન શુદ્ધિકરણ

Question Number : 34 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Among statements (a)-(d), the correct ones are :

(a) Decomposition of hydrogen peroxide gives dioxygen.

(b) Like hydrogen peroxide, compounds, such as $KClO_3$, $Pb(NO_3)_2$ and $NaNO_3$ when heated liberate dioxygen.

(c) 2-Ethylanthraquinone is useful for the industrial preparation of hydrogen peroxide.

(d) Hydrogen peroxide is used for the manufacture of sodium perborate.

Options :

1. (a) and (c) only

2. (a), (b) and (c) only

3. (a), (c) and (d) only

4. (a), (b), (c) and (d)

Question Number : 34 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

कथनों (a)-(d) में, **सही** कथन हैं :

(a) हाइड्रोजन परॉक्साइड का विघटन डाइऑक्सीजन देता है।

(b) हाइड्रोजन परॉक्साइड की तरह, यौगिक जैसे $KClO_3$, $Pb(NO_3)_2$ तथा $NaNO_3$ को जब गर्म करते हैं डाइऑक्सीजन निकलता है।

(c) 2-ऐथिलअन्थ्राक्विनोन को हाइड्रोजन परॉक्साइड के औद्योगिक निर्माण के लिए उपयोग में लाया जाता है।

(d) हाइड्रोजन परॉक्साइड का उपयोग सोडियम परबोरेट के उत्पादन में किया जाता है।

Options :

1. (a) तथा (c) मात्र

2. (a), (b) तथा (c) मात्र

3. (a), (c) तथा (d) मात्र

4. (a), (b), (c) तथा (d)

Question Number : 34 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

આપેલા વિધાનો (a) - (d) માં, સાચા વિધાનો શોધો :

(a) હાઈડ્રોજન પેરોક્સાઈડનું વિઘટન થતા ડાયઓક્સિજન આપે છે.

(b) હાઈડ્રોજન પેરોક્સાઈડ ની જેમજ, સંયોજનો જેવા કે $KClO_3$, $Pb(NO_3)_2$ અને $NaNO_3$ જ્યારે ગરમ કરવામાં આવે ત્યારે ડાયઓક્સિજન મુક્ત કરે છે.

(c) 2-ઈથાઈલએન્થ્રાક્વિનોન એ હાઈડ્રોજન પેરોક્સાઈડ ની ઔદ્યોગિક બનાવટમાં ઉપયોગી છે.

(d) હાઈડ્રોજન પેરોક્સાઈડનો ઉપયોગ સોડિયમ પરબોરેટની બનાવટમાં થાય છે.

Options :

1. માત્ર (a) અને (c)

2. માત્ર (a), (b) અને (c)

3. માત્ર (a), (c) અને (d)

4. (a), (b), (c) અને (d)

Question Number : 35 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

In the following reactions, products (A) and (B), respectively, are :

$NaOH + Cl_2 \rightarrow (A) +$ side products
(hot and conc.)

$Ca(OH)_2 + Cl_2 \rightarrow (B) +$ side products
(dry)

Options :

1. $NaOCl$ and $Ca(OCl)_2$

2. $NaClO_3$ and $Ca(OCl)_2$

3. $NaClO_3$ and $Ca(ClO_3)_2$

4. $NaOCl$ and $Ca(ClO_3)_2$

Question Number : 35 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

निम्नलिखित अभिक्रियाओं में, उत्पाद (A) तथा (B) क्रमशः हैं :

$NaOH + Cl_2 \rightarrow (A) +$ अतिरिक्त उत्पाद
(उष्ण तथा सान्द्र)

$Ca(OH)_2 + Cl_2 \rightarrow (B) +$ अतिरिक्त उत्पाद
(शुष्क)

Options :

1. $NaOCl$ तथा $Ca(OCl)_2$

2. $NaClO_3$ तथा $Ca(OCl)_2$

3. $NaClO_3$ तथा $Ca(ClO_3)_2$

4. NaOCl तथा $Ca(ClO_3)_2$

Question Number : 35 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

નીચેની પ્રક્રિયામાં, નીપજો (A) અને (B) અનુક્રમે શોધો :

$NaOH + Cl_2 \rightarrow$ (A) + અન્ય નીપજો
(ગરમ અને સાંદ્ર)

$Ca(OH)_2 + Cl_2 \rightarrow$ (B) + અન્ય નીપજો
(સુકો)

Options :

1. NaOCl અને $Ca(OCl)_2$

2. $NaClO_3$ અને $Ca(OCl)_2$

3. $NaClO_3$ અને $Ca(ClO_3)_2$

4. NaOCl અને $Ca(ClO_3)_2$

Question Number : 36 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

निम्नलिखित में से रेडॉक्स अभिक्रिया है :

Options :

1. सूर्य के प्रकाश की उपस्थिति में वायुमंडलीय ऑक्सीजन से ओज़ोन का बनना

2. H_2SO_4 की NaOH के साथ अभिक्रिया

3. डाइनाइट्रोजन का डाइऑक्सीजन के साथ 2000 K पर संयोजन

4. $[Co(H_2O)_6]Cl_3$ की $AgNO_3$ के साथ अभिक्रिया

Question Number : 36 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

નીચેનામાંથી રેડોક્ષ પ્રક્રિયા શોધો :

Options :

1. સૂર્યપ્રકાશની હાજરીમાં વાતાવરણમાં રહેલા ઑક્સિજનમાંથી ઓઝોનની બનાવટ

2. H_2SO_4 ની NaOH સાથેની પ્રક્રિયા

3. 2000 K એ ડાઈનાઈટ્રોજનની ડાયઓક્સીજન સાથે સંયોજન

4. $[Co(H_2O)_6]Cl_3$ સાથે $AgNO_3$ ની પ્રક્રિયા

Question Number : 36 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The redox reaction among the following is :

Options :

1. formation of ozone from atmospheric oxygen in the presence of sunlight

2. reaction of H_2SO_4 with NaOH

3. combination of dinitrogen with dioxygen at 2000 K

4. reaction of $[Co(H_2O)_6]Cl_3$ with $AgNO_3$

Question Number : 37 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

સંકિર્ણો MA_2B_2 માટે જેમાં ધાતુ આયન નું સંકરણ અનુક્રમે sp^3 તથા dsp^2 હોય તો આના શક્ય પ્રકાશક્રિયાશીલ સમઘટક ની સંખ્યા શોધો.

નોંધ : A અને B અનુક્રમે એકદંતીય તટસ્થ અને એકદંતીય મોનો એનાયોનિક લિગાન્ડ છે.

Options :

1. 2 અને 2

2. 0 અને 2

3. 0 અને 1

4. 0 અને 0

Question Number : 37 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The number of possible optical isomers for the complexes MA_2B_2 with sp^3 and dsp^2 hybridized metal atom, respectively, is :

Note : A and B are unidentate neutral and unidentate monoanionic ligands, respectively.

Options :

1. 2 and 2

2. 0 and 2

3. 0 and 1

4. 0 and 0

Question Number : 37 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

sp^3 तथा dsp^2 संकरित धातुओं के साथ संकुल MA_2B_2 के लिए संभावित ध्रुवण समावयवों की संख्या है :

नोट : A तथा B क्रमश: एक दन्तुर उदासीन तथा एक दंतुर एक-आयनिक संलग्नी हैं।

Options :

1. 2 तथा 2

2. 0 तथा 2

3. 0 तथा 1

4. 0 तथा 0

Question Number : 38 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

(a)-(d) में दिये गये कथनों में, **गलत** हैं :

(a) प्रबल क्षेत्र संलग्नी के साथ अष्ठफलकीय Co(III) संकर का चुम्बकीय आघूर्ण बहुत उच्च होता है।

(b) जब $\Delta_0 < P$ हो तो एक अष्ठफलकीय संकर में Co(III) का d-इलेक्ट्रॉन विन्यास है $t_{eg}^4\ e_g^2$

(c) $[CoF_6]^{3-}$ की तुलना में, $[Co(en)_3]^{3+}$ द्वारा अवशोषित प्रकाश का तरंगदैर्घ्य कम है।

(d) यदि Co(III) के एक अष्ठफलकीय संकर के लिए Δ_0 18,000 cm^{-1} है, तो इसके चतुष्फलकीय संकर के लिये उसी संलग्नी के साथ Δ_t होगा 16,000 cm^{-1} ।

Options :

1. (a) तथा (b) मात्र

2. (c) तथा (d) मात्र

3. (a) तथा (d) मात्र

4. (b) तथा (c) मात्र

Question Number : 38 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

આપેલા વિધાનો (a) - (d) પૈકી સાચું નથી તે :

(a) Co(III) ના અષ્ટફલકીય સંકિર્ણો પ્રબળ ક્ષેત્ર લિગાન્ડ સાથે ખૂબ ઉંચી ચુંબકીય ચાકમાત્રા ધરાવે છે.

(b) જ્યારે $\Delta_0 < P$, એક અષ્ટફલકીય સંકીર્ણમાં Co(III) માં d-ઇલેક્ટ્રોન ની સંરચના $t_{eg}^4\ e_g^2$ છે.

(c) $[CoF_6]^{3-}$ કરતાં $[Co(en)_3]^{3+}$ દ્વારા શોષાતી પ્રકાશની તરંગલંબાઈ ઓછી છે.

(d) જો Co(III) ના અષ્ટફલકીય સંકીર્ણ માટે Δ_0, $18{,}000\ cm^{-1}$ હોય તો, તેના સમચતુષ્ફલકીય સંકીર્ણની તેજ લિગાન્ડ સાથે Δ_t, $16{,}000\ cm^{-1}$ થશે.

Options :

1. માત્ર (a) અને (b)

2. માત્ર (c) અને (d)

3. માત્ર (a) અને (d)

4. માત્ર (b) અને (c)

Question Number : 38 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Among the statements (a)-(d), the incorrect ones are :

(a) Octahedral Co(III) complexes with strong field ligands have very high magnetic moments

(b) When $\Delta_0 < P$, the d-electron configuration of Co(III) in an octahedral complex is $t_{eg}^4 e_g^2$

(c) Wavelength of light absorbed by $[Co(en)_3]^{3+}$ is lower than that of $[CoF_6]^{3-}$

(d) If the Δ_0 for an octahedral complex of Co(III) is 18,000 cm^{-1}, the Δ_t for its tetrahedral complex with the same ligand will be 16,000 cm^{-1}

Options :

1. (a) and (b) only

2. (c) and (d) only

3. (a) and (d) only

4. (b) and (c) only

Question Number : 39 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

यौगिकों (A) बेन्जनिलाइड (B) ऐनिलीन तथा (C) ऐसीटोफिनोन के एक मिश्रण को पृथक करने के लिए एक स्थिर प्रावस्था में सिलिका जैल से भरे क्रोमोटोग्राफिक कालम का उपयोग किया जाता है। जब कालम को विलायको हेक्सेन-ऐथिल ऐसीटेट, (20 : 80) के मिश्रण के साथ क्षालित किया गया तो प्राप्त यौगिकों का अनुक्रम है :

Options :

1. (A), (B) तथा (C)

2. (B), (C) तथा (A)

3. (C), (A) तथा (B)

4. (B), (A) तथा (C)

Question Number : 39 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ક્રોમેટોગ્રાફી ની સ્તંભ કોલમ માં, સિલિકા જેલ ને સ્થાયી કલા (ફેઈઝ) તરીકે પેક કરવામાં આવી, તેનો ઉપયોગ (A) બેન્ઝએનીલાઈડ, (B) એનિલીન અને (C) એસિટોફિનોન ના મિશ્રણને અલગીકરણ કરવામાં આવી. જ્યારે સ્તંભને હેક્ઝેન : ઈથાઇલ એસિટેટ (20 : 80) દ્રાવકોના મિશ્રણ વડે નિક્ષાલિત કરવામાં આવે ત્યારે મળતા સંયોજનોનો ક્રમ શું છે ?

Options :

1. (A), (B) અને (C)

2. (B), (C) અને (A)

3. (C), (A) અને (B)

4. (B), (A) અને (C)

Question Number : 39 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

A chromatography column, packed with silica gel as stationary phase, was used to separate a mixture of compounds consisting of (A) benzanilide (B) aniline and (C) acetophenone. When the column is eluted with a mixture of solvents, hexane : ethyl acetate (20 : 80), the sequence of obtained compounds is :

Options :

1. (A), (B) and (C)

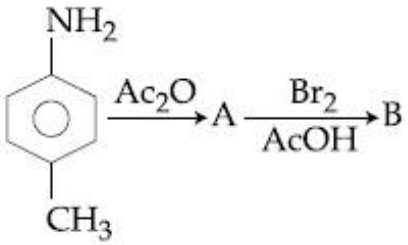
2. (B), (C) and (A)

3. (C), (A) and (B)

4. (B), (A) and (C)

Question Number : 40 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

નીચે આપેલા પ્રક્રિયા શૃંખલામાં, મુખ્ય નીપજ B શોધો :

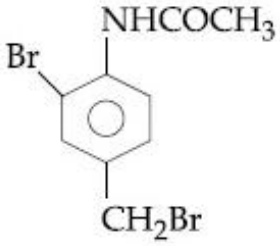


Options :

1. 

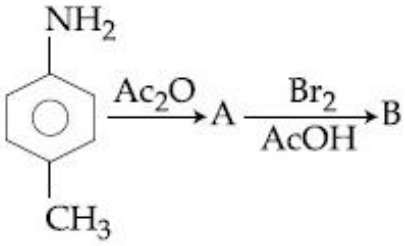
2. 

3. 

4. 

Question Number : 40 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

In the following reaction sequence,



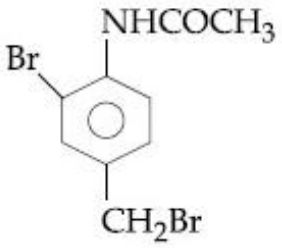
the major product B is :

Options :

1. 

2. 

3. 

4. 

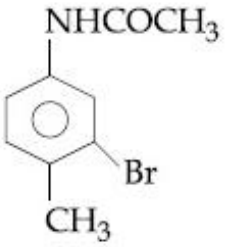
Question Number : 40 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

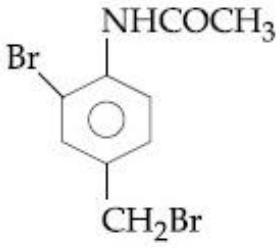
निम्नलिखित अभिक्रिया अनुक्रम में मुख्य उत्पाद B है :

Options :

1. 

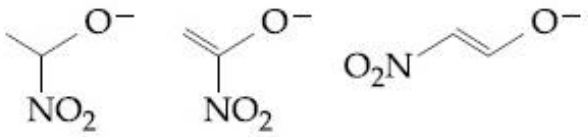
2. 

3. 

4. 

Question Number : 41 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

निम्नलिखित ऐल्कॉक्साइडों के लिए स्थायित्व का **सही** क्रम है :



(A) (B) (C)

Options :

1. (C) > (A) > (B)

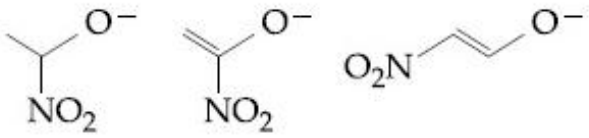
2. (C) > (B) > (A)

3. (B) > (A) > (C)

4. (B) > (C) > (A)

Question Number : 41 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

નીચે આપેલા આલ્કોક્સાઈડ ની સ્થિરતાનો સાચો ક્રમ શોધો :



(A) (B) (C)

Options :

1. (C) > (A) > (B)

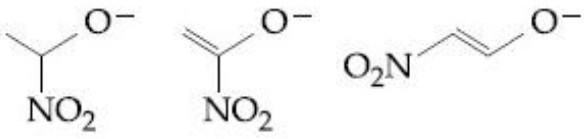
2. (C) > (B) > (A)

3. (B) > (A) > (C)

4. (B) > (C) > (A)

Question Number : 41 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The correct order of stability for the following alkoxides is :



(A) (B) (C)

Options :

1. (C) > (A) > (B)

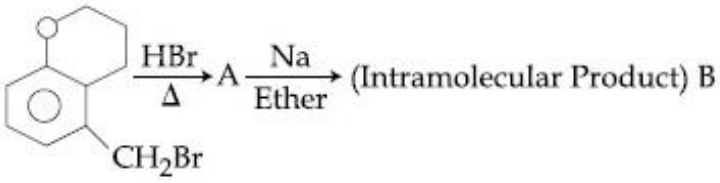
2. (C) > (B) > (A)

3. (B) > (A) > (C)

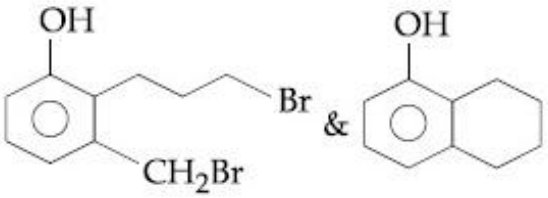
4. (B) > (C) > (A)

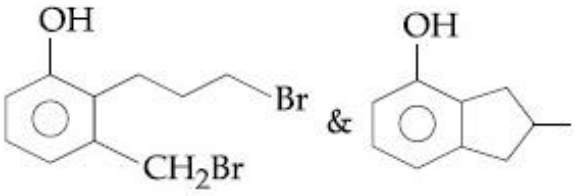
Question Number : 42 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

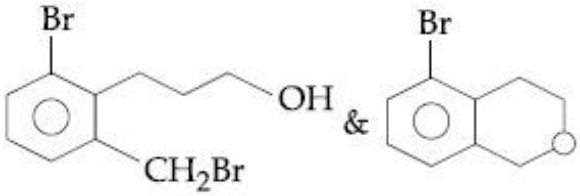
In the following reaction sequence, structures of A and B, respectively will be :

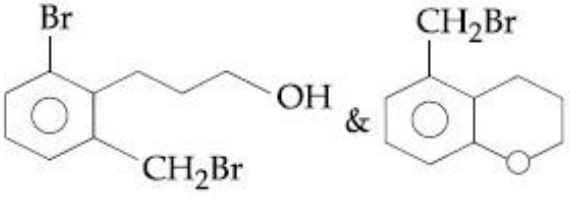


Options :

1. 

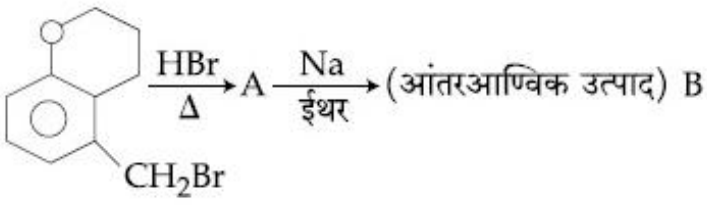
2. 

3. 

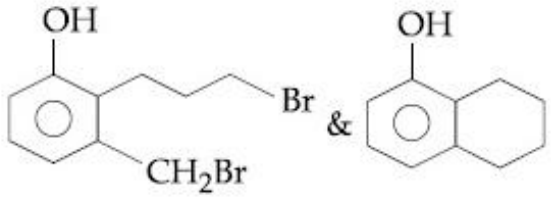
4. 

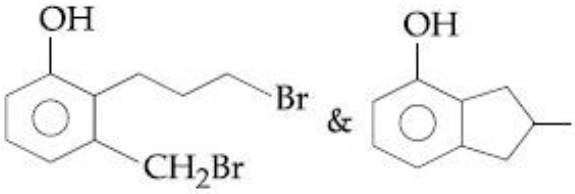
Question Number : 42 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

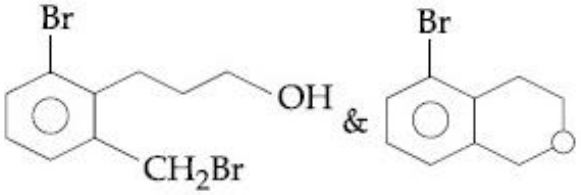
निम्नलिखित अभिक्रिया अनुक्रम में A तथा B की संरचनाएँ क्रमशः होंगी :

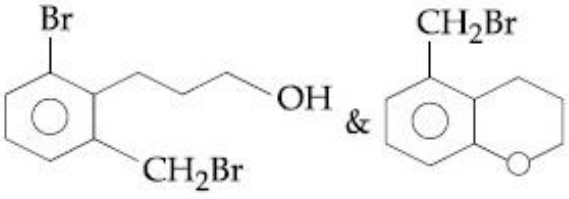


Options :

1. 

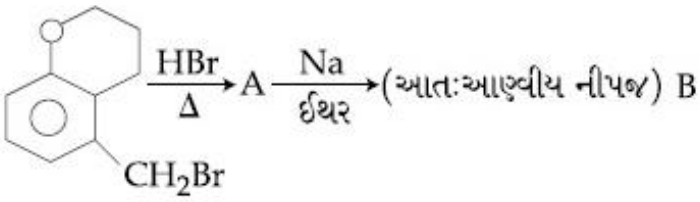
2. 

3. 

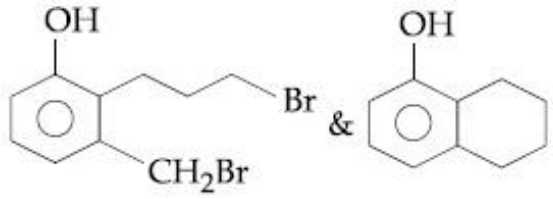
4. 

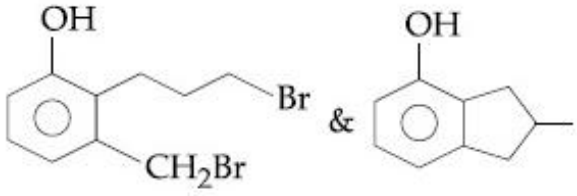
Question Number : 42 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

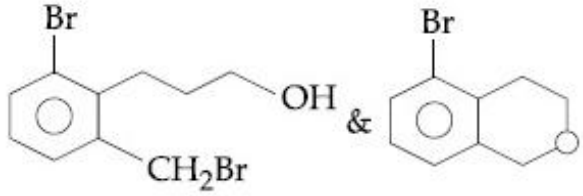
નીચે આપેલા પ્રક્રિયા શૃંખલામાં, A અને B નાં અનુક્રમે બંધારણો શું હશે ?

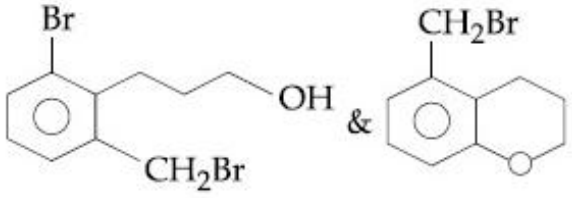


Options :

1. 

2. 

3. 

4. 

Question Number : 43 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Which of the following statements is correct ?

Options :

1. Gluconic acid can form cyclic (acetal/ hemiacetal) structure

2. Gluconic acid is a partial oxidation product of glucose

3. Gluconic acid is a dicarboxylic acid

4. Gluconic acid is obtained by oxidation of glucose with HNO_3

Question Number : 43 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

निम्नलिखित में से कौन सा कथन **सही** है?

Options :

1. ग्लूकोनिक अम्ल चक्रीय ऐसीटैल/हैमीऐसीटैल बना सकता है।

2. ग्लूकोनिक अम्ल ग्लूकोस का एक आंशिक उपचयन उत्पाद है।

3. ग्लूकोनिक अम्ल एक डाइकार्बोक्सिलिक अम्ल है।

4. ग्लूकोनिक अम्ल को ग्लूकोस के HNO_3 के साथ ऑक्सीकरण द्वारा बनाया जा सकता है।

Question Number : 43 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

નીચે આપેલા વિધાનો પૈકી કયું એક સાચું છે?

Options :

1. ગ્લુકોનિક એસિડ ચક્રિય બંધારણ (એસિટાલ/ હેમીએસીટાલ) બનાવી શકે.

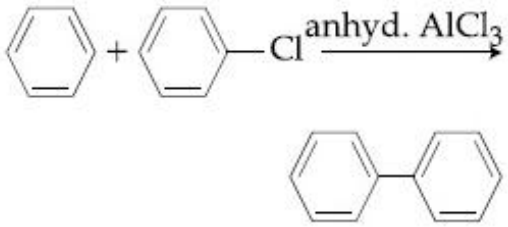
2. ગ્લુકોનિક એસિડ એ ગ્લુકોઝની આંશિક ઓક્સિડેશન નીપજ છે.

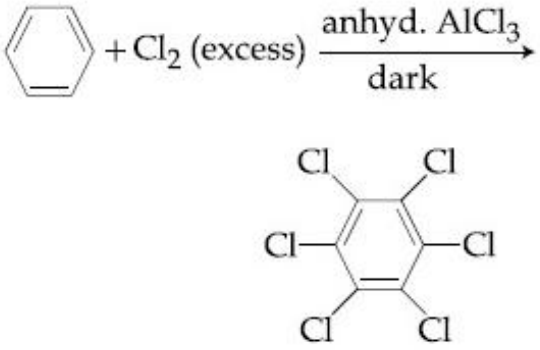
3. ગ્લુકોનિક એસિડ એ એક ડાયકાર્બોક્સિલીક એસિડ છે.

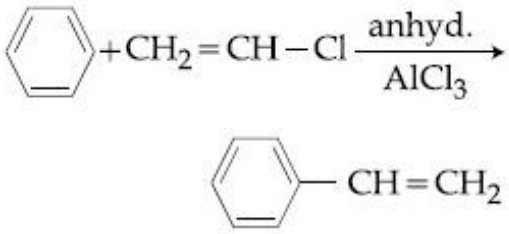
4. ગ્લુકોનિક એસિડ, ગ્લુકોઝનું HNO_3 દ્વારા ઓક્સિડેશન કરવાથી મળે છે.

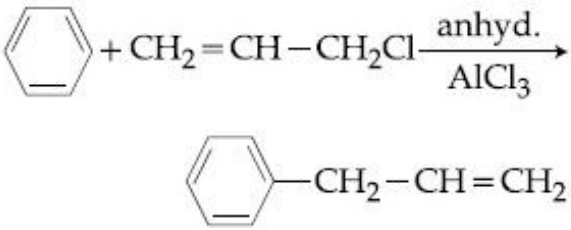
Question Number : 44 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Consider the following reactions :

(a) 

(b) 

(c) 

(d) 

Which of these reactions are possible ?

Options :

1. (b), (c) and (d)

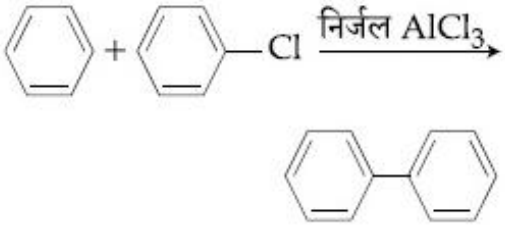
2. (b) and (d)

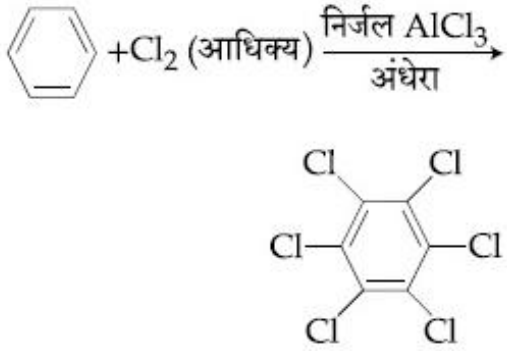
3. (a) and (b)

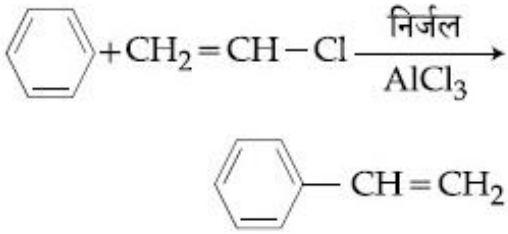
4. (a) and (d)

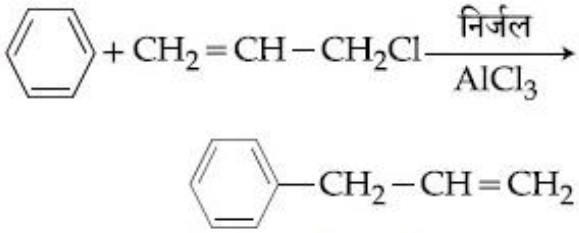
Question Number : 44 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

निम्नलिखित अभिक्रियाओं पर विचार कीजिए :

(a) 

(b) 

(c) 

(d) 

इन अभिक्रियाओं में से कौन सी संभव हैं?

Options :

1. (b), (c) तथा (d)

2. (b) तथा (d)

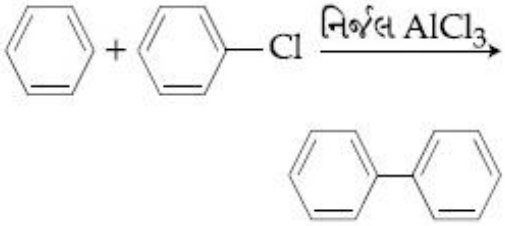
3. (a) तथा (b)

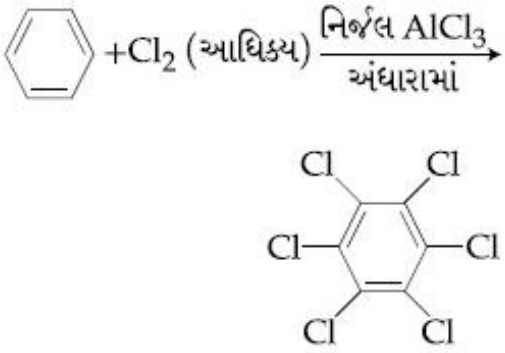
4. (a) तथा (d)

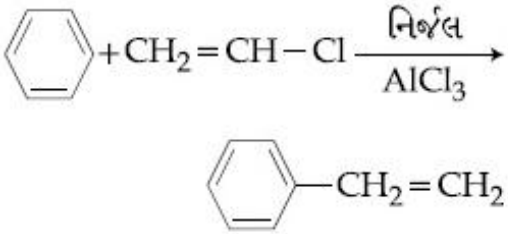
Question Number : 44 Question Type : MCQ Option Shuffling : Yes

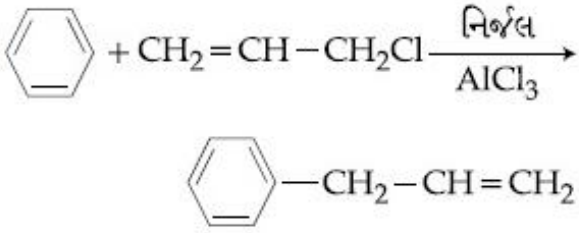
Correct Marks : 4 Wrong Marks : 1

નીચેની પ્રક્રિયા ધ્યાનમાં લો,

(a) 

(b) 

(c) 

(d) 

ઉપરોક્ત પ્રક્રિયા પૈકી કઈ શક્ય છે ?

Options :

1. (b), (c) અને (d)

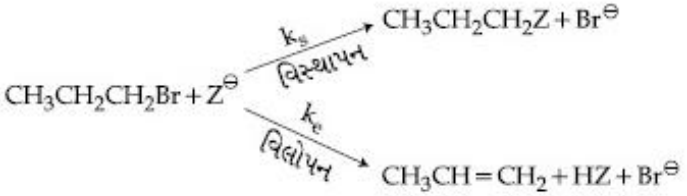
2. (b) અને (d)

3. (a) અને (b)

4. (a) અને (d)

Question Number : 45 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

નીચે આપેલી પ્રક્રિયા,



જ્યાં,

$Z^{\ominus} = CH_3CH_2O^{\ominus}$ (A) અથવા $H_3C-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-O^{\ominus}$ (B),

જ્યાં k_s અને k_e અનુક્રમે વિસ્થાપન અને વિલોપન ના દર અચળાંકો છે. અને $\mu = \frac{k_s}{k_e}$, તો સાચો વિકલ્પ શોધો _____.

Options :

1. $\mu_A > \mu_B$ અને $k_e(A) > k_e(B)$

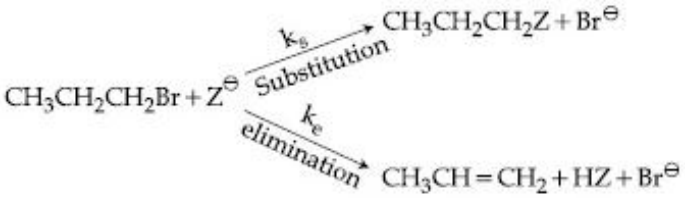
2. $\mu_A > \mu_B$ અને $k_e(B) > k_e(A)$

3. $\mu_B > \mu_A$ અને $k_e(A) > k_e(B)$

4. $\mu_B > \mu_A$ અને $k_e(B) > k_e(A)$

Question Number : 45 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

For the following reactions



where,

$Z^{\ominus} = CH_3CH_2O^{\ominus}$ (A) or $H_3C-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-O^{\ominus}$ (B),

k_s and k_e, are, respectively, the rate constants for substitution and elimination, and $\mu = \frac{k_s}{k_e}$, the correct option is _____.

Options :

1. $\mu_A > \mu_B$ and $k_e(A) > k_e(B)$

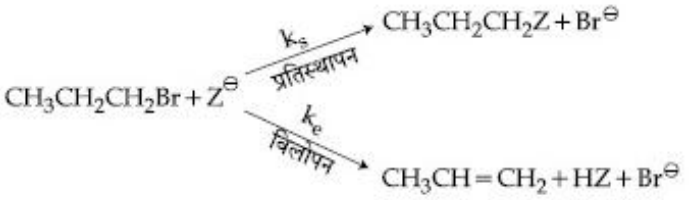
2. $\mu_A > \mu_B$ and $k_e(B) > k_e(A)$

3. $\mu_B > \mu_A$ and $k_e(A) > k_e(B)$

4. $\mu_B > \mu_A$ and $k_e(B) > k_e(A)$

Question Number : 45 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

निम्नलिखित अभिक्रिया पर विचार कीजिए।



जहाँ,

$Z^{\ominus} = CH_3CH_2O^{\ominus}$ (A) अथवा $H_3C-\overset{CH_3}{\underset{CH_3}{C}}-O^{\ominus}$ (B),

k_s एवं k_e क्रमश: प्रतिस्थापन एवं विलोपन के लिये वेग स्थिरांक हैं, और $\mu = \frac{k_s}{k_e}$ हैं, सही विकल्प है _____ ।

Options :

1. $\mu_A > \mu_B$ तथा $k_e(A) > k_e(B)$

2. $\mu_A > \mu_B$ तथा $k_e(B) > k_e(A)$

3. $\mu_B > \mu_A$ तथा $k_e(A) > k_e(B)$

4. $\mu_B > \mu_A$ तथा $k_e(B) > k_e(A)$

Sub-Section Number: 2
Sub-Section Id: 40503671
Question Shuffling Allowed : Yes

Question Number : 46 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The standard heat of formation $\left(\Delta_f H^0_{298}\right)$ of ethane (in kJ/mol), if the heat of combustion of ethane, hydrogen and graphite are -1560, -393.5 and -286 kJ/mol, respectively is _____.

Note: For this question, discrepancy is found in question/answer. So,this question is ignored for all candidates.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
1 to 2.01

Question Number : 46 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

यदि इथेन, हाइड्रोजन तथा ग्राफाइट की दहन उष्मायें क्रमशः -1560, -393.5 तथा -286 kJ/mol हैं, तो इथेन की मानक संभवन ऊष्मा $\left(\Delta_f H^0_{298}\right)$ है _____।

Note: For this question, discrepancy is found in question/answer. So,this question is ignored for all candidates.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
1 to 2.01

Question Number : 46 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

જો ઈથેન, હાઇડ્રોજન અને ગ્રેફાઈટની દહન ઊષ્મા અનુક્રમે -1560, -393.5 અને -286 kJ/mol હોય, તો ઇથેનની પ્રમાણિત સર્જન ઊષ્મા $\left(\Delta_f H^0_{298}\right)$ (kJ/mol માં) છે, _____.

Note: For this question, discrepancy is found in question/answer. So,this question is ignored for all candidates.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
1 to 2.01

Question Number : 47 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

3 g એસિટિક એસિડ ને 250 mL, 0.1 M HCl માં ઉમેરી દ્રાવણને 500 mL સુધી બનાવવામાં આવે છે. જો આ દ્રાવણના 20 mL માં 5 M NaOH નાં $\frac{1}{2}$ mL ઉમેરવામાં આવે તો દ્રાવણની pH છે,_____.
[આપેલ, એસિટિક એસિડ pKa = 4.75, એસિટિક એસિડનું મોલર દળ = 60 g/mol, log3 = 0.4771]
કદમાં થતો ફેરફાર અવગણો.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
5.22 to 5.24

Question Number : 47 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

3 g of acetic acid is added to 250 mL of 0.1 M HCl and the solution made up to 500 mL. To 20 mL of this solution $\frac{1}{2}$ mL of 5 M NaOH is added. The pH of the solution is _____.
[Given : pKa of acetic acid = 4.75, molar mass of acetic acid = 60 g/mol, log3 = 0.4771]
Neglect any changes in volume.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
5.22 to 5.24

Question Number : 47 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

0.1 M HCl के 250 mL में 3 g ऐसीटिक अम्ल मिलाया गया और विलयन को 500 mL तक किया गया। इस विलयन के 20 mL में 5 M NaOH के $\frac{1}{2}$ mL को मिलाया गया। विलयन का pH है _____।

[दिया गया है : ऐसीटिक अम्ल का pKa = 4.75, ऐसीटिक अम्ल का मोलर संहति = 60 g/mol, log3 = 0.4771]

आयतन में किसी प्रकार के परिवर्तन की उपेक्षा करें।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
5.22 to 5.24

Question Number : 48 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The flocculation value of HCl for arsenic sulphide sol. is 30 m mol L^{-1}. If H_2SO_4 is used for the flocculation of arsenic sulphide, the amount, in grams, of H_2SO_4 in 250 ml required for the above purpose is _____.

(molecular mass of H_2SO_4 = 98 g/mol)

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
0.36 to 0.38

Question Number : 48 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

आर्सेनिक सल्फाइड विलयन के लिए HCl के उर्जन का मान 30 m mol L^{-1} है। यदि आर्सेनिक सल्फाइड के उर्जन के लिए H_2SO_4 का उपयोग किया जाए तो उपर्युक्त उद्देश्य के लिए 250 mL में आवश्यक H_2SO_4 की मात्रा (ग्राम में) होगी _____।

(H_2SO_4 की अणु संहति = 98 g/mol)

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
0.36 to 0.38

Question Number : 48 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

HCl માટે આર્સેનિક સલ્ફાઈડ સોલમાટેનું ઉર્ણન મૂલ્ય 30 m mol L^{-1} છે. જો આર્સેનિક સલ્ફાઈડના ઉર્ણન માટે H_2SO_4 નો ઉપયોગ કરવામાં આવે તો, 250 mLમાં H_2SO_4 (ગ્રામમાં) નો કેટલી માત્રા ઉપરોક્ત વિધી માટે જરૂરી બનશે _____.
(H_2SO_4 નું મોલર દળ $=98$ g/mol)

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
0.36 to 0.38

Question Number : 49 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Consider the following reactions :

$$NaCl + K_2Cr_2O_7 + H_2SO_4 \xrightarrow[\text{(Conc.)}]{} (A) + \text{side products}$$

$$(A) + NaOH \rightarrow (B) + \text{Side products}$$

$$(B) + H_2SO_4 + H_2O_2 \xrightarrow[\text{(dilute)}]{} (C) + \text{Side products}$$

The sum of the total number of atoms in one molecule each of (A), (B) and (C) is _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
18 to 18

Question Number : 49 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

निम्नलिखित अभिक्रियाओं पर विचार कीजिए :

$$NaCl + K_2Cr_2O_7 + H_2SO_4 \xrightarrow[\text{(सान्द्र)}]{} (A) + \text{अतिरिक्त उत्पाद}$$

$$(A) + NaOH \rightarrow (B) + \text{अतिरिक्त उत्पाद}$$

$$(B) + H_2SO_4 + H_2O_2 \xrightarrow[\text{(तनु)}]{} (C) + \text{अतिरिक्त उत्पाद}$$

(A), (B) तथा (C) प्रत्येक के एक अणु में तत्वों की कुल संख्या का योग है _____।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
18 to 18

Question Number : 49 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

નીચે આપેલી પ્રક્રિયાઓને ધ્યાનમાં લો :

$$NaCl + K_2Cr_2O_7 + H_2SO_4 \xrightarrow{\text{(સાંદ્ર)}} (A) + \text{અન્ય નીપજો}$$

$$(A) + NaOH \rightarrow (B) + \text{અન્ય નીપજો}$$

$$(B) + H_2SO_4 + H_2O_2 \xrightarrow{\text{(મંદ)}} (C) + \text{અન્ય નીપજો}$$

અણુઓ (A), (B) અને (C) પ્રત્યેક ના એક અણુમાં પરમાણુઓની કુલ સંખ્યાઓ સરવાળો શોધો _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
18 to 18

Question Number : 50 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The number of sp^2 hybridised carbons present in "Aspartame" is _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
9 to 9

Question Number : 50 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

"ऐस्पार्टेम" में उपस्थित sp^2 संकरित कार्बनों की संख्या है _____ ।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
9 to 9

Question Number : 50 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

"એસ્પાર્ટેમ" (Aspartame) માં sp^2 સંકરણ ધરાવતા કાર્બનની સંખ્યા શોધો _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
9 to 9

Mathematics

Section Id :	40503650
Section Number :	3
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	25
Number of Questions to be attempted:	25
Section Marks:	100

Sub-Section Number:	1
Sub-Section Id:	40503672
Question Shuffling Allowed :	Yes

Question Number : 51 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Let α and β be the roots of the equation $x^2 - x - 1 = 0$. If $p_k = (\alpha)^k + (\beta)^k$, $k \geq 1$, then which one of the following statements is not true ?

Options :

1. $p_5 = 11$

2. $p_3 = p_5 - p_4$

3. $(p_1 + p_2 + p_3 + p_4 + p_5) = 26$

4. $p_5 = p_2 \cdot p_3$

Question Number : 51 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

माना α तथा β समीकरण $x^2-x-1=0$ के मूल हैं। यदि $p_k=(\alpha)^k+(\beta)^k$, $k\geq 1$, तो निम्न में से कौन सा एक कथन सत्य **नहीं** है?

Options :

1. $p_5=11$

2. $p_3=p_5-p_4$

3. $(p_1+p_2+p_3+p_4+p_5)=26$

4. $p_5=p_2\cdot p_3$

Question Number : 51 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારોકે α અને β એ સમીકરણ $x^2-x-1=0$ નાં બીજ છે. જો $p_k=(\alpha)^k+(\beta)^k$, $k\geq 1$ હોય તો નીચેના વિધાનોમાંથી ક્યું એક સાચું નથી?

Options :

1. $p_5=11$

2. $p_3=p_5-p_4$

3. $(p_1+p_2+p_3+p_4+p_5)=26$

4. $p_5=p_2\cdot p_3$

Question Number : 52 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

If $\frac{3+i\sin\theta}{4-i\cos\theta}$, $\theta \in [0, 2\pi]$, is a real number,

then an argument of $\sin\theta + i\cos\theta$ is :

Options :

1. $-\tan^{-1}\left(\frac{3}{4}\right)$

2. $\pi - \tan^{-1}\left(\frac{3}{4}\right)$

3. $\pi - \tan^{-1}\left(\frac{4}{3}\right)$

4. $\tan^{-1}\left(\frac{4}{3}\right)$

Question Number : 52 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

यदि $\frac{3+i\sin\theta}{4-i\cos\theta}$, $\theta \in [0, 2\pi]$, एक वास्तविक संख्या

है, तो $\sin\theta + i\cos\theta$ का एक कोणांक (argument)
है :

Options :

1. $-\tan^{-1}\left(\frac{3}{4}\right)$

2. $\pi - \tan^{-1}\left(\frac{3}{4}\right)$

3. $\pi - \tan^{-1}\left(\frac{4}{3}\right)$

4. $\tan^{-1}\left(\frac{4}{3}\right)$

Question Number : 52 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

જો $\frac{3+i\sin\theta}{4-i\cos\theta}$, $\theta \in [0, 2\pi]$ એ વાસ્તવિક સંખ્યા હોય

તો $\sin\theta + i\cos\theta$ નો કોણાંક _____ થાય.

Options :

1. $-\tan^{-1}\left(\frac{3}{4}\right)$

2. $\pi - \tan^{-1}\left(\frac{3}{4}\right)$

3. $\pi - \tan^{-1}\left(\frac{4}{3}\right)$

4. $\tan^{-1}\left(\frac{4}{3}\right)$

Question Number : 53 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Let $A=[a_{ij}]$ and $B=[b_{ij}]$ be two 3×3 real matrices such that $b_{ij}=(3)^{(i+j-2)}a_{ji}$, where $i, j=1, 2, 3$. If the determinant of B is 81, then the determinant of A is :

Options :

1. 1/3

2. 1/9

3. 1/81

4. 3

Question Number : 53 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારોકે $A=[a_{ij}]$ અને $B=[b_{ij}]$ એ બે 3×3 વાસ્તવિક શ્રેણિકો છે, જ્યાં $b_{ij}=(3)^{(i+j-2)}a_{ji}$, $i,j=1,2,3$. જો B નો નિશ્ચાયક 81 હોય, તો A નો નિશ્ચાયક _____ છે.

Options :

1. 1/3

2. 1/9

3. 1/81

4. 3

Question Number : 53 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

माना $A=[a_{ij}]$ तथा $B=[b_{ij}]$, 3×3 के दो वास्तविक आव्यूह इस प्रकार हैं कि $b_{ij}=(3)^{(i+j-2)}a_{ji}$, जहाँ $i,j=1,2,3$. यदि B का सारणिक 81 है, तो A का सारणिक है :

Options :

1. 1/3

2. 1/9

3. 1/81

4. 3

Question Number : 54 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

क्रमित युग्मों (r, k), जिनके लिए $6\cdot{}^{35}C_r = (k^2-3)\cdot{}^{36}C_{r+1}$, जहाँ k एक पूर्णांक है, की संख्या है :

Options :

1. 6

2. 4

3. 3

4. 2

Question Number : 54 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

$6\cdot{}^{35}C_r = (k^2-3)\cdot{}^{36}C_{r+1}$ થાય તેવી ક્રમયુક્ત જોડ (r, k) ની સંખ્યા _____ છે, જ્યાં k પૂર્ણાંક છે.

Options :

1. 6

2. 4

3. 3

4. 2

Question Number : 54 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The number of ordered pairs (r, k) for which $6\cdot{}^{35}C_r = (k^2-3)\cdot{}^{36}C_{r+1}$, where k is an integer, is :

Options :

1. 6

2. 4

3. 3

4. 2

Question Number : 55 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The coefficient of x^7 in the expression $(1+x)^{10}+x(1+x)^9+x^2(1+x)^8+\ldots+\ x^{10}$ is :

Options :

1. 120

2. 210

3. 330

4. 420

Question Number : 55 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

व्यंजक
$(1+x)^{10}+x(1+x)^9+x^2(1+x)^8+...+\ x^{10}$ में
x^7 का गुणांक है :

Options :

1. 120

2. 210

3. 330

4. 420

Question Number : 55 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

$(1+x)^{10}+x(1+x)^9+x^2(1+x)^8+...+\ x^{10}$ માં
x^7 નો સહગુણક કેટલો થાય?

Options :

1. 120

2. 210

3. 330

4. 420

Question Number : 56 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

माना $a_1, a_2, a_3, \ldots$ गुणोत्तर श्रेढ़ी इस प्रकार है कि $a_1 < 0$, $a_1 + a_2 = 4$ तथा $a_3 + a_4 = 16$. यदि $\sum_{i=1}^{9} a_i = 4\lambda$ है, तो λ बराबर है :

Options :

1. -513

2. $\frac{511}{3}$

3. -171

4. 171

Question Number : 56 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Let $a_1, a_2, a_3, \ldots$ be a G. P. such that $a_1 < 0$, $a_1 + a_2 = 4$ and $a_3 + a_4 = 16$. If $\sum_{i=1}^{9} a_i = 4\lambda$, then λ is equal to :

Options :

1. -513

2. $\frac{511}{3}$

3. -171

4. 171

Question Number : 56 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારોકે $a_1, a_2, a_3, \ldots$ એ સમગુણોત્તર શ્રેણી (G.P.) છે, જ્યાં $a_1 < 0$, $a_1 + a_2 = 4$ અને $a_3 + a_4 = 16$. જો $\sum_{i=1}^{9} a_i = 4\lambda$ હોય તો λ ની કિંમત _____ છે.

Options :

1. -513

2. $\frac{511}{3}$

3. -171

4. 171

Question Number : 57 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

If the sum of the first 40 terms of the series, $3 + 4 + 8 + 9 + 13 + 14 + 18 + 19 + \ldots$ is $(102)m$, then m is equal to :

Options :

1. 25

2. 20

3. 10

4. 5

Question Number : 57 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

यदि श्रेणी $3+4+8+9+13+14+18+19+...$ के प्रथम 40 पदों का योगफल (102)m है, तो m बराबर है :

Options :

1. 25

2. 20

3. 10

4. 5

Question Number : 57 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

જો શ્રેઢી $3+4+8+9+13+14+18+19+...$ નાં પહેલા 40 પદોનો સરવાળો (102)m હોય, તો m = _____.

Options :

1. 25

2. 20

3. 10

4. 5

Question Number : 58 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Let $y=y(x)$ be a function of x satisfying $y\sqrt{1-x^2} = k - x\sqrt{1-y^2}$ where k is a constant and $y\left(\frac{1}{2}\right) = -\frac{1}{4}$. Then $\frac{dy}{dx}$ at $x = \frac{1}{2}$, is equal to :

Options :

1. $\frac{2}{\sqrt{5}}$

2. $-\frac{\sqrt{5}}{4}$

3. $-\frac{\sqrt{5}}{2}$

4. $\frac{\sqrt{5}}{2}$

Question Number : 58 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

माना x का एक फलन $y=y(x)$, जो $y\sqrt{1-x^2} = k - x\sqrt{1-y^2}$ को संतुष्ट करता है, जहाँ k एक अचर है तथा $y\left(\frac{1}{2}\right) = -\frac{1}{4}$. तो $x = \frac{1}{2}$ पर $\frac{dy}{dx}$ बराबर है :

Options :

1. $\frac{2}{\sqrt{5}}$

2. $-\frac{\sqrt{5}}{4}$

3. $-\frac{\sqrt{5}}{2}$

4. $\frac{\sqrt{5}}{2}$

Question Number : 58 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારોકે $y=y(x)$ એ x નું એવું વિધેય છે જે $y\sqrt{1-x^2} = k - x\sqrt{1-y^2}$ નું સમાધાન કરે છે, જ્યાં k અચળ છે તથા $y\left(\frac{1}{2}\right) = -\frac{1}{4}$ તો $x = \frac{1}{2}$ હોય ત્યારે $\left(\frac{dy}{dx}\right)$ નું મૂલ્ય _____ થાય.

Options :

1. $\frac{2}{\sqrt{5}}$

2. $-\frac{\sqrt{5}}{4}$

3. $-\frac{\sqrt{5}}{2}$

4. $\frac{\sqrt{5}}{2}$

Question Number : 59 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The value of c in the Lagrange's mean value theorem for the function $f(x)=x^3-4x^2+8x+11$, when $x \in [0, 1]$ is :

Options :

1. $\frac{4-\sqrt{7}}{3}$

2. $\frac{\sqrt{7}-2}{3}$

3. $\frac{4-\sqrt{5}}{3}$

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

Question Number : 59 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

फलन $f(x) = x^3 - 4x^2 + 8x + 11, x \in [0, 1]$, के लिए लग्रांज मध्यमान प्रमेय में c का मान है :

Options :

1. $\frac{4 - \sqrt{7}}{3}$

2. $\frac{\sqrt{7} - 2}{3}$

3. $\frac{4 - \sqrt{5}}{3}$

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

Question Number : 59 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

વિધેય $f(x) = x^3 - 4x^2 + 8x + 11$ જ્યાં $x \in [0, 1]$ માટે લાગ્રાન્જ નાં મધ્યકમાન પ્રમેયમાં c નું મૂલ્ય _____ છે.

Options :

1. $\frac{4 - \sqrt{7}}{3}$

2. $\frac{\sqrt{7} - 2}{3}$

3. $\frac{4 - \sqrt{5}}{3}$

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

Question Number : 60 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

माना 5 घात के एक बहुपद $f(x)$ के क्रांतिक बिन्दु $x=\pm 1$ हैं। यदि $\lim\limits_{x\to 0}\left(2+\frac{f(x)}{x^3}\right)=4$ है, तो निम्न में से कौन सा एक सत्य **नहीं** है?

Options :

1. f एक विषम फलन है।

2. f का एक उच्चिष्ठ बिन्दु $x=1$ है तथा एक निम्ननिष्ठ बिन्दु $x=-1$ है।

3. $f(1)-4f(-1)=4.$

4. f का एक निम्ननिष्ठ बिन्दु $x=1$ है तथा एक उच्चिष्ठ बिन्दु $x=-1$ है।

Question Number : 60 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Let $f(x)$ be a polynomial of degree 5 such that $x=\pm 1$ are its critical points. If $\lim\limits_{x\to 0}\left(2+\frac{f(x)}{x^3}\right)=4$, then which one of the following is not true ?

Options :

1. f is an odd function.

2. $x=1$ is a point of maxima and $x=-1$ is a point of minimum of f.

3. $f(1)-4f(-1)=4$.

4. $x=1$ is a point of minima and $x=-1$ is a point of maxima of f.

Question Number : 60 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારોકે $f(x)$ એ 5 ઘાતવાળી બહુપદી છે, જ્યાં $x=\pm 1$ તેના નિર્ણાયક બિંદુઓ છે. જો $\lim_{x\to 0}\left(2+\frac{f(x)}{x^3}\right)=4$, તો નીચેના વિધાનોમાંથી ક્યું સાચુ નથી?

Options :

1. f એ અયુગ્મ વિધેય છે.

2. f એ $x=1$ આગળ મહત્તમ છે તથા $x=-1$ આગળ ન્યૂનતમ છે.

3. $f(1)-4f(-1)=4$.

4. f એ $x=1$ આગળ ન્યૂનતમ છે તથા $x=-1$ આગળ મહત્તમ છે.

Question Number : 61 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The value of α for which

$4\alpha \int_{-1}^{2} e^{-\alpha|x|}\, dx = 5$, is :

Options :

1. $\log_e \left(\frac{4}{3}\right)$

2. $\log_e 2$

3. $\log_e \sqrt{2}$

4. $\log_e\left(\frac{3}{2}\right)$

Question Number : 61 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

α का वह मान, जिसके लिए $4\alpha \int_{-1}^{2} e^{-\alpha|x|}\, dx = 5$

है, है :

Options :

1. $\log_e \left(\frac{4}{3}\right)$

2. $\log_e 2$

3. $\log_e \sqrt{2}$

4. $\log_e\left(\frac{3}{2}\right)$

Question Number : 61 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

જો $4\alpha \int_{-1}^{2} e^{-\alpha|x|}\, dx = 5$ થાય તો α નું મૂલ્ય કેટલું

હોય?

Options :

1. $\log_e\left(\frac{4}{3}\right)$

2. $\log_e 2$

3. $\log_e \sqrt{2}$

4. $\log_e\left(\frac{3}{2}\right)$

Question Number : 62 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The area (in sq. units) of the region $\{(x, y) \in \mathbf{R}^2 | 4x^2 \le y \le 8x + 12\}$ is :

Options :

1. $\frac{124}{3}$

2. $\frac{125}{3}$

3. $\frac{127}{3}$

4. $\frac{128}{3}$

Question Number : 62 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

પ્રદેશ $\{(x, y) \in \mathbf{R}^2 | 4x^2 \leq y \leq 8x+12\}$ નું ક્ષેત્રફળ
(ચો. એકમમાં) _____ છે.

Options :

1. $\frac{124}{3}$

2. $\frac{125}{3}$

3. $\frac{127}{3}$

4. $\frac{128}{3}$

Question Number : 62 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

क्षेत्र $\{(x, y) \in \mathbf{R}^2 | 4x^2 \leq y \leq 8x+12\}$ का क्षेत्रफल
(वर्ग इकाइयों में) है :

Options :

1. $\frac{124}{3}$

2. $\frac{125}{3}$

3. $\frac{127}{3}$

4. $\frac{128}{3}$

Question Number : 63 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

माना अवकल समीकरण $\left(y^2 - x\right)\frac{dy}{dx} = 1$ का हल वक्र $y = y(x)$, $y(0) = 1$ को सन्तुष्ट करता है। यह वक्र x-अक्ष को जिस बिन्दु पर काटता है उसका भुज है :

Options :

1. 2

2. $2+e$

3. $2-e$

4. $-e$

Question Number : 63 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Let $y = y(x)$ be the solution curve of the differential equation, $\left(y^2 - x\right)\frac{dy}{dx} = 1$, satisfying $y(0) = 1$. This curve intersects the x-axis at a point whose abscissa is :

Options :

1. 2

2. $2+e$

3. $2-e$

4. $-e$

Question Number : 63 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારોકે વક્ર $y=y(x)$, એ વિકલ સમીકરણ $\left(y^2-x\right)\frac{dy}{dx}=1$ નો ઉકેલ છે, જ્યાં $y(0)=1$.
આ વક્ર x-અક્ષને જે બિંદુમાં છેદે તેની ભુજા (x-યામ) _____ થાય.

Options :

1. 2

2. $2+e$

3. $2-e$

4. $-e$

Question Number : 64 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

माना मूल बिन्दु से वृत्त $x^2+y^2-8x-4y+16=0$ पर खींची गई स्पर्श रेखायें इसे बिन्दुओं A तथा B पर स्पर्श करती हैं। तो $(AB)^2$ बराबर है :

Options :

1. $\frac{32}{5}$

2. $\frac{52}{5}$

3. $\frac{56}{5}$

4. $\frac{64}{5}$

Question Number : 64 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Let the tangents drawn from the origin to the circle, $x^2+y^2-8x-4y+16=0$ touch it at the points A and B. The $(AB)^2$ is equal to :

Options :

1. $\frac{32}{5}$

2. $\frac{52}{5}$

3. $\frac{56}{5}$

4. $\frac{64}{5}$

Question Number : 64 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારોકે ઉગમબિંદુ માંથી વર્તુળ $x^2+y^2-8x-4y+16=0$ ને દોરેલા સ્પર્શકો તેને બિંદુઓ A અને B માં સ્પર્શે છે. તો $(AB)^2=$_____.

Options :

1. $\frac{32}{5}$

2. $\frac{52}{5}$

3. $\frac{56}{5}$

4. $\frac{64}{5}$

Question Number : 65 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The locus of the mid-points of the perpendiculars drawn from points on the line, $x=2y$ to the line $x=y$ is :

Options :

1. $3x-2y=0$

2. $2x-3y=0$

3. $7x-5y=0$

4. $5x-7y=0$

Question Number : 65 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

रेखा $x=2y$ के बिन्दुओं से रेखा $x=y$ पर डाले गये लम्बों के मध्य बिन्दुओं का बिन्दुपथ है :

Options :

1. $3x-2y=0$

2. $2x-3y=0$

3. $7x-5y=0$

4. $5x-7y=0$

Question Number : 65 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

રેખા $x=2y$ પરનાં બિંદુઓથી રેખા $x=y$ પર દોરેલા લંબોનાં મધ્યબિંદુઓનો બિંદુપથ _____ થાય.

Options :

1. $3x-2y=0$

2. $2x-3y=0$

3. $7x-5y=0$

4. $5x-7y=0$

Question Number : 66 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

If $3x + 4y = 12\sqrt{2}$ is a tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{9} = 1$ for some $a \in \mathbf{R}$, then the distance between the foci of the ellipse is :

Options :

1. $2\sqrt{2}$

2. $2\sqrt{7}$

3. $2\sqrt{5}$

4. 4

Question Number : 66 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

यदि किसी $a \in \mathbf{R}$ के लिए दीर्घवृत्त $\frac{x^2}{a^2} + \frac{y^2}{9} = 1$ की एक स्पर्श रेखा $3x + 4y = 12\sqrt{2}$ है, तो दीर्घवृत्त की नाभियों के बीच की दूरी है :

Options :

1. $2\sqrt{2}$

2. $2\sqrt{7}$

3. $2\sqrt{5}$

4. 4

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

Correct Marks : 4 Wrong Marks : 1

જો $3x + 4y = 12\sqrt{2}$ એ કોઈક $a \in R$ માટે ઉપવલય

$\frac{x^2}{a^2} + \frac{y^2}{9} = 1$ નો સ્પર્શક હોય, તો ઉપવલયની નાભિઓ વચ્ચેનું અંતર _____ થાય.

Options :

1. $2\sqrt{2}$

2. $2\sqrt{7}$

3. $2\sqrt{5}$

4. 4

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

Correct Marks : 4 Wrong Marks : 1

Let $\vec{a}$, $\vec{b}$ and $\vec{c}$ be three unit vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$. If $\lambda = \vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a}$ and $\vec{d} = \vec{a} \times \vec{b} + \vec{b} \times \vec{c} + \vec{c} \times \vec{a}$, then the ordered pair, $(\lambda, \vec{d})$ is equal to :

Options :

1. $\left(-\frac{3}{2}, 3\vec{a} \times \vec{b}\right)$

2. $\left(\frac{3}{2}, 3\vec{a} \times \vec{c}\right)$

3. $\left(-\frac{3}{2}, 3\vec{c} \times \vec{b}\right)$

4. $\left(\frac{3}{2}, 3\vec{b} \times \vec{c}\right)$

Question Number : 67 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

माना $\vec{a}, \vec{b}$ तथा $\vec{c}$ तीन मात्रक (unit) सदिश इस प्रकार हैं कि $\vec{a} + \vec{b} + \vec{c} = \vec{0}$. यदि $\lambda = \vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a}$ तथा $\vec{d} = \vec{a} \times \vec{b} + \vec{b} \times \vec{c} + \vec{c} \times \vec{a}$, तो क्रमित युग्म $\left(\lambda, \vec{d}\right)$ बराबर है :

Options :

1. $\left(-\frac{3}{2}, 3\vec{a} \times \vec{b}\right)$

2. $\left(\frac{3}{2}, 3\vec{a} \times \vec{c}\right)$

3. $\left(-\frac{3}{2}, 3\vec{c} \times \vec{b}\right)$

4. $\left(\frac{3}{2}, 3\vec{b} \times \vec{c}\right)$

Question Number : 67 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારોકે $\vec{a}$, $\vec{b}$ અને $\vec{c}$ એ ત્રણ એકમ સદિશ છે, જ્યાં

$\vec{a}+\vec{b}+\vec{c}=\vec{0}$.જો

$\lambda=\vec{a}\cdot\vec{b}+\vec{b}\cdot\vec{c}+\vec{c}\cdot\vec{a}$ અને

$\vec{d}=\vec{a}\times\vec{b}+\vec{b}\times\vec{c}+\vec{c}\times\vec{a}$ હોય તો

ક્રમયુક્ત જોડ $\left(\lambda, \vec{d}\right)=$

Options :

1. $\left(-\frac{3}{2}, 3\vec{a}\times\vec{b}\right)$

2. $\left(\frac{3}{2}, 3\vec{a}\times\vec{c}\right)$

3. $\left(-\frac{3}{2}, 3\vec{c}\times\vec{b}\right)$

4. $\left(\frac{3}{2}, 3\vec{b}\times\vec{c}\right)$

Question Number : 68 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

In a workshop, there are five machines and the probability of any one of them to be out of service on a day is $\frac{1}{4}$. If the probability that at most two machines will be out of service on the same day is $\left(\frac{3}{4}\right)^3 k$, then k is equal to :

Options :

1. $\frac{17}{4}$

2. $\frac{17}{2}$

3. 4

4. $\frac{17}{8}$

Question Number : 68 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

एक कार्यशाला में पाँच मशीनें हैं तथा उनमें से एक दिन किसी एक के खराब होने की प्रायिकता $\frac{1}{4}$ है। यदि किसी एक दिन अधिकतम दो मशीन खराब होने की प्रायिकता $\left(\frac{3}{4}\right)^3$ k है, तो k बराबर है :

Options :

1. $\frac{17}{4}$

2. $\frac{17}{2}$

3. 4

4. $\frac{17}{8}$

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

Correct Marks : 4 Wrong Marks : 1

એક કાર્યશાળામાં પાંચ યંત્રો છે અને કોઈ એક દિવસે તેમાનું કોઈ એક કાર્યરત ન હોય તેની સંભાવના $\frac{1}{4}$ છે. જો એકજ દિવસે વધુમાં વધુ બે યંત્રો કાર્યરત ન હોય તેની સંભાવના $\left(\frac{3}{4}\right)^3 k$ હોય તો $k=$_____.

Options :

1. $\frac{17}{4}$

2. $\frac{17}{2}$

3. 4

4. $\frac{17}{8}$

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

Correct Marks : 4 Wrong Marks : 1

$(0, 2\pi) - \{\pi\}$ में समीकरण $2\cot^2\theta - \frac{5}{\sin\theta} + 4 = 0$ को सन्तुष्ट करने वाले θ के न्यूनतम तथा अधिकतम मान क्रमशः θ_1 तथा θ_2 हैं, तो $\int_{\theta_1}^{\theta_2} \cos^2 3\theta \, d\theta$ बराबर है :

Options :

1. $\frac{\pi}{3} + \frac{1}{6}$

2. $\frac{\pi}{9}$

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

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

Question Number : 69 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

θ_1 અને θ_2 એ સમીકરણ

$2\cot^2\theta - \frac{5}{\sin\theta} + 4 = 0$ નું સમાધાન કરતી

$(0, 2\pi) - \{\pi\}$ માંની અનુક્રમે θ ની લઘુત્તમ અને મહત્તમ

કિંમતો હોય તો $\int_{\theta_1}^{\theta_2} \cos^2 3\theta \, d\theta =$ _____.

Options :

1. $\frac{\pi}{3} + \frac{1}{6}$

2. $\frac{\pi}{9}$

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

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

Question Number : 69 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

If θ_1 and θ_2 be respectively the smallest and the largest values of θ in $(0, 2\pi) - \{\pi\}$ which satisfy the equation,

$2\cot^2\theta - \frac{5}{\sin\theta} + 4 = 0$, then

$\int_{\theta_1}^{\theta_2} \cos^2 3\theta \, d\theta$ is equal to :

Options :

1. $\frac{\pi}{3} + \frac{1}{6}$

2. $\frac{\pi}{9}$

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

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

Question Number : 70 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Let A, B, C and D be four non-empty sets. The contrapositive statement of "If $A \subseteq B$ and $B \subseteq D$, then $A \subseteq C$" is :

Options :

1. If $A \not\subseteq C$, then $A \not\subseteq B$ and $B \subseteq D$

2. If $A \not\subseteq C$, then $A \not\subseteq B$ or $B \not\subseteq D$

3. If $A \not\subseteq C$, then $A \subseteq B$ and $B \subseteq D$

4. If $A \subseteq C$, then $B \subset A$ or $D \subset B$

Question Number : 70 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

माना A, B, C तथा D चार अरिक्त समुच्चय हैं। तो कथन "यदि $A \subseteq B$ तथा $B \subseteq D$, तो $A \subseteq C$" का प्रतिधनात्मक कथन है :

Options :

1. यदि $A \not\subseteq C$, तो $A \not\subseteq B$ तथा $B \subseteq D$

2. यदि $A \not\subseteq C$, तो $A \not\subseteq B$ अथवा $B \not\subseteq D$

3. यदि $A \not\subseteq C$, तो $A \subseteq B$ तथा $B \subseteq D$

4. यदि $A \subseteq C$, तो $B \subset A$ अथवा $D \subset B$

Question Number : 70 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારોકે A, B, C અને D એ ચાર અરિક્ત ગણ છે. તો "જો $A \subseteq B$ અને $B \subseteq D$ હોય તો $A \subseteq C$" નું સમાનાર્થી પ્રેરણ નીચેનામાંથી ક્યું છે?

Options :

1. જો $A \not\subseteq C$, તો $A \not\subseteq B$ અને $B \subseteq D$

2. જો $A \not\subseteq C$, તો $A \not\subseteq B$ અથવા $B \not\subseteq D$

3. જો $A \not\subseteq C$, તો $A \subseteq B$ અને $B \subseteq D$

4. જો $A \subseteq C$, તો $B \subset A$ અથવા $D \subset B$

Sub-Section Number: 2
Sub-Section Id: 40503673
Question Shuffling Allowed : Yes

Question Number : 71 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Let $X = \{n \in N : 1 \leq n \leq 50\}$. If $A = \{n \in X : n \text{ is a multiple of } 2\}$ and $B = \{n \in X : n \text{ is a multiple of } 7\}$, then the number of elements in the smallest subset of X containing both A and B is _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
29 to 29

Question Number : 71 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

ધારોકે $X = \{n \in N : 1 \leq n \leq 50\}$. જો $A = \{n \in X : n$ એ 2 નો ગુણક છે$\}$ અને $B = \{n \in X : n$ એ 7 નો ગુણક છે$\}$, તો A અને B બન્ને ને સમાવતા હોય તેવા X ના નાનામાં નાના ઉપગણનાં ઘટકોની સંખ્યા _____ છે.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
29 to 29

Question Number : 71 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

माना $X = \{n \in N : 1 \leq n \leq 50\}$. यदि $A = \{n \in X : n, 2$ का एक गुणज है$\}$ तथा $B = \{n \in X : n, 7$ का एक गुणज है$\}$, तो X के सबसे छोटे उपसमुच्चय, जिसमें A तथा B दोनों हैं, में अवयवों की संख्या है _____।

Response Type: Numeric
Evaluation Required For SA: Yes

Show Word Count: Yes
Answers Type: Range
Possible Answers :
29 to 29

Question Number : 72 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

If the system of linear equations,

$$x+y+z=6$$
$$x+2y+3z=10$$
$$3x+2y+\lambda z=\mu$$

has more than two solutions, then $\mu-\lambda^2$ is equal to _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
13 to 13

Question Number : 72 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

यदि रैखिक समीकरण निकाय

$$x+y+z=6$$
$$x+2y+3z=10$$
$$3x+2y+\lambda z=\mu$$

के दो से अधिक हल हैं, तो $\mu-\lambda^2$ बराबर है _____।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
13 to 13

Question Number : 72 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

જો સુરેખ સમીકરણ

$$x+y+z=6$$
$$x+2y+3z=10$$
$$3x+2y+\lambda z=\mu$$

ને બેથી વધુ ઉકેલો હોય તો $\mu-\lambda^2=$ _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
13 to 13

Question Number : 73 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

यदि $\left(-\frac{1}{3}, \frac{1}{3}\right)$ में

$$f(x) = \begin{cases} \frac{1}{x} \log_e \left(\frac{1+3x}{1-2x}\right), & x \neq 0 \\ k, & x = 0 \end{cases}$$

द्वारा परिभाषित फलन f संतत है, तो k बराबर है _____।

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

Question Number : 73 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

જો વિધેય f એ $\left(-\frac{1}{3}, \frac{1}{3}\right)$ પર

$$f(x) = \begin{cases} \frac{1}{x} \log_e \left(\frac{1+3x}{1-2x}\right), & \text{જ્યારે } x \neq 0 \\ k, & \text{જ્યારે } x = 0 \end{cases}$$

દ્વારા વ્યાખ્યાયિત કરવામાં આવે અને એ સતત હોય તો k =_____.

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

Question Number : 73 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

If the function f defined on $\left(-\frac{1}{3}, \frac{1}{3}\right)$ by

$$f(x) = \begin{cases} \frac{1}{x} \log_e \left(\frac{1+3x}{1-2x}\right), & \text{when } x \neq 0 \\ k, & \text{when } x = 0 \end{cases}$$

is continuous, then k is equal to _____.

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

Question Number : 74 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

If the foot of the perpendicular drawn from the point $(1, 0, 3)$ on a line passing through $(\alpha, 7, 1)$ is $\left(\frac{5}{3}, \frac{7}{3}, \frac{17}{3}\right)$, then α is equal to _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
4 to 4

Question Number : 74 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

यदि $(\alpha, 7, 1)$ से जाने वाली एक रेखा पर बिन्दु $(1, 0, 3)$ से डाले गये लम्ब का पाद $\left(\frac{5}{3}, \frac{7}{3}, \frac{17}{3}\right)$ है, तो α बराबर है _____ ।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
4 to 4

Question Number : 74 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

જો $(\alpha, 7, 1)$ માંથી પસાર થતી રેખા પર બિંદુ $(1, 0, 3)$ માંથી દોરેલ લંબનો લંબપાદ $\left(\frac{5}{3}, \frac{7}{3}, \frac{17}{3}\right)$ હોય, તો $\alpha =$ _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
4 to 4

Question Number : 75 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

यदि आठ संख्याओं $3, 7, 9, 12, 13, 20, x$ तथा y के माध्य तथा प्रसरण क्रमशः 10 तथा 25 हैं, तो $x \cdot y$ बराबर है _____ ।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
54 to 54

Question Number : 75 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

જો આઠ સંખ્યાઓ 3, 7, 9, 12, 13, 20, x અને y નો મધ્યક અને વિચરણ અનુક્રમે 10 અને 25 હોય, તો $x \cdot y =$ _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
54 to 54

Question Number : 75 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

If the mean and variance of eight numbers 3, 7, 9, 12, 13, 20, x and y be 10 and 25 respectively, then $x \cdot y$ is equal to _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
54 to 54