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Display Marks:	Yes

BTECH

Group Number :	1
Group Id :	40503624
Group Maximum Duration :	0
Group Minimum Duration :	180
Show Attended Group? :	No
Edit Attended Group? :	No
Break time:	0
Group Marks:	300
Is this Group for Examiner?:	No

Physics

Section Id :	40503675
Section Number :	1
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:	405036122
Question Shuffling Allowed :	Yes

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

A quantity f is given by $f = \sqrt{\frac{hc^5}{G}}$ where c is speed of light, G universal gravitational constant and h is the Planck's constant. Dimension of f is that of :

Options :

1. volume

2. momentum

3. area

4. energy

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

एक राशि f का सूत्र $f = \sqrt{\frac{hc^5}{G}}$ है। यहाँ पर c प्रकाश की गति, G सर्वव्यापी गुरुत्वाकर्षण स्थिरांक तथा h प्लांक का स्थिरांक है। f की विमाएँ निम्न में से किसके समान है?

Options :

1. आयतन

2. संवेग

3. क्षेत्रफल

4. ऊर्जा

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

રાશિ f એ $f = \sqrt{\frac{hc^5}{G}}$ વડે આપેલ છે. અંહી c એ પ્રકાશની ઝડપ G એ સાર્વત્રિક ગુરુત્વાકર્ષી અચળાંક અને h એ પ્લાંકનો અચળાંક છે. f નું પરિમાણ _____ છે.

Options :

1. કદ

2. વેગમાન

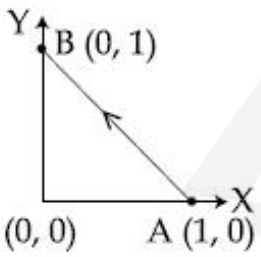
3. ક્ષેત્રફળ

4. ઊર્જા

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

Consider a force $\vec{F} = -x\hat{i} + y\hat{j}$. The work done by this force in moving a particle from point A(1, 0) to B(0, 1) along the line segment is :

(all quantities are in SI units)



Options :

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

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

3. 1

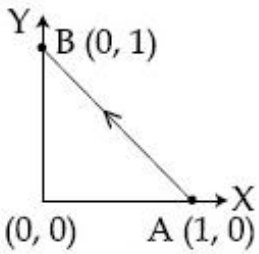
4. 2

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

आपको एक बल $\vec{F} = -x\hat{i} + y\hat{j}$ दिया गया है।

एक कण को बिन्दु A(1, 0) से बिन्दु B(0, 1) तक चित्र में दिखायी गयी रेखा पर ले जाने में इस बल द्वारा किया गया कार्य होगा :

(सभी राशियाँ SI में दी गयी है।)



Options :

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

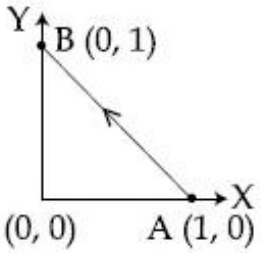
2. $\frac{3}{2}$

3. 1

4. 2

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

બળ $\vec{F} = -x\hat{i} + y\hat{j}$ ધ્યાનમાં લો. આપેલ રેખાખંડ ને સમાંતર બિન્દુ A(1, 0) થી B(0, 1) સુધી જવા માટે આ બળ દ્વારા થતું કાર્ય _____ છે.
(દરેક રાશિઓ SI એકમમાં છે)



Options :

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

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

3. 1

4. 2

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

Two particles of equal mass m have respective initial velocities $u\hat{i}$ and $u\left(\frac{\hat{i} + \hat{j}}{2}\right)$. They collide completely inelastically. The energy lost in the process is :

Options :

1. $\frac{1}{8} mu^2$

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

3. $\sqrt{\frac{2}{3}}mu^2$

4. $\frac{1}{3}mu^2$

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

સમાન દળ m ધરાવતા બે કણોનાં પ્રારંભિક વેગ અનુક્રમે $u\hat{i}$ અને $u\left(\frac{\hat{i}+\hat{j}}{2}\right)$ છે. તેઓ સંપૂર્ણરીતે અસ્થિતિસ્થાપક અથડામણ અનુભવે છે આ પ્રક્રિયામાં થતો ઉર્જાનો વ્યય _____ છે.

Options :

1. $\frac{1}{8}mu^2$

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

3. $\sqrt{\frac{2}{3}}mu^2$

4. $\frac{1}{3}mu^2$

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

समान द्रव्यमान m के दो कणों का प्रारम्भिक वेग $u\hat{i}$ और $u\left(\frac{\hat{i}+\hat{j}}{2}\right)$ है। ये कण पूर्णत: अप्रत्यास्थ रूप से टकराते हैं। इस प्रक्रिया में होने वाली ऊर्जा की क्षति है :

Options :

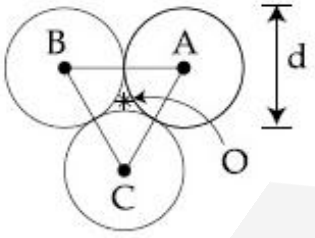
1. $\frac{1}{8}mu^2$

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

3. $\sqrt{\frac{2}{3}}mu^2$

4. $\frac{1}{3}mu^2$

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



Three solid spheres each of mass m and diameter d are stuck together such that the lines connecting the centres form an equilateral triangle of side of length d. The ratio I_0/I_A of moment of inertia I_0 of the system about an axis passing the centroid and about center of any of the spheres I_A and perpendicular to the plane of the triangle is :

Options :

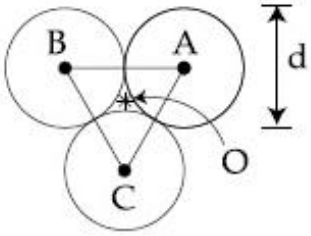
1. $\frac{13}{23}$

2. $\frac{13}{15}$

3. $\frac{23}{13}$

4. $\frac{15}{13}$

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



द्रव्यमान m और व्यास d के तीन ठोस गोलों को इस प्रकार चिपकाया गया है कि उनके केन्द्रों को जोड़ने वाली रेखाएँ d लम्बाई की भुजा का एक समबाहु त्रिभुज बनाती है। इस त्रिभुज के केन्द्रक और किसी एक गोले के केन्द्र से होकर जाने वाले तथा त्रिभुज के समतल के लम्बवत अक्षों के सापेक्ष इस निकाय के जड़त्व आघूर्ण क्रमशः I_0 तथा I_A हैं। तब I_0/I_A का मान है :

Options :

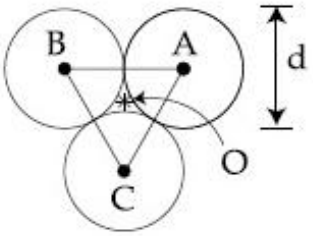
1. $\frac{13}{23}$

2. $\frac{13}{15}$

3. $\frac{23}{13}$

4. $\frac{15}{13}$

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



m દળ અને d વ્યાસ વાળા ત્રણ ઘન ગોળાઓ એવી રીતે સાથે જોડાયેલા છે કે જેથી તેમના કેન્દ્રોને જોડતી રેખાઓ d લંબાઈની બાજુઓ વાળો સમબાજુ ત્રિકોણ બનાવે છે. મુખ્યકેન્દ્ર માંથી પસ્પર થતી અક્ષને અનુલક્ષીને જડત્વની ચાકમાત્રા I_0 અને કોઈપણ ગોળાના કેન્દ્ર અને ત્રિકોણના સમતલને લંબ હોય તેવી અક્ષને અનુલક્ષીને જડત્વની ચાકમાત્રા I_A હોય તો ચાકમાત્રાનો ગુણોત્તર I_0/I_A ———— હશે.

Options :

1. $\frac{13}{23}$

2. $\frac{13}{15}$

3. $\frac{23}{13}$

4. $\frac{15}{13}$

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

A body A of mass m is moving in a circular orbit of radius R about a planet. Another body B of mass $\frac{m}{2}$ collides with A with a velocity which is half $\left(\frac{\vec{v}}{2}\right)$ the instantaneous velocity $\vec{v}$ of A. The collision is completely inelastic. Then, the combined body :

Options :

1. Escapes from the Planet's Gravitational field

2. Falls vertically downwards towards the planet

3. continues to move in a circular orbit

4. starts moving in an elliptical orbit around the planet

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

द्रव्यमान m को एक वस्तु A एक ग्रह के चारों ओर R त्रिज्या की एक वृत्तीय कक्षा में चल रही है। द्रव्यमान $\frac{m}{2}$ की एक दूसरी वस्तु B वस्तु A से $\left(\frac{\vec{v}}{2}\right)$ वेग से टकराती है। यहाँ $\vec{v}$ वस्तु A का तात्क्षणिक वेग है। यह टक्कर पूर्णतः अप्रत्यास्थ है। तब संयुक्त वस्तु :

Options :

1. ग्रह के गुरुत्वाकर्षण क्षेत्र से पलायन कर जायेगी।

2. ग्रह की ओर ऊर्ध्वाधर दिशा में गिरेगी।

3. वृत्तीय कक्षा में चलती रहेगी।

4. एक दीर्घवृत्त कक्षा में चलना शुरू कर देगी।

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

ગ્રહને અનુલક્ષીને m દળ વાળી વસ્તુ A એ R ત્રિજ્યાવાળા વર્તુળાકાર કક્ષમાં ભ્રમણ કરે છે. A ના તાત્ક્ષણિક વેગ $\vec{v}$ કરતા અડધા વેગ $\left(\frac{\vec{v}}{2}\right)$ અને $\frac{m}{2}$ દળ ધરાવતો બીજા વસ્તુ A સાથે અથડાય છે. આ અથડામણ સંપૂર્ણપણે અસ્થિતિસ્થાપક છે તો સંયુક્ત વસ્તુ _____.

Options :

1. ગ્રહના ગુરુત્વીય ક્ષેત્રમાંથી છટકી જશે

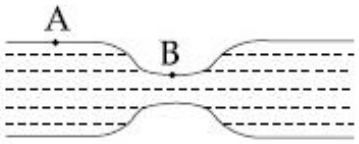
2. શિરોલંબ દિશામાં નીચે ગ્રહની તરફ પડે છે

3. વર્તુળાકાર કક્ષમાં ગતિ કરવાનુ ચાલુ રાખશે

4. ગ્રહની ફરતે ઉપવલયી (elliptical) કક્ષામાં ગતિ કરવાનું શરૂ કરે છે

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

Water flows in a horizontal tube (see figure). The pressure of water changes by $700\ \text{Nm}^{-2}$ between A and B where the area of cross section are $40\ \text{cm}^2$ and $20\ \text{cm}^2$, respectively. Find the rate of flow of water through the tube.
(density of water $=1000\ \text{kgm}^{-3}$)



(Fig)

Options :

1. $1810\ \text{cm}^3/\text{s}$

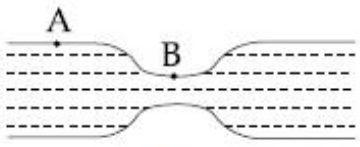
2. $2420\ \text{cm}^3/\text{s}$

3. $2720\ \text{cm}^3/\text{s}$

4. $3020\ \text{cm}^3/\text{s}$

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

एक क्षैतिज नली में पानी बह रहा है (चित्र देखें)। इस नली में A से B के बीच पानी के दबाव में $700\ Nm^{-2}$ का अन्तर है। A और B पर नली की अनुप्रस्थ काट का क्षेत्रफल क्रमश: $40\ cm^2$ और $20\ cm^2$ है। नली में पानी के बहाव की दर है :
(पानी का घनत्व $=1000\ kgm^{-3}$)



(Fig)

Options :

1. $1810\ cm^3/s$

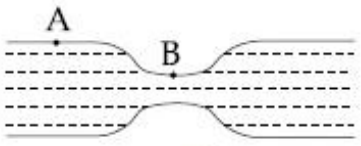
2. $2420\ cm^3/s$

3. $2720\ cm^3/s$

4. $3020\ cm^3/s$

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

સમક્ષિતિજ નળીમાં પાણી વહે છે (આકૃતિ જુઓ). A અને B વચ્ચે પાણીનું દબાણ $700\ Nm^{-2}$ જેટલું બદલાય છે; અહીં A અને B નળીના આડછેડનું ક્ષેત્રફળ અનુક્રમે $40\ cm^2$ અને $20\ cm^2$ છે. નળીમાં પાણીના વહનનો દર શોધો.
(પાણીની ઘનતા $=1000\ kgm^{-3}$)



(આકૃતિ)

Options :

1. 1810 cm^3/s

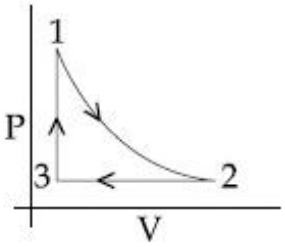
2. 2420 cm^3/s

3. 2720 cm^3/s

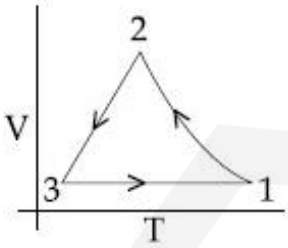
4. 3020 cm^3/s

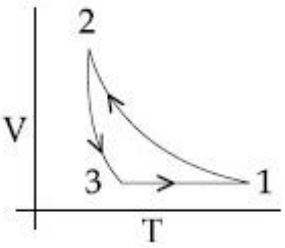
Question Number : 7 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

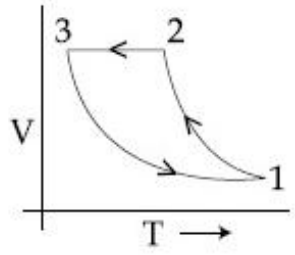
Which of the following is an equivalent cyclic process corresponding to the thermodynamic cyclic given in the figure? where, $1 \rightarrow 2$ is adiabatic.
(Graphs are schematic and are not to scale)

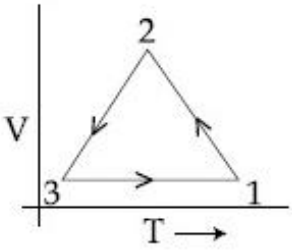


Options :

1.


2.


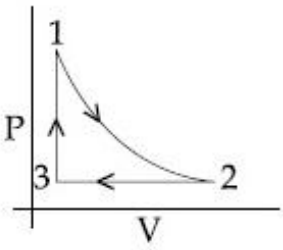
3. 

4. 

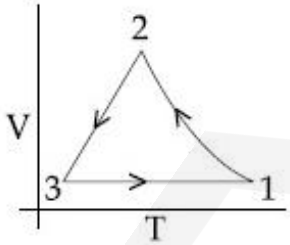
Question Number : 7 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

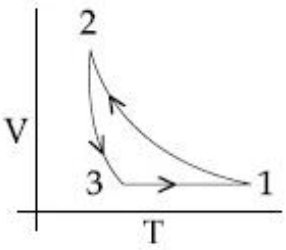
नीचे दिये गये ग्राफों में कौन सा ग्राफ चित्र में दिखायी गयी ऊष्मागतिज चक्रीय प्रक्रिया के समतुल्य चक्रीय प्रक्रिया दर्शाता है? चित्र में $1 \rightarrow 2$ एक रुद्धोष्म प्रक्रिया है।

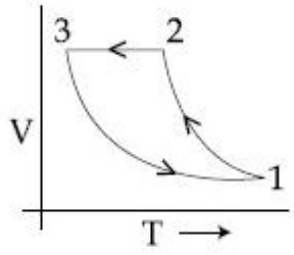
(चित्र सांकेतिक है।)

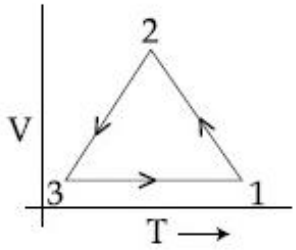


Options :

1. 

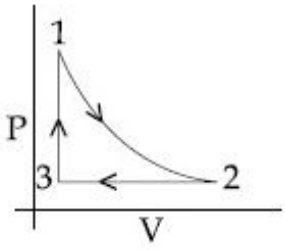
2. 

3. 

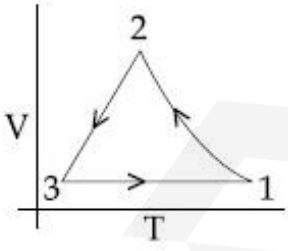
4. 

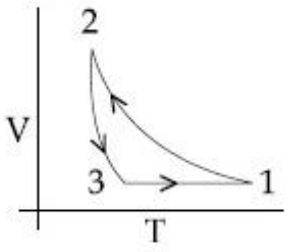
Question Number : 7 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

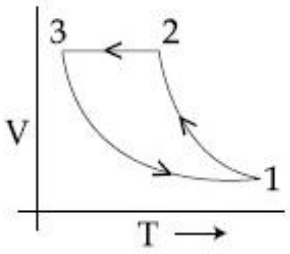
જ્યારે 1 → 2 એ સમોષ્મી ચક્રીય પ્રક્રિયા હોય તો નીચના પૈકી _____ ચક્રીય પ્રક્રિયા આકૃતિમાં દર્શાવેલ થર્મોડાયનામિક ચક્રને સમતુલ્ય થશે.
(આલેખ ફક્ત રેખાકૃતિ દર્શાવે છે જે માપક્રમ મુજબ નથી)

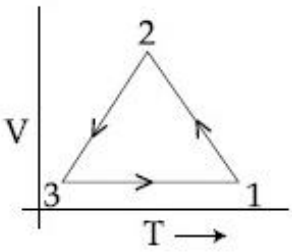


Options :

1. 

2. 

3. 

4. 

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

Consider two ideal diatomic gases A and B at some temperature T. Molecules of the gas A are rigid, and have a mass m. Molecules of the gas B have an additional vibrational mode, and have a mass $\frac{m}{4}$. The ratio of the specific heats (C_V^A and C_V^B) of gas A and B, respectively is :

Options :

1. 3 : 5

2. 5 : 7

3. 7 : 9

4. 5 : 9

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

किसी तापमान T पर दो आदर्श द्विपरमाणुक गैसे A और B पर विचार करें। गैस A के अणु दृढ़ हैं तथा उनका द्रव्यमान m है। गैस B के अणु कम्पन गति भी करते है और उनका द्रव्यमान $\frac{m}{4}$ है। गैसों A और B की विशिष्ट ऊष्माओं, क्रमशः C_V^A तथा C_V^B का अनुपात होगा :

Options :

1. 3 : 5

2. 5 : 7

3. 7 : 9

4. 5 : 9

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

કોઈક તાપમાન T એ બે આદર્શ દ્વિપરમાણુક વાયુ A અને B લો. વાયુ A ના અણુઓ દઢ છે અને તેનું દળ m છે. વાયુ B ના અણુઓ વધારની કંપનમોડ્ ધરાવે છે અને તેમનું દળ $\frac{m}{4}$ છે. વાયુ A અને B ની વિશિષ્ટ ઊષ્માઓ (C_V^A અને C_V^B) નો ગુણોત્તર અનુક્રમે _____ છે.

Options :

1. $3:5$

2. $5:7$

3. $7:9$

4. $5:9$

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

Three harmonic waves having equal frequency ν and same intensity I_0, have phase angles $0, \frac{\pi}{4}$ and $-\frac{\pi}{4}$ respectively. When they are superimposed the intensity of the resultant wave is close to :

Options :

1. I_0

2. $0.2\,I_0$

3. $3\,I_0$

4. $5.8\,I_0$

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

एक समान आवृत्ति ν तथा तीव्रता I_0 की तीन हरात्मक तरंगों के कलाकोण क्रमशः $0, \frac{\pi}{4}$ तथा $-\frac{\pi}{4}$ हैं। जब इन तरंगों के अध्यारोपित (superimpose) करा जाता है तो परिणामी तरंग की तीव्रता होगी :

Options :

1. I_0

2. $0.2\, I_0$

3. $3\, I_0$

4. $5.8\, I_0$

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

સમાન આવૃત્તિ ν અને એકસરખી તીવ્રતા I_0 વાળા અને અનુક્રમે $0, \frac{\pi}{4}$ અને $-\frac{\pi}{4}$ કળા ધરાવતા ત્રણ પ્રસંવાદી તરંગો છે. જ્યારે તેઓને એકબીજા પર સંપાત કરવામાં આવે છે ત્યારે પરિણામી તરંગની તીવ્રતા _____ ની નજીકની છે.

Options :

1. I_0

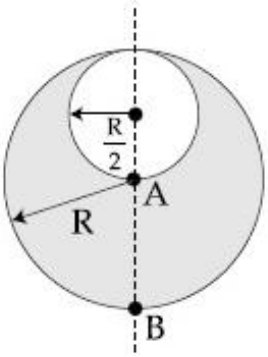
2. $0.2\, I_0$

3. $3\, I_0$

4. $5.8\,I_0$

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

Consider a sphere of radius R which carries a uniform charge density ρ. If a sphere of radius $\frac{R}{2}$ is carved out of it, as shown, the ratio $\frac{|\vec{E}_A|}{|\vec{E}_B|}$ of magnitude of electric field $\vec{E}_A$ and $\vec{E}_B$, respectively, at points A and B due to the remaining portion is :



Options :

1. $\frac{18}{34}$

2. $\frac{21}{34}$

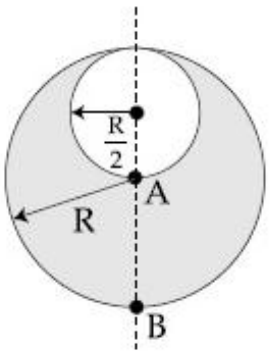
3. $\frac{17}{54}$

4. $\frac{18}{54}$

Question Number : 10 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

एक R त्रिज्या के गोले में समान घनत्व ρ का आवेश वितरित है। यदि इस गोले से $\frac{R}{2}$ त्रिज्या का एक गोला काटकर चित्रानुसार निकाल दिया जाय तो बचे हुए भाग के कारण बिन्दुओं A तथा B पर विद्युत क्षेत्र (क्रमशः $\vec{E}_A$ तथा $\vec{E}_B$) के मान का अनुपात $\frac{|\vec{E}_A|}{|\vec{E}_B|}$ होगा :



Options :

1. $\frac{18}{34}$

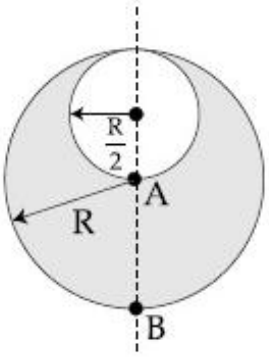
2. $\frac{21}{34}$

3. $\frac{17}{54}$

4. $\frac{18}{54}$

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

નિયમિત વીજભાર ઘનતા ρ ધરાવતો એક R ત્રિજ્યાવાળો ગોળો ધ્યાનમાં લો. જો $\frac{R}{2}$ ત્રિજ્યાવાળા ગોળાને આકૃતિમાં બતાવ્યા મુજબ કાપવામાં આવે, તો બાકી રહેલા ભાગને લીધે બિંદુ A અને B પર લાગતા વિદ્યુત ક્ષેત્ર અનુક્રમે $\vec{E}_A$ અને $\vec{E}_B$ ના માનનો ગુણોત્તર $\frac{|\vec{E}_A|}{|\vec{E}_B|}$ _____ છે.



Options :

1. $\frac{18}{34}$

2. $\frac{21}{34}$

3. $\frac{17}{54}$

4. $\frac{18}{54}$

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

An electric dipole of moment $\vec{p} = (-\hat{i} - 3\hat{j} + 2\hat{k}) \times 10^{-29}$ C.m is at the origin (0, 0, 0). The electric field due to this dipole at $\vec{r} = +\hat{i} + 3\hat{j} + 5\hat{k}$

(note that $\vec{r} \cdot \vec{p} = 0$) is parallel to :

Options :

1. $(-\hat{i} - 3\hat{j} + 2\hat{k})$

2. $(+\hat{i} + 3\hat{j} - 2\hat{k})$

3. $(-\hat{i} + 3\hat{j} - 2\hat{k})$

4. $(+\hat{i} - 3\hat{j} - 2\hat{k})$

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

एक विद्युत द्विध्रुव जिसका आघूर्ण (moment) $\vec{p} = (-\hat{i} - 3\hat{j} + 2\hat{k}) \times 10^{-29}$ C.m है, मूलबिन्दु (0, 0, 0) पर रखा हुआ है। इसके द्वारा $\vec{r} = +\hat{i} + 3\hat{j} + 5\hat{k}$ बनने वाले विद्युत क्षेत्र की दिशा निम्न में से किसके समान्तर होगी :

(ध्यान दें कि $\vec{r} \cdot \vec{p} = 0$)

Options :

1. $(-\hat{i} - 3\hat{j} + 2\hat{k})$

2. $(+\hat{i}+3\hat{j}-2\hat{k})$

3. $(-\hat{i}+3\hat{j}-2\hat{k})$

4. $(+\hat{i}-3\hat{j}-2\hat{k})$

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

$(0, 0, 0)$ બિન્દુ એ વિદ્યુત દ્વિધ્રુવી ચાકમાત્રા $\vec{p} = (-\hat{i}-3\hat{j}+2\hat{k}) \times 10^{-29}$ C.m છે. આ દ્વિધ્રુવીને લીધે $\vec{r} = +\hat{i}+3\hat{j}+5\hat{k}$ એ મળતું વિદ્યુતક્ષેત્ર _____ ને સમાંતર છે.

(અંહી નોંધો કે $\vec{r} \cdot \vec{p} = 0$ છે.)

Options :

1. $(-\hat{i}-3\hat{j}+2\hat{k})$

2. $(+\hat{i}+3\hat{j}-2\hat{k})$

3. $(-\hat{i}+3\hat{j}-2\hat{k})$

4. $(+\hat{i}-3\hat{j}-2\hat{k})$

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

A long, straight wire of radius a carries a current distributed uniformly over its cross-section. The ratio of the magnetic fields due to the wire at distance $\frac{a}{3}$ and 2a, respectively from the axis of the wire is :

Options :

1. 1/2

2. 2

3. 2/3

4. 3/2

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

एक लम्बे सीधे a त्रिज्या के तार में विद्युत धारा बह रही है। यह धारा इसके अनुप्रस्थ काट पर समान रूप से वितरित है। तार द्वारा इसके अक्ष से क्रमशः $\frac{a}{3}$ तथा 2a दूरी पर बनने वाले चुम्बकीय क्षेत्रों के मान का अनुपात होगा :

Options :

1. 1/2

2. 2

3. 2/3

4. 3/2

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

a ત્રિજ્યાવાળા લાંબા સીધા તારના આડછેદ પર નિયમિત રીતે પ્રવાહ વહેંચાયેલ છે. તારને લીધે તારની અક્ષથી અનુક્રમે $\frac{a}{3}$ અને 2a અંતરે રહેલ બિંદુઓ આગળ ચુંબકીય ક્ષેત્રના માનનો ગુણોત્તર _____ છે.

Options :

1. 1/2

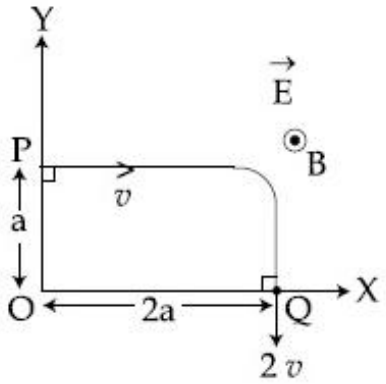
2. 2

3. 2/3

4. 3/2

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

A charged particle of mass 'm' and charge 'q' moving under the influence of uniform electric field $E\vec{i}$ and a uniform magnetic field $B\vec{k}$ follows a trajectory from point P to Q as shown in figure. The velocities at P and Q are respectively, $v\vec{i}$ and $-2v\vec{j}$. Then which of the following statements (A, B, C, D) are the correct ? (Trajectory shown is schematic and not to scale)



(A) $E = \frac{3}{4}\left(\frac{mv^2}{qa}\right)$

(B) Rate of work done by the electric field at P is $\frac{3}{4}\left(\frac{mv^3}{a}\right)$

(C) Rate of work done by both the fields at Q is zero

(D) The difference between the magnitude of angular momentum of the particle at P and Q is 2 mav.

Options :

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

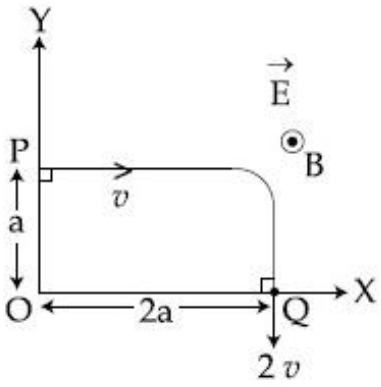
2. (B), (C), (D)

3. (A), (C), (D)

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

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

द्रव्यमान 'm' और आवेश 'q' का एक कण एक समान विद्युत क्षेत्र $E\vec{i}$ तथा एकसमान चुम्बकीय क्षेत्र $B\vec{k}$ में चलता हुआ बिन्दु P से चित्र में दिखाये पथ पर चलकर बिन्दु Q तक पहुँचता है। कण का बिन्दुओं P और Q पर वेग क्रमश: $v\vec{i}$ तथा $-2v\vec{j}$ है। ऐसे में नीचे दिये गये कथनों (A, B, C, D) में से कौन-कौन से कथन **सही** हैं? (दिखाया गया पथ सांकेतिक है)



(A) $E = \frac{3}{4}\left(\frac{mv^2}{qa}\right)$

(B) बिन्दु P पर विद्युत क्षेत्र द्वारा कण पर किये जा रहे कार्य की दर $\frac{3}{4}\left(\frac{mv^3}{a}\right)$ है।

(C) दोनों विद्युत तथा चुम्बकीय क्षेत्रों द्वारा कण पर बिन्दु Q पर किये जा रहे कार्य की दर शून्य है।

(D) बिन्दुओं P और Q पर कण के कोणीय संवेग के मान में $2\,mav$ का अन्तर है।

Options :

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

2. (B), (C), (D)

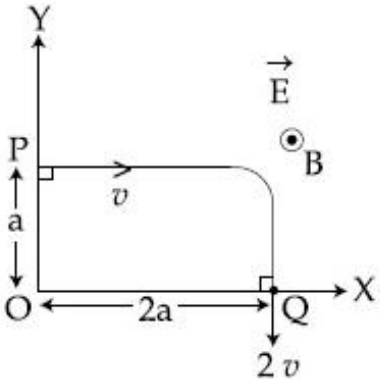
3. (A), (C), (D)

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

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

'm' દળ અને 'q' વીજભાર ધરાવતો એક વીજભારિત કણ નિયમિત વિદ્યુતક્ષેત્ર $E\vec{i}$ અને નિયમિત ચુંબકીય ક્ષેત્ર $B\vec{k}$ ની અસર હેઠળ બિંદુ P થી Q તરફ ગતિ કરતા આકૃતિમાં બતાવ્યા મુજબનો પરીપથ અનુસરે છે.

બિન્દુ P અને Q આગળ વેગ અનુક્રમે $v\vec{i}$ અને $-2v\vec{j}$ છે. નીચેના માંથી કયું વિધાન માત્ર સાચું છે? (આલેખ યે એક રેખાકૃતિ છે જે માપ ક્રમમાં થી)



(A) $E = \frac{3}{4}\left(\frac{mv^2}{qa}\right)$

(B) બિન્દુ P આગળ વિદ્યુતક્ષેત્ર દ્વારા થતાં કાર્યનો દર $\frac{3}{4}\left(\frac{mv^3}{a}\right)$ છે.

(C) બિન્દુ Q એ બંન્ને ક્ષેત્રો દ્વારા થતાં કાર્યનો દર શૂન્ય છે.

(D) બિન્દુ P અને Q આગળ કણના કોણીય વેગમાન ના માનમાં ફેરફાર $2\,mav$ છે.

Options :

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

2. (B), (C), (D)

3. (A), (C), (D)

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

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

The electric fields of two plane electromagnetic plane waves in vacuum are given by

$\vec{E}_1 = E_0\hat{j}\ \cos(\omega t - kx)$ and

$\vec{E}_2 = E_0\hat{k}\ \cos(\omega t - ky)$

At t=0, a particle of charge q is at origin with a velocity $\vec{v} = 0.8\,c\hat{j}$ (c is the speed of light in vaccum). The instantaneous force experienced by the particle is :

Options :

1. $E_0q\left(-0.8\hat{i} + \hat{j} + \hat{k}\right)$

2. $E_0q\left(0.8\hat{i} + \hat{j} + 0.2\hat{k}\right)$

3. $E_0q\left(0.4\hat{i} - 3\hat{j} + 0.8\hat{k}\right)$

4. $E_0q\left(0.8\hat{i} - \hat{j} + 0.4\hat{k}\right)$

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

निर्वात में दो समतल विद्युत-चुम्बकीय तरंगों के विद्युत-क्षेत्र $\vec{E}_1 = E_0\hat{j}\ \cos(\omega t - kx)$ तथा

$\vec{E}_2 = E_0\hat{k}\ \cos(\omega t - ky)$ हैं।

समय $t=0$ पर q आवेश का एक कण $\vec{v} = 0.8\,c\hat{j}$ (c निर्वात में प्रकाश की गति है) वेग से मूलबिन्दु पर चल रहा है। कण पर लगने वाला तात्क्षणिक बल है :

Options :

1. $E_0q\left(-0.8\hat{i} + \hat{j} + \hat{k}\right)$

2. $E_0q\left(0.8\hat{i} + \hat{j} + 0.2\hat{k}\right)$

3. $E_0q\left(0.4\hat{i} - 3\hat{j} + 0.8\hat{k}\right)$

4. $E_0q\left(0.8\hat{i} - \hat{j} + 0.4\hat{k}\right)$

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

શૂન્યાવકાશમાં બે સમતલ વિદ્યુતચુંબકીય તરંગોના વિદ્યુત ક્ષેત્ર $\vec{E}_1 = E_0\hat{j}\ \cos(\omega t - kx)$ અને

$\vec{E}_2 = E_0\hat{k}\ \cos(\omega t - ky)$ છે.

$t=0$ સમયે q વીજભાર ધરાવતો એક કણ ઉગમ બિન્દુ પર છે જેના વેગ $\vec{v} = 0.8\,c\hat{j}$ છે. (c એ શૂન્યાવકાશમાં પ્રકાશની ઝડપ છે) કણ દ્વારા અનુભવાતું તત્ક્ષણિક બળ _____ છે.

Options :

1. $E_0 q\left(-0.8\hat{i}+\hat{j}+\hat{k}\right)$

2. $E_0 q\left(0.8\hat{i}+\hat{j}+0.2\hat{k}\right)$

3. $E_0 q\left(0.4\hat{i}-3\hat{j}+0.8\hat{k}\right)$

4. $E_0 q\left(0.8\hat{i}-\hat{j}+0.4\hat{k}\right)$

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

A vessel of depth 2h is half filled with a liquid of refractive index $2\sqrt{2}$ and the upper half with another liquid of refractive index $\sqrt{2}$. The liquids are immiscible. The apparent depth of the inner surface of the bottom of vessel will be :

Options :

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

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

3. $\frac{h}{2(\sqrt{2}+1)}$

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

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

गहराई 2h के एक बर्तन में दो अमिश्रणीय द्रव जिनके अपवर्तनांक $\sqrt{2}$ और $2\sqrt{2}$ है आधी-आधी ऊँचाई h तक भरे हुए हैं तथा $\sqrt{2}$ अपवर्तनांक का द्रव इसके ऊपरी भाग में है। बर्तन के निचले हिस्से की आंतरिक सतह की आभासी ऊँचाई होगी :

Options :

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

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

3. $\frac{h}{2(\sqrt{2}+1)}$

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

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

2h ઉંચાઈ ધરાવતા એક પાત્રને અડધે સુધી $\sqrt{2}$ વક્રીભવનાંક ધરાવતું પ્રવાહી ભરેલ છે અને બીજા અડધા ભાગને $2\sqrt{2}$ વક્રીભવનાંક ધરાવતા બીજા પ્રવાહી વડે ભરેલ છે. પ્રવાહીઓ અમિશ્રણીય છે. પાત્રના નીચેના ભાગની અંદરની સપાટીની દેખીતી આભાસી ઉંચાઈ _____ છે.

Options :

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

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

3. $\frac{h}{2(\sqrt{2}+1)}$

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

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

The aperture diameter of a telescope is 5 m. The separation between the moon and the earth is 4×10^5 km. With light of wavelength of 5500 Å, the minimum separation between objects on the surface of moon, so that they are just resolved, is close to :

Options :

1. 20 m

2. 60 m

3. 200 m

4. 600 m

Question Number : 16 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

एक टेलीस्कोप के द्वारक का व्यास 5 m है। पृथ्वी और चन्द्रमा के बीच की दूरी 4×10^5 km है। यदि प्रकाश का तरंगदैर्ध्य 5500 Å लिया जाय तो चन्द्रमा पर दो वस्तुओं की बीच की न्यूनतम दूरी लगभग कितनी होगी जिससे उनमें विभेदन करा जा सके :

Options :

1. 20 m

2. 60 m

3. 200 m

4. 600 m

Question Number : 16 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

ટેલિસ્કોપનું એપ્રચર (દ્વારકાછિદ્ર) વ્યાસ 5 m છે. ચંદ્ર અને સૂર્ય વચ્ચેનુ અંતર 4×10^5 km છે. 5500 Å તરંગલંબાઈ ધરાવતા પ્રકાશ, ચાંદની સપાટી પર રહેલ વસ્તુઓ એકબીજથી દૂરી દેખાય તે માટેનું તેમની વચ્ચેનું લઘુત્તમ અંતર (દૂરી) _____ ની નજીકનું છે.

Options :

1. 20 m

2. 60 m

3. 200 m

4. 600 m

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

A particle moving with kinetic energy E has de Broglie wavelength λ. If energy ΔE is added to its energy, the wavelength become λ/2. Value of ΔE, is :

Options :

1. E

2. 2E

3. 3E

4. 4E

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

गतिज ऊर्जा E के एक कण का डी-ब्रोग्ली तरंगदैर्ध्य λ है। यदि इसकी ऊर्जा में ΔE ऊर्जा और जोड़ दी जाय तो तरंगदैर्ध्य का मान λ/2 हो जाता है। ΔE का मान है :

Options :

1. E

2. 2E

3. 3E

4. 4E

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

E ગતિઊર્જા સાથે ગતિ કરતા કણની ડી-બ્રોગ્લી તરંગલંબાઈ λ છે. જો આ ઉર્જામાં ΔE જેટલી ઉર્જા ઉમેરવામાં આવે તો તેની તરંગલંબાઈ $\lambda/2$ થાય છે. ΔE નું મૂલ્ય _____ છે.

Options :

1. E

2. 2E

3. 3E

4. 4E

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

Radiation, with wavelength 6561 Å falls on a metal surface to produce photoelectrons. The electrons are made to enter a uniform magnetic field of 3×10^{-4} T. If the radius of the largest circular path followed by the electrons is 10 mm, the work function of the metal is close to :

Options :

1. 0.8 eV

2. 1.1 eV

3. 1.6 eV

4. 1.8 eV

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

तरंगदैर्ध्य 6561 Å का विकिरण एक धातु की सतह पर पड़ता है और इससे प्रकाशिक इलैक्ट्रॉन (photoelectrons) पैदा होते हैं। इन इलैक्ट्रॉनों को एकसमान चुम्बकीय क्षेत्र, जिसका मान 3×10^{-4} T है, में प्रवेश कराने पर उनके द्वारा बनाये गये सबसे बड़े वृत्तीय पथ की त्रिज्या 10 mm है। धातु के कार्य फलन का मान निम्न में से किसके निकटतम है ?

Options :

1. 0.8 eV

2. 1.1 eV

3. 1.6 eV

4. 1.8 eV

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

6561 Å તરંગલંબાઈ વાળા વિકિરણ ને ધાતુની સપાટી પર આપાત કરતા ફોટોઇલેક્ટ્રોનો ઉત્સર્જિત થાય છે. ઈલેક્ટ્રોનોને 3×10^{-4}T વાળા એકસમાન ચુંબકીય ક્ષેત્રમાં દાખલ કરાવવામાં આવે છે. જો ઈલેક્ટ્રોન દ્વારા અનુસરવામાં આવતા સૌથી નાના વર્તુળાકાર પથની ત્રિજ્યા 10 mm હોય તો ધાતુ નું કાર્ય વિધેય _____ ની નજીક છે.

Options :

1. 0.8 eV

2. 1.1 eV

3. 1.6 eV

4. 1.8 eV

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

If the screw on a screw-gauge is given six rotations, it moves by 3 mm on the main scale. If there are 50 divisions on the circular scale the least count of the screw gauge is :

Options :

1. 0.01 cm

2. 0.02 mm

3. 0.001 cm

4. 0.001 mm

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

एक स्क्रूगेज में यदि पेच को छः बार घुमाया जाय तो यह मुख्य पैमाने पर 3 mm की दूरी तय करता है। यदि वृत्तीय पैमाने पर 50 भाग हों तो स्क्रूगेज का अल्पतमांक कितना होगा?

Options :

1. 0.01 cm

2. 0.02 mm

3. 0.001 cm

4. 0.001 mm

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

જો સ્ક્રૂગેજના સ્ક્રૂને છ પરિભ્રમણ આપવામાં આવેતો તે મુખ્ય સ્કેલ પર 3 mm જેટલું અંતર કાપે છે. જો વર્તુળ સ્કેલ પર 50 કાપા હોય તો સ્ક્રૂગેજની લઘુત્તમ માપ શક્તિ _____ છે.

Options :

1. 0.01 cm

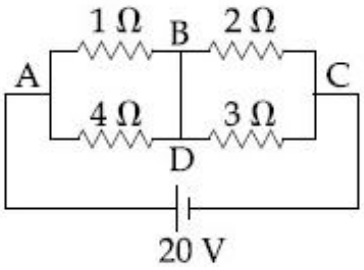
2. 0.02 mm

3. 0.001 cm

4. 0.001 mm

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

In the given circuit diagram, a wire is joining points B and D. The current in this wire is :



Options :

1. zero

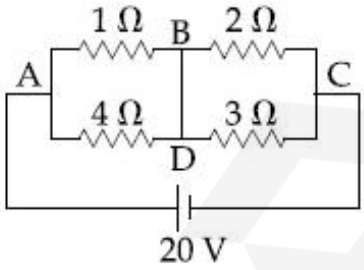
2. 2A

3. 4A

4. 0.4A

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

चित्र में दिखाये परिपथ में बिन्दुओं B और D को एक तार द्वारा जोड़ा गया है। इस तार से बहने वाली विद्युत धारा का मान एम्पीयर में होगा :



Options :

1. शून्य

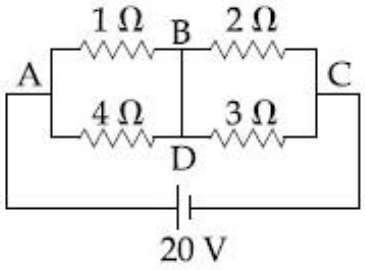
2. 2A

3. 4A

4. 0.4A

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

આપેલ પરિપથમાં, એક તાર બિંદુઓ B અને D ને જોડે છે. તારમાં પ્રવાહ (Amp માં) _____ થશે.



Options :

1. શૂન્ય

2. 2A

3. 4A

4. 0.4A

Sub-Section Number: 2
Sub-Section Id: 405036123
Question Shuffling Allowed : Yes

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

The distance x covered by a paritcle in one dimensional motion varies with time t as $x^2 = at^2 + 2bt + c$. If the acceleration of the particle depends on x as x^{-n}, where n is an integer, the value of n is _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
3 to 3

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

एक दिशा में चलते हुए एक कण द्वारा t समय में तय की गयी दूरी x सूत्र $x^2 = at^2 + 2bt + c$ के अनुसार दी जाती है। यदि कण के त्वरण की x पर निर्भरता x^{-n} (n एक पूर्णांक है) द्वारा दी जाती हो तो n का मान है _____।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
3 to 3

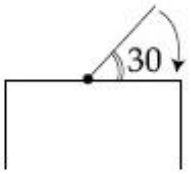
Question Number : 21 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

એક કણની એક પરિમાણીય ગતિ દરમ્યાન કપાતું અંતર x સમયે t સાથે $x^2 = at^2 + 2bt + c$ અનુસાર બદલાય છે. જો કણનો પ્રવેગ x ઉપર, x^{-n} પ્રમાણે આધાર રાખતો હોય, જ્યાં n પૂર્ણાંક છે, તો n મૂલ્ય _____ થશે.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
3 to 3

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

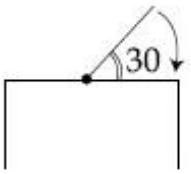
One end of a straight uniform 1 m long bar is pivoted on horizontal table. It is released from rest when it makes an angle 30° from the horizontal (see figure). Its angular speed when it hits the table is given as $\sqrt{n}\ s^{-1}$, where n is an integer. The value of n is _____.



Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
15 to 15

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

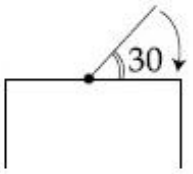
एक एकसमान 1 m लम्बी छड़ का एक सिरा एक क्षैतिज मेज़ पर कीलकित (pivoted) है। छड़ को क्षैतिज दिशा से 30° कोण बनाते हुए स्थिर अवस्था से छोड़ा जाता है (चित्र देखें)। यदि मेज़ से टकराते समय छड़ का कोणीय वेग $\sqrt{n}\ s^{-1}$ (यहाँ पर n एक पूर्णांक है) हो तो n का मान है _____।



Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
15 to 15

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

1 m લાંબા સીધા નિયમિત સળીયાના એક છેડાને સમક્ષિતિજ ટેબલ પર કીલકીત (ટેક્વવામાં) કરવામાં આવેલ છે. તે જ્યારે સમક્ષિતિજ સાથે 30° નો કોણ બનાવે ત્યારે તેને સ્થિર સ્થિતિ માંથી મુક્ત કરવામાં આવે છે, (આકૃતિ જુઓ). તે જ્યારે ટેબલને અડથાય ત્યારે તેની કોણીય ઝડપ $\sqrt{n}\ s^{-1}$ મુજબ અપાય છે, જ્યાં n એ એક પૂર્ણાંક છે. n નું મુલ્ય _____ છે.



Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
15 to 15

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

A body of mass m = 10 kg is attached to one end of a wire of length 0.3 m. The maximum angular speed (in rad s^{-1}) with which it can be rotated about its other end in space station is (Breaking stress of wire = 4.8×10^7 Nm^{-2} and area of cross-section of the wire = 10^{-2} cm^2) is :

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
4 to 4

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

द्रव्यमान 10 kg की एक वस्तु 0.3 m लम्बे एक तार के एक छोर से जुड़ी हुई है। आंतरिक्ष में तार को इसके दूसरे सिरे के चारों ओर कितनी अधिकतम कोणीय गति (rad s^{-1} में) से घुमाया जा सकता है? (तार = 4.8×10^7 Nm^{-2} स्ट्रेस पर टूट जाता है और इसकी अनुप्रस्थ काट का क्षेत्रफल = 10^{-2} cm^2 है) _____।

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

Answers Type: Range
Possible Answers :
4 to 4

Question Number : 23 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
$m = 10$ kg દળવાળા એક વસ્તુને 0.3 m લાંબા તાર ના એક છેડે જોડેલ છે. અવકાશ સ્ટેશન (Space station) માં તે બીજા છેડાને સાપેક્ષ ભ્રમણ કરી શકે તે માટે તેની મહત્તમ કોણીય ઝડપ (rad s^{-1} માં) _____ છે. (તારનું બ્રેકિંગ (વિભંજન) પ્રતિબળ $= 4.8 \times 10^7$ Nm^{-2} અને તારના આડછેદનું ક્ષેત્રફળ $= 10^{-2}$ cm^2 છે.)

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
4 to 4

Question Number : 24 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
In a fluorescent lamp choke (a small transformer) 100 V of reverse voltage is produced when the choke current changes uniformly from 0.25 A to 0 in a duration of 0.025 ms. The self-inductance of the choke (in mH) is estimated to be _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
10 to 10

Question Number : 24 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
एक प्रतिदीप्त बत्ती में लगी चोक (एक छोटा ट्रान्सफार्मर) में बहने वाली विद्युत धारा जब कालावधी 0.025 ms में 0.25 A से एक समान रूप से घटकर शून्य हो जाती है तो इसमें 100 V की विलोम वोल्टता पैदा होती है। चोक का स्वप्रेरकत्व (self-inductance) का मान mH में कितना है _____.

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

Possible Answers :
10 to 10

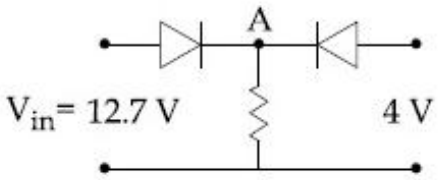
Question Number : 24 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

જ્યારે ચોકમાંથી વહેતો પ્રવાહ 0.025 ms ના સમયગાળા દરમ્યાન એક સરખી રીતે 0.25 A થી 0 બદલાય છે, ત્યારે પ્રસ્ફૂરક (fluorescent) બલ્બ ના ચોક (નાનુ ટ્રાન્સફોર્મર)માં 100 V જેટલો રીવર્સ વોલ્ટેજ ઉત્પન થાય છે. ચોકના આત્મપ્રેરણ (mH માં) નું અંદાજીત મૂલ્ય _____ છે.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
10 to 10

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

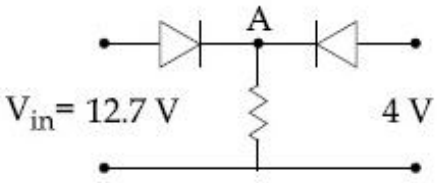
Both the diodes used in the circuit shown are assumed to be ideal and have negligible resistance when these are forward biased. Built in potential in each diode is 0.7 V. For the input voltages shown in the figure, the voltage (in Volts) at point A is _____.



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

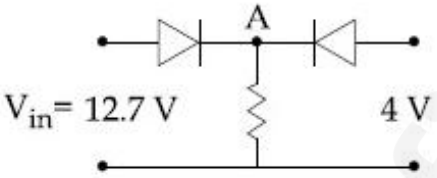
दिखाये गये परिपथ में प्रयोग किये गये दोनों डायोडों को आदर्श मानें तथा अग्रदिशिक (फारवर्ड) बायस में इनका प्रतिरोध नगण्य मानें। प्रत्येक डायोड का अंतरनिर्मित विभावन्तर (Built-in-potential), 0.7 V है। चित्र में दिखायी गयी निवेश (input) वोल्टता के लिये बिन्दु A पर वोल्टता का मान (वोल्ट में) होगा _____।



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

પરીપથમાં વાપરવામાં આવેલા બંને ડાયોડોનો અવરોધ સમાન છે અને જ્યારે તેઓ ફોરવર્ડ બાયસમાં હોય ત્યારે તેઓ અવગણ્ય અવરોધ ધરાવે છે. દરેક ડાયોડનો અંર્તનિર્મિત (built-in) વીજસ્થિતિમાન 0.7 V છે. આકૃતિમાં બતાવેલ ઇનપુટ વોલ્ટેજ માટે બિન્દુ A આગળ વોલ્ટેજ (વોલ્ટમાં) _____ છે.



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

Chemistry

Section Id :	40503676
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: 405036124
Question Shuffling Allowed : Yes

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

The de Broglie wavelength of an electron in the 4^{th} Bohr orbit is :

Options :

1. $4\pi a_0$

2. $8\pi a_0$

3. $6\pi a_0$

4. $2\pi a_0$

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

चौथी बोर कक्षा में एक इलेक्ट्रॉन की डी-ब्रोग्ली तरंगदैर्घ्य होगी :

Options :

1. $4\pi a_0$

2. $8\pi a_0$

3. $6\pi a_0$

4. $2\pi a_0$

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

4થી ખ્હોર કક્ષામાં રહેલા એક ઈલેક્ટ્રોનની ડી-બ્રોગ્લી તરંગલંબાઈ શોધો :

Options :

1. $4\pi a_0$

2. $8\pi a_0$

3. $6\pi a_0$

4. $2\pi a_0$

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

If the magnetic moment of a dioxygen species is 1.73 B.M, it may be :

Options :

1. O_2 or O_2^-

2. O_2 or O_2^+

3. O_2^- or O_2^+

4. O_2, O_2^- or O_2^+

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

एक डाईऑक्सीज़न स्पीशीज़ का चुम्बकीय आघूर्ण 1.73 B.M है, यह हो सकती है :

Options :

1. O_2 अथवा O_2^-

2. O_2 अथवा O_2^+

3. O_2^- अथवा O_2^+

4. O_2, O_2^- अथवा O_2^+

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

એક ડાયઓક્સિજન સ્પીસીઝ ની ચુંબકીય ચાકમાત્રા 1.73 B.M છે તો તે હોય શકે :

Options :

1. O_2 અથવા O_2^-

2. O_2 અથવા O_2^+

3. O_2^- અથવા O_2^+

4. O_2, O_2^- અથવા O_2^+

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

If enthalpy of atomisation for $Br_{2(l)}$ is x kJ/mol and bond enthalpy for Br_2 is y kJ/mol, the relation between them :

Options :

1. is $x = y$

2. is $x > y$

3. is $x < y$

4. does not exist

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

यदि $Br_{2(l)}$ के लिए कणन एन्थैल्पी x kJ/mol हो तथा Br_2 के लिए आबन्ध एन्थैल्पी y kJ/mol हो, तो उनके बीच सम्बन्ध :

Options :

1. $x = y$ होगा

2. $x > y$ होगा

3. $x < y$ होगा

4. बनता नहीं है।

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

$Br_{2(l)}$ ની પરમાણ્વીય કરણ એન્થાલ્પી x kJ/mol છે અને Br_2 માટે બંધ એન્થાલ્પી y kJ/mol છે. તો તેમની વચ્ચેનો સંબંધ :

Options :

1. $x = y$ છે

2. $x > y$ છે

3. $x < y$ છે

4. અસ્તિત્વ ધરાવતો નથી

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

For following reactions

$$A \xrightarrow{700\ K} \text{Product}$$

$$A \xrightarrow[\text{catalyst}]{500\ K} \text{Product}$$

it was found that the E_a is decreased by 30 kJ/mol in the presence of catalyst. If the rate remains unchanged, the activation energy for catalysed reaction is (Assume pre exponential factor is same) :

Options :

1. 105 kJ/mol

2. 135 kJ/mol

3. 75 kJ/mol

4. 198 kJ/mol

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

निम्न अभिक्रियाओं के लिए

$$A \xrightarrow{700\ K} \text{उत्पाद}$$

$$A \xrightarrow[\text{उत्प्रेरक}]{500\ K} \text{उत्पाद}$$

यह पाया गया कि उत्प्रेरक की उपस्थिति में E_a, 30 kJ/mol से घट गई। यदि दर अपरिवर्तित रहे तो उत्प्रेरित अभिक्रिया के लिए संक्रियण ऊर्जा होगी (मान लीजिये पूर्व चरघातांकी गुणक वही रहता है) :

Options :

1. 105 kJ/mol

2. 135 kJ/mol

3. 75 kJ/mol

4. 198 kJ/mol

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

નીચેની પ્રક્રિયાઓ માટે,

$$A \xrightarrow{700\ K} \text{નીપજ}$$

$$A \xrightarrow[\text{ઉદ્દીપક}]{500\ K} \text{નીપજ}$$

એવુ જાણવા મળ્યું કે ઉદ્દીપકની હાજરીમાં E_a માં 30 kJ/mol જેટલો ઘટાડો થાય છે. જો પ્રક્રિયા દર બદલાતો ન હોય તો, ઉદ્દીપકીય પ્રક્રિયા માટેની સક્રિયકરણ શક્તિ, (ધારીલો કે પૂર્વઘાતાંકીય અવયવ સમાન છે.) શોધો :

Options :

1. 105 kJ/mol

2. 135 kJ/mol

3. 75 kJ/mol

4. 198 kJ/mol

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

The K_{sp} for the following dissociation is 1.6×10^{-5}

$$PbCl_{2(s)} \rightleftharpoons Pb^{2+}_{(aq)} + 2Cl^{-}_{(aq)}$$

Which of the following choices is correct for a mixture of 300 mL 0.134 M $Pb(NO_3)_2$ and 100 mL 0.4 M NaCl ?

Options :

1. $Q > K_{sp}$

2. $Q = K_{sp}$

3. Not enough data provided

4. $Q < K_{sp}$

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

निम्न वियोजन के लिये K_{sp} का मान 1.6×10^{-5} है,

$$PbCl_{2(s)} \rightleftharpoons Pb^{2+}_{(aq)} + 2Cl^{-}_{(aq)}$$

0.134 M $Pb(NO_3)_2$ के 300 mL तथा 0.4 M NaCl के 100 mL को मिलाकर बनाये गये मिश्रण के लिए निम्न में से कौन सा विकल्प **सही** है ?

Options :

1. $Q > K_{sp}$

2. $Q = K_{sp}$

3. पर्याप्त आँकड़ा उपलब्ध नहीं

4. $Q < K_{sp}$

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

નીચેના વિયોજન માટે K_{sp} 1.6×10^{-5} છે.

$$PbCl_{2(s)} \rightleftharpoons Pb^{2+}_{(aq)} + 2Cl^{-}_{(aq)}$$

નીચે આપેલી પસંદગીઓ પૈકી કઈ એક 300 mL 0.134 M $Pb(NO_3)_2$ અને 100 mL 0.4 M NaCl ના મિશ્રણ માટે સાચી છે ?

Options :

1. $Q > K_{sp}$

2. $Q = K_{sp}$

3. પુરતી માહિતિ ઉપલબ્ધ નથી

4. $Q < K_{sp}$

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

'X' melts at low temperature and is a bad conductor of electricity in both liquid and solid state. X is :

Options :

1. Zinc sulphide

2. Carbon tetrachloride

3. Silicon carbide

4. Mercury

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

'X' निम्न ताप पर पिघलता है तथा द्रव तथा ठोस दोनों अवस्थाओं में विद्युत का कुचालक है। X है :

Options :

1. जिंक सल्फाइड

2. कार्बन टेट्राक्लोराइड

3. सिलकान कार्बाइड

4. मर्करी

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

'X' ઓછા તાપમાને પિગળે છે અને તે બંન્ને પ્રવાહી અને ઘન અવસ્થાઓમાં વિદ્યુત પ્રવાહનો ખરાબ વાહક છે તો X શોધો.

Options :

1. ઝિંક સલ્ફાઈડ

2. કાર્બન ટેટ્રાક્લોરાઈડ

3. સિલિકોન કાર્બાઈડ

4. મરક્યુરી

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

B has a smaller first ionization enthalpy than Be. Consider the following statements :

(I) it is easier to remove 2p electron than 2s electron

(II) 2p electron of B is more shielded from the nucleus by the inner core of electrons than the 2s electrons of Be

(III) 2s electron has more penetration power than 2p electron

(IV) atomic radius of B is more than Be

(atomic number B = 5, Be = 4)

The correct statements are :

Options :

1. (I), (II) and (III)

2. (I), (II) and (IV)

3. (II), (III) and (IV)

4. (I), (III) and (IV)

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

B की प्रथम आयनन एन्थैल्पी Be से कम है। निम्न कथनों पर विचार कीजिए :

(I) 2s इलेक्ट्रॉन की तुलना में 2p इलेक्ट्रॉन हटाना आसान है।

(II) Be के 2s इलेक्ट्रॉनों की तुलना में B के 2p इलेक्ट्रॉन आंतरिक कोर इलेक्ट्रॉनों द्वारा नाभिक से ज्यादा परिरक्षित हैं।

(III) 2p इलेक्ट्रॉनों की तुलना में 2s इलेक्ट्रॉन की प्रवेशी सामर्थ्य ज्यादा है।

(IV) B की परमाणु त्रिज्या, Be से ज्यादा है।

(परमाणु संख्या B = 5, Be = 4)

सही कथन हैं :

Options :

1. (I), (II) तथा (III)

2. (I), (II) तथा (IV)

3. (II), (III) तथा (IV)

4. (I), (III) तथा (IV)

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

B ની પ્રથમ આયનીકરણ એન્થાલ્પી Be કરતા નાની છે.
નીચે આપેલા વિધાનો ધ્યાનમાં લો :

(I) 2p નો ઇલેક્ટ્રોન 2s ના ઇલેક્ટ્રોન કરતા દૂર કરવો સહેલો છે.

(II) B નો 2p ઈલેક્ટ્રોન Be ના 2s ઈલેક્ટ્રોન કરતા તેના ઈનર કોરના ઈલેક્ટ્રોન વડે તેના ન્યુક્લિયસથી વધુ આચ્છાદિત છે.

(III) 2s ઈલેક્ટ્રોનની ભેદન શક્તિ 2p ઈલેક્ટ્રોન કરતાં વધુ છે.

(IV) B ની પરમાણ્વીય ત્રિજ્યા Be કરતા વધુ છે.

(પરમાણ્વીય ક્રમ B = 5, Be = 4)

સાચું કથન શોધો :

Options :

1. (I), (II) અને (III)

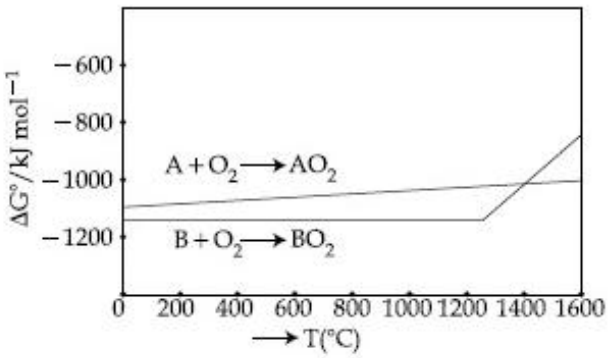
2. (I), (II) અને (IV)

3. (II), (III) અને (IV)

4. (I), (III) અને (IV)

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

According to the following diagram, A reduces BO_2 when the temperature is :



Options :

1. $< 1400\,^{\circ}C$

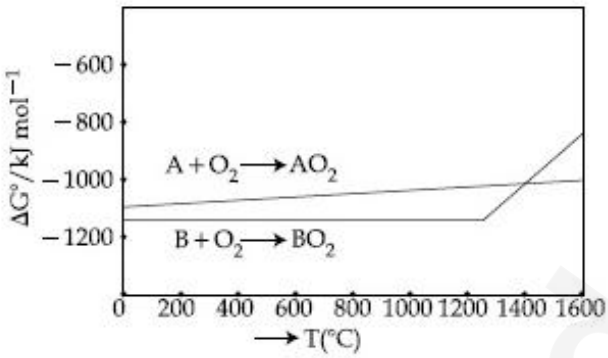
2. $> 1400\,^{\circ}C$

3. $> 1200\,^{\circ}C$ but $< 1400\,^{\circ}C$

4. $< 1200\,^{\circ}C$

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

निम्न चित्र के अनुसार A, BO_2 का अपचयन करता है जब ताप है :



Options :

1. $< 1400\,^{\circ}C$

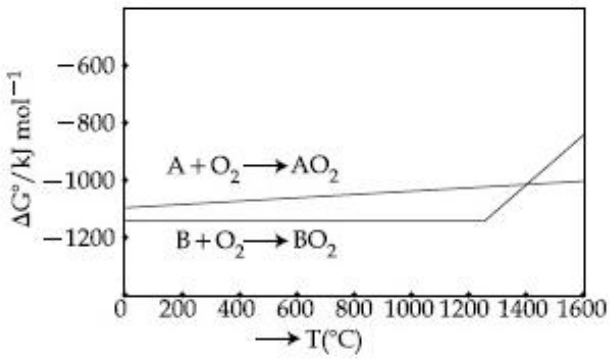
2. $> 1400\,^{\circ}C$

3. $> 1200\,^{\circ}C$ परन्तु $< 1400\,^{\circ}C$

4. $< 1200\,^{\circ}C$

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

નીચે આપેલી આકૃતિ મુજબ A એ BO_2 નું રિડક્શન કરે જ્યારે તાપમાન :



Options :

1. < 1400 °C

2. > 1400 °C

3. > 1200 °C પણ < 1400 °C

4. < 1200 °C

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

The acidic, basic and amphoteric oxides, respectively, are :

Options :

1. MgO, Cl_2O, Al_2O_3

2. N_2O_3, Li_2O, Al_2O_3

3. Cl_2O, CaO, P_4O_{10}

4. Na_2O, SO_3, Al_2O_3

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

अम्लीय, क्षारीय तथा उभयधर्मी ऑक्साइडें क्रमश: हैं :

Options :

1. MgO, Cl_2O, Al_2O_3

2. N_2O_3, Li_2O, Al_2O_3

3. Cl_2O, CaO, P_4O_{10}

4. Na_2O, SO_3, Al_2O_3

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

એસિડિક, બેઝિક અને ઉભયગુણી ઓક્સાઈડો અનુક્રમે શોધો :

Options :

1. MgO, Cl_2O, Al_2O_3

2. N_2O_3, Li_2O, Al_2O_3

3. Cl_2O, CaO, P_4O_{10}

4. Na_2O, SO_3, Al_2O_3

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

The compound that cannot act both as oxidising and reducing agent is :

Options :

1. HNO_2

2. H_2O_2

3. H_2SO_3

4. H_3PO_4

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

वह यौगिक जो उपचायक तथा अपचायक दोनों की तरह कार्य नहीं कर सकता, है :

Options :

1. HNO_2

2. H_2O_2

3. H_2SO_3

4. H_3PO_4

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

સંયોજન કે જે ઓક્સિડેશનકર્તા અને રિડક્શનકર્તા એમ બંને તરીકે વર્તી શકતો નથી તે :

Options :

1. HNO_2

2. H_2O_2

3. H_2SO_3

4. H_3PO_4

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

The electronic configurations of bivalent europium and trivalent cerium are :

(atomic number : Xe = 54, Ce = 58, Eu = 63)

Options :

1. [Xe] $4f^7$ $6s^2$ and [Xe] $4f^2$ $6s^2$

2. [Xe] $4f^2$ and [Xe] $4f^7$

3. [Xe] $4f^7$ and [Xe] $4f^1$

4. [Xe] $4f^4$ and [Xe] $4f^9$

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

द्विसंयोजक यूरोपियम तथा त्रिसंयोजक सीरियम के इलेक्ट्रॉनिक विन्यास हैं : (परमाणु संख्या Xe = 54, Ce = 58, Eu = 63)

Options :

1. $[Xe]\ 4f^7\ 6s^2$ तथा $[Xe]\ 4f^2\ 6s^2$

2. $[Xe]\ 4f^2$ तथा $[Xe]\ 4f^7$

3. $[Xe]\ 4f^7$ तथा $[Xe]\ 4f^1$

4. $[Xe]\ 4f^4$ तथा $[Xe]\ 4f^9$

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

દ્વિભારીત યુરોપિયમ અને ત્રિભારીત સિરીયમ ની ઇલેક્ટ્રોનીય સંરચના શોધો. (પરમાણુ ક્રમાંક Xe = 54, Ce = 58, Eu = 63)

Options :

1. $[Xe]\ 4f^7\ 6s^2$ અને $[Xe]\ 4f^2\ 6s^2$

2. $[Xe]\ 4f^2$ અને $[Xe]\ 4f^7$

3. $[Xe]\ 4f^7$ અને $[Xe]\ 4f^1$

4. $[Xe]\ 4f^4$ અને $[Xe]\ 4f^9$

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

Complex X of composition $Cr(H_2O)_6Cl_n$ has a spin only magnetic moment of 3.83 BM. It reacts with $AgNO_3$ and shows geometrical isomerism. The IUPAC nomenclature of X is :

Options :

1. Hexaaqua chromium(III) chloride

2. Tetraaquadichlorido chromium(IV) chloride dihydrate

3. Tetraaquadichlorido chromium(III) chloride dihydrate

4. Dichloridotetraaqua chromium(IV) chloride dihydrate

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

$Cr(H_2O)_6Cl_n$ संघटन के संकुल X का स्पिन मात्र का चुम्बकीय आघूर्ण 3.83 BM है। यह $AgNO_3$ के साथ अभिक्रिया करता है और ज्यामितीय समावयवता प्रदर्शित करता है। X का आई यू पी ए सी नाम है :

Options :

1. हेक्साएक्वाक्रोमियम(III) क्लोराइड

2. टेट्राऐक्वाडाइक्लोराइडो क्रोमियम(IV) क्लोराइड डाइहाइड्रेट

3. टेट्राऐक्वाडाइक्लोराइडो क्रोमियम(III) क्लोराइड डाइहाइड्रेट

4. डाइक्लोराइडाटेट्राऐक्वा क्रोमियम(IV) क्लोराइड डाइहाइड्रेट

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

સંકીર્ણ X જેનું બંધારણ $Cr(H_2O)_6Cl_n$ છે. તેની ફક્ત સ્પીન ચુંબકીય ચાકમાત્રા 3.83 BM છે. જે $AgNO_3$ સાથે પ્રક્રિયા કરે છે અને ભૌમિતિક સમઘટકતા દર્શાવે છે. તો X નું IUPAC નામકરણ શોધો :

Options :

1. હેક્ઝાએક્વાક્રોમિયમ(III) ક્લોરાઈડ

2. ટેટ્રાએક્વાડાયક્લોરીડોક્રોમિયમ(IV) ક્લોરાઈડ ડાયહાઇડ્રેટ

3. ટેટ્રાએક્વાડાયક્લોરીડોક્રોમિયમ(III) ક્લોરાઇડ ડાયહાઇડ્રેટ

4. ડાયક્લોરીડોટેટ્રાએક્વાક્રોમિયમ(IV) ક્લોરાઈડ ડાયહાઈડ્રેટ

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

$[Pd(F)(Cl)(Br)(I)]^{2-}$ has n number of geometrical isomers. Then, the spin-only magnetic moment and crystal field stabilisation energy [CFSE] of $[Fe(CN)_6]^{n-6}$, respectively, are :

[Note : Ignore the pairing energy]

Options :

1. 0 BM and $-2.4\ \Delta_0$

2. 1.73 BM and $-2.0\ \Delta_0$

3. 2.84 BM and $-1.6\ \Delta_0$

4. 5.92 BM and 0

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

$[Pd(F)(Cl)(Br)(I)]^{2-}$ के ज्यामितीय समावयवों की संख्या n है। तब $[Fe(CN)_6]^{n-6}$ का स्पिन मात्र चुम्बकीय आघूर्ण तथा क्रिस्टल क्षेत्र स्थायीकरण ऊर्जा [CFSE] क्रमश: हैं :

[नोट : युग्मन ऊर्जा को छोड़ दीजिए]

Options :

1. 0 BM तथा $-2.4\ \Delta_0$

2. 1.73 BM तथा $-2.0\ \Delta_0$

3. 2.84 BM तथा $-1.6\ \Delta_0$

4. 5.92 BM तथा 0

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

$[Pd(F)(Cl)(Br)(I)]^{2-}$ પાસે ભૌમિતિક સમઘટકોની સંખ્યા n છે. તો $[Fe(CN)_6]^{n-6}$ ની ફક્ત સ્પીન ચુંબકીય ચાકમાત્રા અને સ્ફટિક ક્ષેત્ર સ્થિરીકરણ ઉર્જા [CFSE] અનુક્રમે શોધો :

[નોંધ : યુગ્મીકરણ ઉર્જા ને અવગણો]

Options :

1. 0 BM અને $-2.4\ \Delta_0$

2. 1.73 BM અને $-2.0\ \Delta_0$

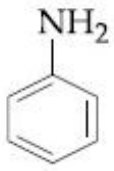
3. 2.84 BM અને $-1.6\ \Delta_0$

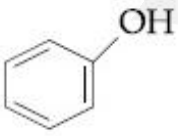
4. 5.92 BM અને 0

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

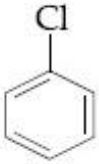
Which of these will produce the highest yield in Friedel Crafts reaction ?

Options :

1. 

2. 

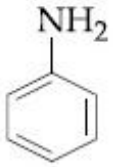
3. 

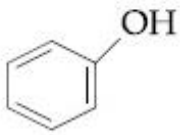
4. 

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

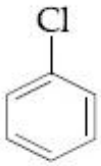
फ्रीडल क्राफ्टस अभिक्रिया में इनमें से कौन अधिकतम उत्पाद देगा?

Options :

1. 

2. 

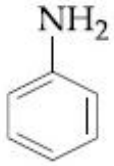
3. 

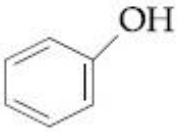
4. 

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

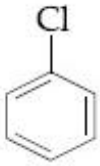
નીચે આપેલા પૈકી ક્યો એક ફ્રિડલ ક્રાફ્ટ્સ પ્રક્રિયામાં સૌથી વધુ નીપજ આપશે?

Options :

1. 

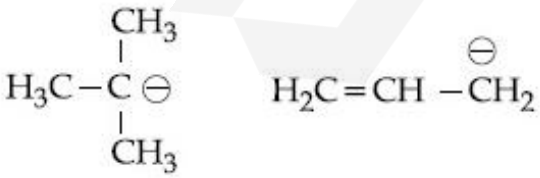
2. 

3. 

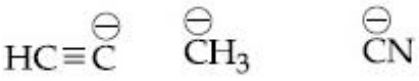
4. 

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

The increasing order of basicity for the following intermediates is (from weak to strong)



(i) (ii)



(iii) (iv) (v)

Options :

1. (v) < (i) < (iv) < (ii) < (iii)

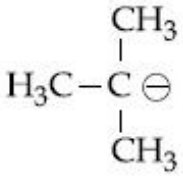
2. (v) < (iii) < (ii) < (iv) < (i)

3. (iii) < (i) < (ii) < (iv) < (v)

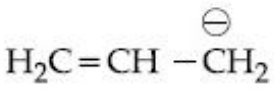
4. (iii) < (iv) < (ii) < (i) < (v)

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

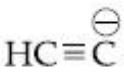
निम्न मध्यवर्तियों के लिए क्षारीयता का बढ़ता क्रम है
(दुर्बल से प्रबल) :



(i)



(ii)



(iii)

(iv)

(v)

Options :

1. (v) < (i) < (iv) < (ii) < (iii)

2. (v) < (iii) < (ii) < (iv) < (i)

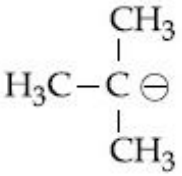
3. (iii) < (i) < (ii) < (iv) < (v)

4. (iii) < (iv) < (ii) < (i) < (v)

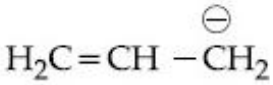
Question Number : 40 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

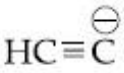
નીચેના મધ્યવર્તિઓમાં બેઝિકતાનો ચઢતો ક્રમ શોધો :
(નિર્બળ થી પ્રબળ તરફ)



(i)



(ii)



(iii)

(iv)

(v)

Options :

1. (v) < (i) < (iv) < (ii) < (iii)

2. (v) < (iii) < (ii) < (iv) < (i)

3. (iii) < (i) < (ii) < (iv) < (v)

4. (iii) < (iv) < (ii) < (i) < (v)

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

A chemist has 4 samples of artificial sweetener A, B, C and D. To identify these samples, he performed certain experiments and noted the following observations :

(i) A and D both form blue-violet colour with ninhydrin.

(ii) Lassaigne extract of C gives positive $AgNO_3$ test and negative $Fe_4[Fe(CN)_6]_3$ test.

(iii) Lassaigne extract of B and D gives positive sodium nitroprusside test.

Based on these observations which option is correct ?

Options :

1. A : Alitame; B : Saccharin; C : Aspartame; D : Sucralose

2. A : Aspartame; B : Saccharin; C : Sucralose; D : Alitame

3. A : Aspartame; B : Alitame; C : Saccharin; D : Sucralose

4. A : Saccharin; B : Alitame; C : Sucralose; D : Aspartame

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

एक केमिस्ट के पास कृत्रिम मधुरकों A, B, C तथा D का 4 प्रतिदर्श हैं। इन प्रतिदर्शों को पहचानने के लिए उसने कुछ प्रयोग किये तथा निम्न प्रेक्षणों को नोट किया :

(i) A तथा D दोनों निनहाइड्रिन के साथ नीला-बैंगनी रंग देते हैं।

(ii) C का लैसें सारकत्त $AgNO_3$ के साथ सकारात्मक तथा $Fe_4[Fe(CN)_6]_3$ के साथ नकारात्मक परीक्षण देता है।

(iii) B तथा D का लैसें सारकत्त सोडियम नाइट्रोप्रूसाइड के साथ सकारात्मक परीक्षण देता है।

इन प्रेक्षणों के आधार पर कौन सा विकल्प **सही** है?

Options :

1. A : ऐलीटेम; B : सैकरीन; C : ऐस्परटेम; D : सुक्रालोज

2. A : ऐस्परटेम; B : सैकरीन; C : सुक्रालोज; D : ऐलीटेम

3. A : ऐस्परटेम; B : ऐलीटेम; C : सैकरीन; D : सुक्रालोज

4. A : सैकरीन; B : ऐलीटेम; C : सुक्रालोज; D : ऐस्परटेम

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

એક કેમિસ્ટ પાસે કૃત્રિમ ગળ્યા પદાર્થના 4 નમૂનાઓ A, B, C અને D છે. આ નમૂનોઓને ઓળખાવા તેણે કેટલાક પ્રયોગો કરી નીચેના અવલોકનોની નોંધ કરી –

(i) A અને D બન્ને નીનહાઈડ્રીન સાથે ભૂરો જાંબલી રંગ આપે છે.

(ii) C ના લેસાઈનનું નિષ્કર્ષણ હકારાત્મક $AgNO_3$ કસોટી આપે છે. અને નકારાત્મક $Fe_4[Fe(CN)_6]_3$ કસોટી આપે છે.

(iii) B અને D નું લેસાઈન નિષ્કર્ષણ હકારાત્મક સોડિયમ નાઈટ્રોપ્રુસાઈડ કસોટી આપે છે.

ઉપરોક્ત અવલોકનના આધારે નીચેનામાંથી ક્યો વિકલ્પ સાચો છે?

Options :

1. A : એલીટિમ; B : સેકેરીન; C : એસ્પાર્ટેમ; D : સુક્રાલોઝ

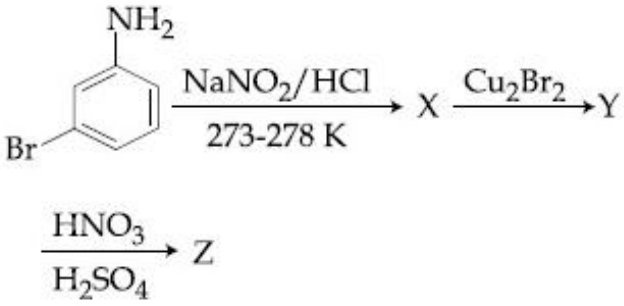
2. A : એસ્પાર્ટેમ; B : સેકેરીન; C : સુક્રાલોઝ; D : એલીટિમ

3. A : એસ્પાર્ટેમ; B : એલીટિમ; C : સેકેરીન; D : સુક્રાલોઝ

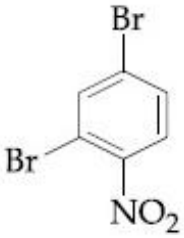
4. A : સેકેરીન; B : એલીટિમ; C : સુક્રાલોઝ; D : એસ્પાર્ટેમ

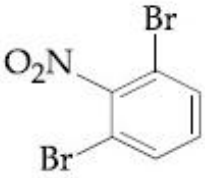
Question Number : 42 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

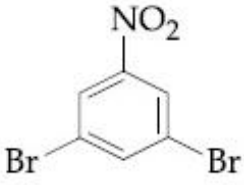
The major product Z obtained in the following reaction scheme is :

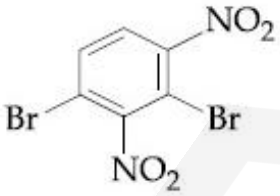


Options :

1. 

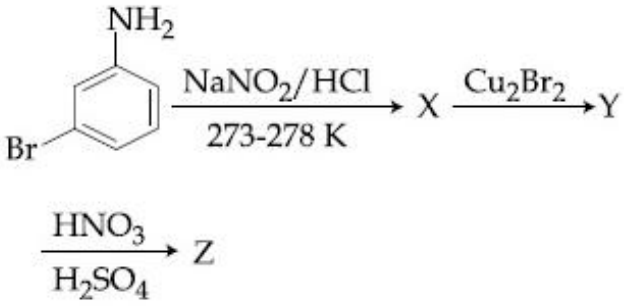
2. 

3. 

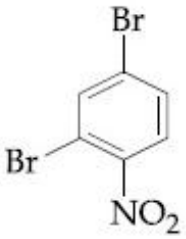
4. 

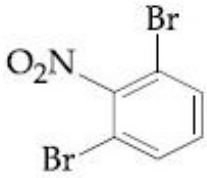
Question Number : 42 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

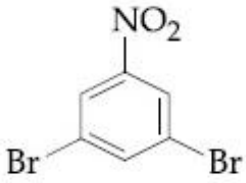
निम्न अभिक्रिया स्कीम में प्राप्त होने वाला मुख्य उत्पाद Z है :

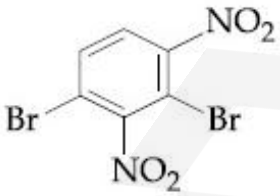


Options :

1. 

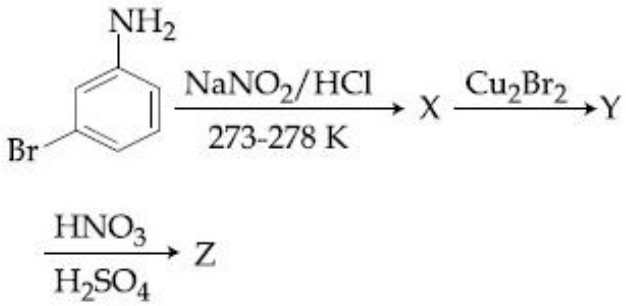
2. 

3. 

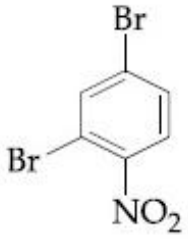
4. 

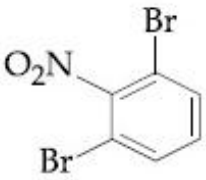
Question Number : 42 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

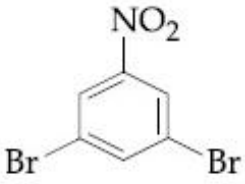
નીચેની પ્રક્રિયામાં મળતી મુખ્ય નીપજ Z શોધો.

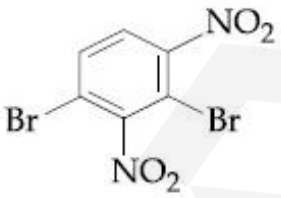


Options :

1. 

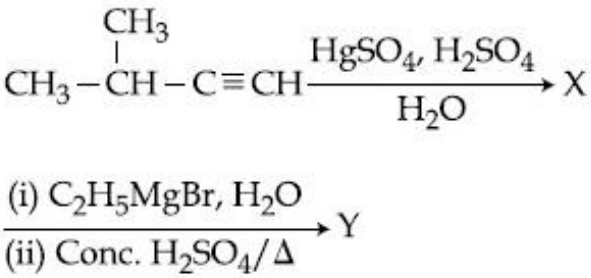
2. 

3. 

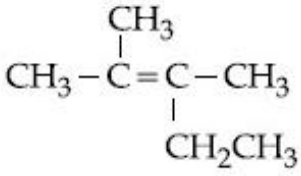
4. 

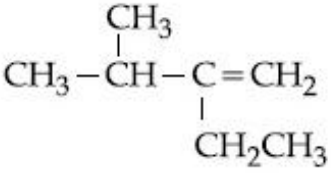
Question Number : 43 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

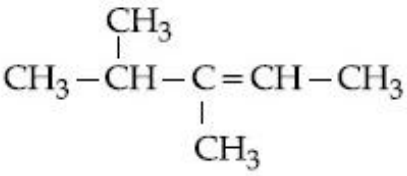
The major product (Y) in the following reactions is :

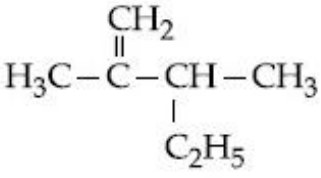


Options :

1.


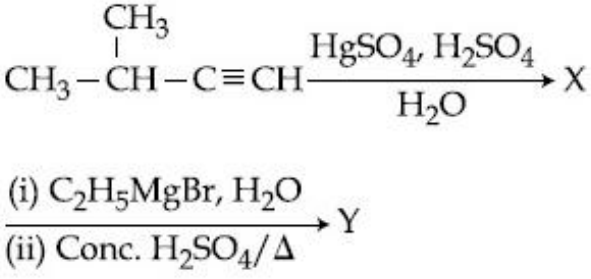
2.


3.


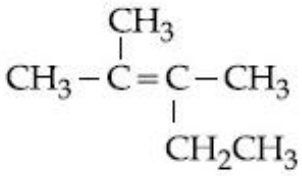
4.


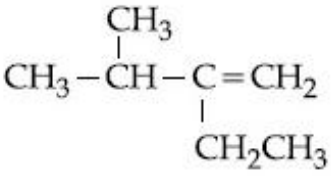
Question Number : 43 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

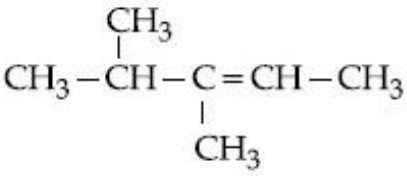
निम्न अभिक्रियाओं में मुख्य उत्पाद (Y) है :

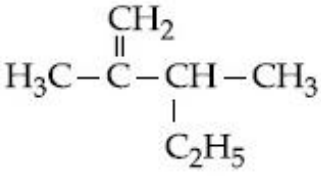


Options :

1. 

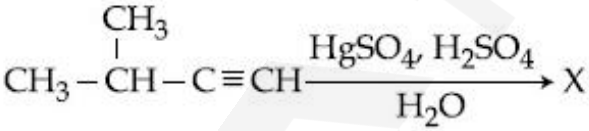
2. 

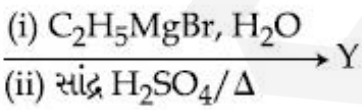
3. 

4. 

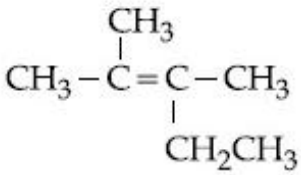
Question Number : 43 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

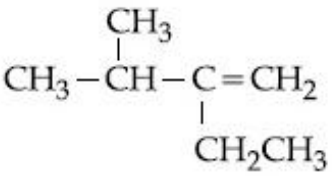
નીચે આપેલ પ્રક્રિયામાં મુખ્ય નીપજ (Y) શોધો :

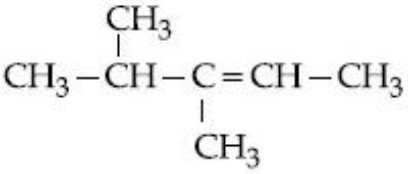


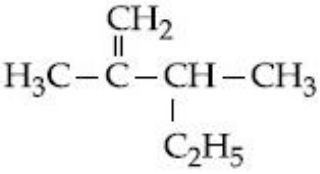


Options :

1. 

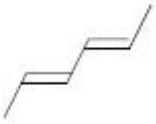
2. 

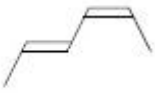
3. 

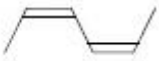
4. 

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

The correct order of heat of combustion for following alkadienes is :

(a) 

(b) 

(c) 

Options :

1. (c) < (b) < (a)

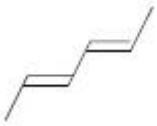
2. (b) < (c) < (a)

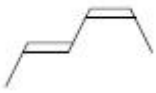
3. (a) < (c) < (b)

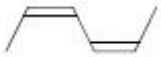
4. (a) < (b) < (c)

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

निम्न ऐल्काडाइन्स के लिए दहन ऊष्मा का सही क्रम है:

(a) 

(b) 

(c) 

Options :

1. (c) < (b) < (a)

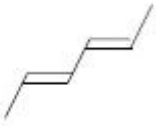
2. (b) < (c) < (a)

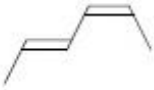
3. (a) < (c) < (b)

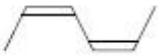
4. (a) < (b) < (c)

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

નીચેના આલ્કાડાઈનસ્ ની દહન ઉષ્માનો સાચો ક્રમ શોધો :

(a) 

(b) 

(c) 

Options :

1. (c) < (b) < (a)

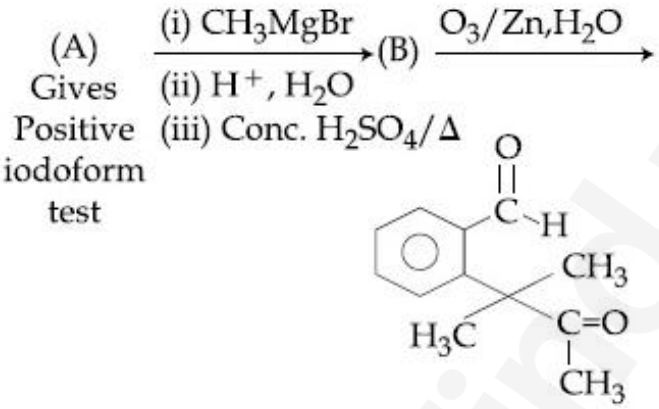
2. (b) < (c) < (a)

3. (a) < (c) < (b)

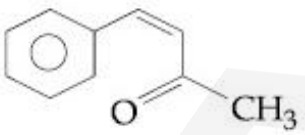
4. (a) < (b) < (c)

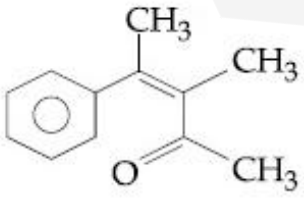
Question Number : 45 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

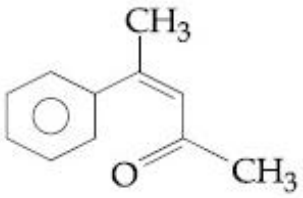
Identify (A) in the following reaction sequence :

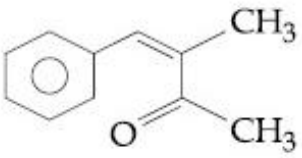


Options :

1. 

2. 

3. 

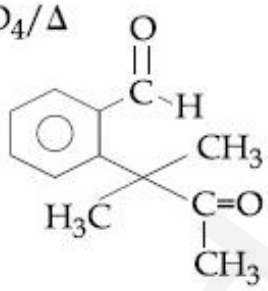
4. 

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

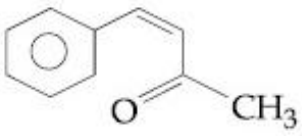
निम्न अभिक्रिया अनुक्रम में (A) की पहचान कीजिए :

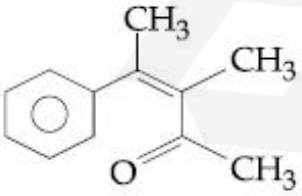
(A) $\xrightarrow[\text{(ii) } H^+, H_2O]{\text{(i) } CH_3MgBr}$ (B) $\xrightarrow[\text{(iii) सान्द्र } H_2SO_4/\Delta]{O_3/Zn, H_2O}$

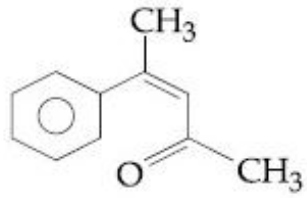
सकारात्मक आइडोफार्म परीक्षण देता है

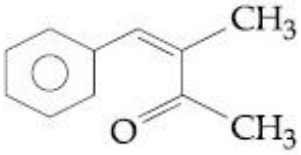


Options :

1. 

2. 

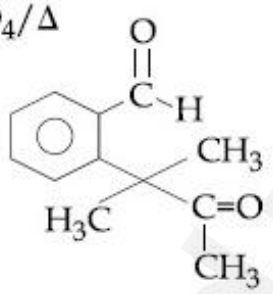
3. 

4. 

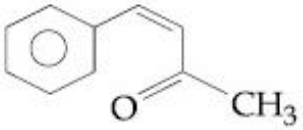
Question Number : 45 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

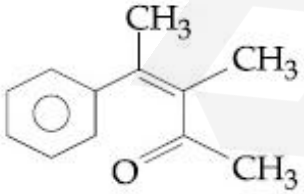
નીચે આપેલ પ્રક્રિયા શ્રેણીમાં (A) ઓળખો :

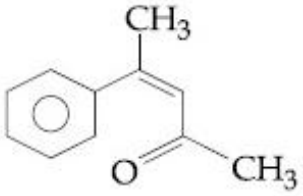
(A) (i) CH_3MgBr → (B) $O_3/Zn,H_2O$ →
હકારાત્મક (ii) H^+, H_2O
આયોડોફોર્મ (iii) સાંદ્ર H_2SO_4/Δ
પ્રક્રિયા આપે છે

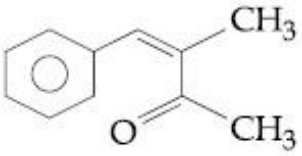


Options :

1. 

2. 

3. 

4. 

Sub-Section Number: 2
Sub-Section Id: 405036125
Question Shuffling Allowed : Yes

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

The molarity of HNO_3 in a sample which has density 1.4 g/mL and mass percentage of 63% is _____. (Molecular Weight of $HNO_3 = 63$)

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
14 to 14

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

उस प्रतिदर्श में, जिसका घनत्व 1.4 g/mL तथा द्रव्यमान प्रतिशतता 63% की हो, HNO_3 की मोलरता होगी _____ (HNO_3 का अणुभार = 63)

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
14 to 14

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

1.4 g/mL ઘનતા અને 63% દળ ટકાવારી ધરાવતા એક નમૂનામાં HNO_3 ની મોલારિટી શું છે _____ (HNO_3 અણુભાર = 63)

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
14 to 14

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

How much amount of NaCl should be added to 600 g of water ($\rho = 1.00$ g/mL) to decrease the freezing point of water to $-0.2°C$? _____. (The freezing point depression constant for water = 2 K kg mol^{-1})

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

600 g पानी ($\rho = 1.00$ g/mL) में NaCl की कितनी मात्रा मिलायी जाय कि उसका हिमांक घटकर $-0.2°C$ हो जाय? _____। (पानी के लिए हिमांक अवनमन स्थिरांक = 2 K kg mol^{-1})

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

પાણીનું ઠારણ બિંદુમાં $-0.2°C$ નો ઘટાડો કરવા માટે NaCl નો કેટલા જથ્થો 600 g પાણીમાં ઉમેરવો પડે _____. ($\rho = 1.00$ g/mL) પાણી માટે ઠારણ બિંદુ અવનયન અચળાંક = 2 K kg mol^{-1})

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

108 g of silver (molar mass 108 g mol^{-1}) is deposited at cathode from $AgNO_3(aq)$ solution by a certain quantity of electricity. The volume (in L) of oxygen gas produced at 273 K and 1 bar pressure from water by the same quantity of electricity is _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
5.66 to 5.68

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

एक निश्चित विद्युत मात्रा द्वारा $AgNO_3$(जलीय) से 108 g सिलवर (मोलर द्रव्यमान 108 g mol^{-1}) कैथोड पर निक्षेपित किया गया। विद्युत की उसी मात्रा द्वारा 273 K तथा 1 बार दाब पर बनायी गई ऑक्सीजन का आयतन (L में) होगा _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
5.66 to 5.68

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

$AgNO_3(aq)$ ના દ્રાવણમાં વિજપ્રવાહ ના ચોક્કસ જથ્થા વડે 108 g સિલ્વર (ચાંદી) (મોલર દળ 108 g mol^{-1}) કેથોડ પર જમા થાય છે. વિજપ્રવાહના એટલાજ જથ્થા વડે 273 K અને 1 bar દબાણે પાણી માંથી ઓક્સિજન વાયુ નું કેટલું કદ (લિટરમાં) ઉત્પન્ન થશે _____.

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

Answers Type: Range
Possible Answers :
5.66 to 5.68

Question Number : 49 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
The hardness of a water sample containing 10^{-3} M $MgSO_4$ expressed as $CaCO_3$ equivalents (in ppm) is _____.
(molar mass of $MgSO_4$ is 120.37 g/mol)

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
100 to 100

Question Number : 49 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
10^{-3} M $MgSO_4$ वाले जल के प्रतिदर्श की कठोरता जिसको $CaCO_3$ समतुल्य (ppm में) अभिव्यक्त किये जाने पर, होगी _____.
($MgSO_4$ का मोलर संहति = 120.37 g/mol)

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
100 to 100

Question Number : 49 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
10^{-3}M $MgSO_4$ ધરાવતા પાણીના એક નમૂનાની કઠીનતા $CaCO_3$ ને તુલ્ય છે તેને ppm માં દર્શાવો _____.
($MgSO_4$ નું મોલર દળ = 120.37 g/mol)

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
100 to 100

Question Number : 50 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
The mass percentage of nitrogen in histamine is _____.

Response Type: Numeric
Evaluation Required For SA: Yes

Show Word Count: Yes
Answers Type: Range
Possible Answers :
37.80 to 38.20

Question Number : 50 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
हिस्टैमिन में नाइट्रोजन की द्रव्यमान प्रतिशतता है _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
37.80 to 38.20

Question Number : 50 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
હિસ્ટામાઈનમાં નાઈટ્રોજનની દળ ટકાવારી શોધો _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
37.80 to 38.20

Mathematics

Section Id :	40503677
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:	405036126
Question Shuffling Allowed :	Yes

Question Number : 51 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1
If for all real triplets (a, b, c), $f(x)=a+bx+cx^2$; then $\int_0^1 f(x)dx$ is equal to :

Options :

1. $\frac{1}{3}\left\{f(0)+f\left(\frac{1}{2}\right)\right\}$

2. $\frac{1}{2}\left\{f(1)+3f\left(\frac{1}{2}\right)\right\}$

3. $2\left\{3f(1)+2f\left(\frac{1}{2}\right)\right\}$

4. $\frac{1}{6}\left\{f(0)+f(1)+4f\left(\frac{1}{2}\right)\right\}$

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

यदि सभी वास्तविक त्रिकों (a, b, c) के लिए,

$f(x)=a+bx+cx^2$ है, तो $\int_0^1 f(x)dx$ बराबर है :

Options :

1. $\frac{1}{3}\left\{f(0)+f\left(\frac{1}{2}\right)\right\}$

2. $\frac{1}{2}\left\{f(1)+3f\left(\frac{1}{2}\right)\right\}$

3. $2\left\{3f(1)+2f\left(\frac{1}{2}\right)\right\}$

4. $\frac{1}{6}\left\{f(0)+f(1)+4f\left(\frac{1}{2}\right)\right\}$

Question Number : 51 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

દરેક વાસ્તવિક ત્રિપુટીઓ (a, b, c) માટે, જો $f(x)=a+bx+cx^2$ હોય, તો $\int_0^1 f(x)dx$ =_____ .

Options :

1. $\frac{1}{3}\left\{f(0)+f\left(\frac{1}{2}\right)\right\}$

2. $\frac{1}{2}\left\{f(1)+3f\left(\frac{1}{2}\right)\right\}$

3. $2\left\{3f(1)+2f\left(\frac{1}{2}\right)\right\}$

4. $\frac{1}{6}\left\{f(0)+f(1)+4f\left(\frac{1}{2}\right)\right\}$

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

The number of real roots of the equation, $e^{4x}+e^{3x}-4e^{2x}+e^{x}+1=0$ is :

Options :

1. 1

2. 2

3. 3

4. 4

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

समीकरण $e^{4x}+e^{3x}-4e^{2x}+e^{x}+1=0$ के
वास्तविक मूलों की संख्या है :

Options :

1. 1

2. 2

3. 3

4. 4

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

સમીકરણ $e^{4x}+e^{3x}-4e^{2x}+e^{x}+1=0$ નાં
વાસ્તવિક બીજની સંખ્યા કેટલી થાય?

Options :

1. 1

2. 2

3. 3

4. 4

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

Let z be a complex number such that

$\left|\frac{z-i}{z+2i}\right|=1$

and $|z|=\frac{5}{2}$. Then the value of $|z+3i|$ is :

Options :

1. $\frac{15}{4}$

2. $2\sqrt{3}$

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

4. $\sqrt{10}$

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

माना z एक ऐसी सम्मिश्र संख्या है, कि $\left|\frac{z-i}{z+2i}\right|=1$

है तथा $|z|=\frac{5}{2}$ है, तो $|z+3i|$ का मान है :

Options :

1. $\frac{15}{4}$

2. $2\sqrt{3}$

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

4. $\sqrt{10}$

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

સંકર સંખ્યા z માટે $\left|\frac{z-i}{z+2i}\right|=1$ અને $|z|=\frac{5}{2}$ થાય છે. તો $|z+3i|$ ની કિંમત _____ છે.

Options :

1. $\frac{15}{4}$

2. $2\sqrt{3}$

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

4. $\sqrt{10}$

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

If the matrices $A=\begin{bmatrix}1 & 1 & 2\\ 1 & 3 & 4\\ 1 & -1 & 3\end{bmatrix}$, $B=\text{adj } A$ and $C=3A$, then $\frac{|\text{adj } B|}{|C|}$ is equal to :

Options :

1. 2

2. 8

3. 16

4. 72

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

यदि आव्यूह $A=\begin{bmatrix}1 & 1 & 2\\ 1 & 3 & 4\\ 1 & -1 & 3\end{bmatrix}$, $B=\text{adj } A$ तथा

$C=3A$ हैं, तो $\frac{|\text{adj } B|}{|C|}$ का मान है:

Options :

1. 2

2. 8

3. 16

4. 72

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

જો શ્રેણીકો $A=\begin{bmatrix}1 & 1 & 2\\ 1 & 3 & 4\\ 1 & -1 & 3\end{bmatrix}$, $B=\text{adj } A$ અને

$C=3A$ હોય, તો $\frac{|\text{adj } B|}{|C|}$ = _____ .

Options :

1. 2

2. 8

3. 16

4. 72

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

If for some α and β in R, the intersection of the following three planes

$x+4y-2z=1$

$x+7y-5z=\beta$

$x+5y+\alpha z=5$

is a line in R^3, then $\alpha+\beta$ is equal to :

Options :

1. -10

2. 0

3. 2

4. 10

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

यदि R में किन्हीं α तथा β के लिए, निम्न तीन समतलों

$x+4y-2z=1$

$x+7y-5z=\beta$

$x+5y+\alpha z=5$

का प्रतिच्छेदन, R^3 में एक रेखा है, तो $\alpha+\beta$ का मान है :

Options :

1. -10

2. 0

3. 2

4. 10

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

જો કોઇક $\alpha, \beta \in R$ માટે ત્રણ સમતલો

$x+4y-2z=1$

$x+7y-5z=\beta$

$x+5y+\alpha z=5$

નો છેદ એ R^3 માં એક રેખા હોય, તો $\alpha+\beta=$_____ .

Options :

1. -10

2. 0

3. 2

4. 10

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

If the number of five digit numbers with distinct digits and 2 at the 10^{th} place is 336 k, then k is equal to :

Options :

1. 8

2. 7

3. 6

4. 4

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

यदि विभिन्न अंकों वाली पाँच अंकों की संख्याओं, जिनका दहाई का अंक 2 है, की संख्या 336 k है, तो k बराबर है :

Options :

1. 8

2. 7

3. 6

4. 4

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

જેનાં દશકનાં સ્થાને 2 આવતો હોય અને બધાજ અંકો ભિન્ન હોય તેવી પાંચ અંકોની સંખ્યાઓની સંખ્યા જો 336 k હોય, તો k=_____ .

Options :

1. 8

2. 7

3. 6

4. 4

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

The product

$2^{\frac{1}{4}} \cdot 4^{\frac{1}{16}} \cdot 8^{\frac{1}{48}} \cdot 16^{\frac{1}{128}} \cdot \ldots$ to ∞

is equal to :

Options :

1. 1

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

3. 2

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

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

गुणनफल $2^{\frac{1}{4}} \cdot 4^{\frac{1}{16}} \cdot 8^{\frac{1}{48}} \cdot 16^{\frac{1}{128}} \cdot \ldots \infty$ तक बराबर है :

Options :

1. 1

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

3. 2

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

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

ગુણાકાર $2^{\frac{1}{4}} \cdot 4^{\frac{1}{16}} \cdot 8^{\frac{1}{48}} \cdot 16^{\frac{1}{128}} \cdot \ldots \infty$ સુધી ની કિંમત કેટલી થાય?

Options :

1. 1

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

3. 2

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

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

If $f(x) = \begin{cases} \dfrac{\sin(a+2)x + \sin x}{x} & ; x < 0 \\ b & ; x = 0 \\ \dfrac{(x+3x^2)^{1/3} - x^{1/3}}{x^{4/3}} & ; x > 0 \end{cases}$

is continuous at $x = 0$, then $a + 2b$ is equal to :

Options :

1. -1

2. 0

3. 1

4. -2

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

यदि $f(x) = \begin{cases} \dfrac{\sin(a+2)x + \sin x}{x} & ; x < 0 \\ b & ; x = 0 \\ \dfrac{(x+3x^2)^{1/3} - x^{1/3}}{x^{4/3}} & ; x > 0 \end{cases}$

$x = 0$ पर संतत है, तो $a + 2b$ का मान है :

Options :

1. -1

2. 0

3. 1

4. -2

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

જો $f(x)=\begin{cases}\dfrac{\sin(a+2)x+\sin x}{x} & ;x<0\\ b & ;x=0\\ \dfrac{(x+3x^2)^{1/3}-x^{1/3}}{x^{4/3}} & ;x>0\end{cases}$

એ $x=0$ આગળ સતત હોય, તો $a+2b$ =_____ .

Options :

1. -1

2. 0

3. 1

4. -2

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

A spherical iron ball of 10 cm radius is coated with a layer of ice of uniform thickness that melts at a rate of $50\,cm^3/min$. When the thickness of ice is 5 cm, then the rate (in cm/min.) at which of the thickness of ice decreases, is :

Options :

1. $\frac{1}{36\pi}$

2. $\frac{5}{6\pi}$

3. $\frac{1}{18\pi}$

4. $\frac{1}{54\pi}$

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

एक 10 cm त्रिज्या वाली गोलाकार लोहे की गेंद को बर्फ की एक समान मोटाई वाली परत से लेप किया गया है, जो कि $50\,cm^3/min$ की दर से पिघलती है। जब बर्फ की परत की मोटाई 5 cm है, उस समय बर्फ की मोटाई के घटने की दर (cm/min में), है :

Options :

1. $\frac{1}{36\pi}$

2. $\frac{5}{6\pi}$

3. $\frac{1}{18\pi}$

4. $\frac{1}{54\pi}$

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

જેની ત્રિજ્યા 10 સે.મી. હોય તેવા લોખંડનાં ગોળાકાર દડાને એકસમાન જાડાઈ રહે તેવી રીતે બરફના સ્તર વડે આવરિત કરવામાં આવેલ છે, જે 50 સે.મી.^{3}/મિનિટ ના દર થી પીગળે છે. જ્યારે બરફની જાડાઈ 5 સે.મી. હોય, ત્યારે બરફની જાડાઇનો ઘટવાનો દર (સે.મી./મિનિટમાં) કેટલે થાય?

Options :

1. $\frac{1}{36\pi}$

2. $\frac{5}{6\pi}$

3. $\frac{1}{18\pi}$

4. $\frac{1}{54\pi}$

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

Let f be any function continuous on [a, b] and twice differentiable on (a, b). If for all $x \in (a, b)$, $f'(x) > 0$ and $f''(x) < 0$, then for any $c \in (a, b)$, $\frac{f(c) - f(a)}{f(b) - f(c)}$ is greater than :

Options :

1. $\frac{b - c}{c - a}$

2. $\frac{c - a}{b - c}$

3. 1

4. $\frac{b + a}{b - a}$

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

माना f कोई फलन है जोकि [a, b] में संतत तथा (a, b) में दो बार अवकलनीय है। यदि सभी $x \in (a, b)$ के लिए $f'(x) > 0$ तथा $f''(x) < 0$ हैं, तो किसी भी $c \in (a, b)$, के लिए $\frac{f(c) - f(a)}{f(b) - f(c)}$ निम्न में से किससे बड़ा है?

Options :

1. $\frac{b - c}{c - a}$

2. $\frac{c - a}{b - c}$

3. 1

4. $\frac{b+a}{b-a}$

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

ધારોકે કોઇ વિધેય f એ [a, b] માં સતત અને (a, b) માં દ્વિ-વિકલનીય છે. જો $x \in (a, b)$ માટે $f'(x) > 0$ અને $f''(x) < 0$ હોય, તો કોઈપણ $c \in (a, b)$, માટે $\frac{f(c)-f(a)}{f(b)-f(c)}$ એ નીચેનામાંથી કોના કરતાં મોટું હોય?

Options :

1. $\frac{b-c}{c-a}$

2. $\frac{c-a}{b-c}$

3. 1

4. $\frac{b+a}{b-a}$

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

If $f'(x)=\tan^{-1}(\sec x+\tan x)$, $-\frac{\pi}{2}<x<\frac{\pi}{2}$, and $f(0)=0$, then $f(1)$ is equal to :

Options :

1. $\frac{\pi - 1}{4}$

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

3. $\frac{\pi + 1}{4}$

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

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

यदि $f'(x) = \tan^{-1}(\sec x + \tan x)$,

$-\frac{\pi}{2} < x < \frac{\pi}{2}$ है तथा $f(0) = 0$ है, तो $f(1)$ का

मान है :

Options :

1. $\frac{\pi - 1}{4}$

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

3. $\frac{\pi + 1}{4}$

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

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

જો $f'(x)=\tan^{-1}(\sec x+\tan x),\ -\frac{\pi}{2}<x<\frac{\pi}{2}$

અને $f(0)=0$ હોય, તો $f(1)=$_____ .

Options :

1. $\frac{\pi-1}{4}$

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

3. $\frac{\pi+1}{4}$

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

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

The integral $\int\frac{dx}{(x+4)^{8/7}(x-3)^{6/7}}$ is equal

to :

(where C is a constant of integration)

Options :

1. $\frac{1}{2}\left(\frac{x-3}{x+4}\right)^{3/7}+C$

2. $\left(\frac{x-3}{x+4}\right)^{1/7}+C$

3. $-\left(\frac{x-3}{x+4}\right)^{-1/7}+C$

4. $-\frac{1}{13}\left(\frac{x-3}{x+4}\right)^{-13/7}+C$

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

समाकल $\int \frac{dx}{(x+4)^{8/7}(x-3)^{6/7}}$ बराबर है :

(जहाँ C एक समाकलन अचर है)

Options :

1. $\frac{1}{2}\left(\frac{x-3}{x+4}\right)^{3/7}+C$

2. $\left(\frac{x-3}{x+4}\right)^{1/7}+C$

3. $-\left(\frac{x-3}{x+4}\right)^{-1/7}+C$

4. $-\frac{1}{13}\left(\frac{x-3}{x+4}\right)^{-13/7}+C$

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

સંકલન $\int \frac{dx}{(x+4)^{8/7}(x-3)^{6/7}}$ ની કિંમત બરાબર

(જ્યાં C એ સંકલનનો અચળાંક છે)

Options :

1. $\frac{1}{2}\left(\frac{x-3}{x+4}\right)^{3/7}+C$

2. $\left(\frac{x-3}{x+4}\right)^{1/7}+C$

3. $-\left(\frac{x-3}{x+4}\right)^{-1/7}+C$

4. $-\frac{1}{13}\left(\frac{x-3}{x+4}\right)^{-13/7}+C$

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

The value of $\int_0^{2\pi} \frac{x\sin^8 x}{\sin^8 x+\cos^8 x}dx$ is equal

to :

Options :

1. 4π

2. 2π

3. $2\pi^2$

4. π^2

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

$\int_0^{2\pi} \frac{x \sin^8 x}{\sin^8 x + \cos^8 x} dx$ का मान है :

Options :

1. 4π

2. 2π

3. $2\pi^2$

4. π^2

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

સંકલન $\int_0^{2\pi} \frac{x \sin^8 x}{\sin^8 x + \cos^8 x} dx$ ની કિંમત _____ થાય.

Options :

1. 4π

2. 2π

3. $2\pi^2$

4. π^2

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

Let C be the centroid of the triangle with vertices $(3, -1)$, $(1, 3)$ and $(2, 4)$. Let P be the point of intersection of the lines $x+3y-1=0$ and $3x-y+1=0$. Then the line passing through the points C and P also passes through the point :

Options :

1. $(7, 6)$

2. $(-9, -7)$

3. $(9, 7)$

4. $(-9, -6)$

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

माना शीर्षों $(3, -1)$, $(1, 3)$ तथा $(2, 4)$ वाले त्रिभुज का केंद्रक C है। माना रेखाओं $x+3y-1=0$ तथा $3x-y+1=0$ का प्रतिच्छेदन बिन्दु P है, तो बिन्दुओं C तथा P से गुजरने वाली रेखा, निम्न में से किस बिन्दु से भी गुजरती है?

Options :

1. $(7, 6)$

2. $(-9, -7)$

3. $(9, 7)$

4. $(-9, -6)$

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

ધારોકે $(3, -1)$, $(1, 3)$ અને $(2, 4)$ શિરોબિંદુઓ વાળા ત્રિકોણનું મધ્યકેન્દ્ર C છે. ધારો કે રેખાઓ $x+3y-1=0$ અને $3x-y+1=0$ નું છેદબિંદુ P છે. તો બિંદુઓ C અને P માંથી પસાર થતી રેખા એ નીચેનાં કયા બિંદુમાંથી પણ પસાર થશે?

Options :

1. $(7, 6)$

2. $(-9, -7)$

3. $(9, 7)$

4. $(-9, -6)$

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

A circle touches the y-axis at the point $(0, 4)$ and passes through the point $(2, 0)$. Which of the following lines is not a tangent to this circle ?

Options :

1. $3x-4y-24=0$

2. $3x+4y-6=0$

3. $4x+3y-8=0$

4. $4x-3y+17=0$

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

एक वृत्त y-अक्ष को बिन्दु $(0, 4)$ पर स्पर्श करता है तथा बिन्दु $(2, 0)$ से होकर जाता है। निम्न में से कौन सी रेखा इस वृत्त की स्पर्श रेखा **नहीं** है?

Options :

1. $3x-4y-24=0$

2. $3x+4y-6=0$

3. $4x+3y-8=0$

4. $4x-3y+17=0$

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

એક વર્તુળ y-અક્ષ ને બિંદુ $(0, 4)$ માં સ્પર્શે છે અને બિંદુ $(2, 0)$ માંથી પસાર થાય છે. તો નીચેના માંથી કઇ રેખા આ વર્તુળનો સ્પર્શક નથી?

Options :

1. $3x-4y-24=0$

2. $3x+4y-6=0$

3. $4x+3y-8=0$

4. $4x-3y+17=0$

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

If e_1 and e_2 are the eccentricities of the ellipse, $\frac{x^2}{18}+\frac{y^2}{4}=1$ and the hyperbola, $\frac{x^2}{9}-\frac{y^2}{4}=1$ respectively and (e_1, e_2) is a point on the ellipse, $15x^2+3y^2=k$, then k is equal to :

Options :

1. 17

2. 16

3. 15

4. 14

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

यदि e_1 तथा e_2 क्रमशः दीर्घवृत्त $\frac{x^2}{18}+\frac{y^2}{4}=1$ तथा अतिपरवलय $\frac{x^2}{9}-\frac{y^2}{4}=1$ की उत्केंद्रताएँ है तथा (e_1, e_2) दीर्घवृत्त $15x^2+3y^2=k$ पर स्थित एक बिन्दु है, तो k का मान है :

Options :

1. 17

2. 16

3. 15

4. 14

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

જો e_1 અને e_2 એ અનુક્રમે ઉપવલય $\frac{x^2}{18} + \frac{y^2}{4} = 1$

અને અતિવલય $\frac{x^2}{9} - \frac{y^2}{4} = 1$ ની ઉત્કેન્દ્રતાઓ હોય,

અને (e_1, e_2) એ ઉપવલય $15x^2 + 3y^2 = k$ પરનું બિંદુ

હોય, તો $k =$ _____ .

Options :

1. 17

2. 16

3. 15

4. 14

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

In a box, there are 20 cards, out of which 10 are labelled as A and the remaining 10 are labelled as B. Cards are drawn at random, one after the other and with replacement, till a second A-card is obtained. The probability that the second A-card appears before the third B-card is :

Options :

1. $\frac{15}{16}$

2. $\frac{13}{16}$

3. $\frac{11}{16}$

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

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

एक बक्से में 20 कार्ड हैं जिनमें से 10 पर A अंकित किया गया है तथा शेष 10 पर B अंकित किया गया है। बक्से में से यादृच्छया एक के बाद एक (प्रतिस्थापना सहित) कार्ड तब तक निकाले गए जब तक कि दूसरा A से अंकित कार्ड न आ जाए। दूसरे A से अंकित कार्ड के तीसरे B से अंकित कार्ड से पहले आने की प्रायिकता है :

Options :

1. $\frac{15}{16}$

2. $\frac{13}{16}$

3. $\frac{11}{16}$

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

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

એક ખોખામાં 20 પત્તાઓ છે, જેમાંથી 10 ને A વડે અંકિત કરવામાં આવ્યા છે અને બાકીનાં 10 ને B વડે અંકિત કરવામાં આવ્યા છે. જ્યાં સુધી બીજી વખત પત્તું A ન આવે ત્યાં સુધી એક પછી એક પત્તા પુરવણી સહિત યાદચ્છિક રીતે ખેંચવામાં આવે છે. તો ત્રીજી વખત પત્તું B આવે તે પહેલાં બીજી વખત પત્તું A આવે તેની સંભાવના કેટલી થાય?

Options :

1. $\frac{15}{16}$

2. $\frac{13}{16}$

3. $\frac{11}{16}$

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

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

Let the observations $x_i(1 \le i \le 10)$ satisfy the equations, $\sum_{i=1}^{10}(x_i - 5) = 10$ and $\sum_{i=1}^{10}(x_i - 5)^2 = 40$. If μ and λ are the mean and the variance of the observations, $x_1 - 3, x_2 - 3, ..., x_{10} - 3$, then the ordered pair (μ, λ) is equal to :

Options :

1. $(6, 6)$

2. $(3, 6)$

3. $(6, 3)$

4. $(3, 3)$

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

माना प्रेक्षण $x_i(1 \le i \le 10)$ समीकरणों $\sum_{i=1}^{10}(x_i - 5) = 10$ तथा $\sum_{i=1}^{10}(x_i - 5)^2 = 40$ को संतुष्ट करते हैं। यदि μ तथा λ, प्रेक्षणों $x_1 - 3, x_2 - 3, ..., x_{10} - 3$ के क्रमश: माध्य तथा प्रसरण हैं, तो क्रमित युग्म (μ, λ) बराबर है :

Options :

1. $(6, 6)$

2. $(3, 6)$

3. $(6, 3)$

4. $(3, 3)$

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

ધારો કે અવલોકનો $x_i (1 \le i \le 10)$ એ સમીકરણો

$\sum_{i=1}^{10} (x_i - 5) = 10$ અને $\sum_{i=1}^{10} (x_i - 5)^2 = 40$ નું

સમાધાન કરે છે. જો μ અને λ એ અવલોકનો $x_1 - 3$, $x_2 - 3, \ldots, x_{10} - 3$ નાં અનુક્રમે મધ્યક અને વિચરણ હોય, તો ક્રમયુક્ત જોડ (μ, λ) બરાબર :

Options :

1. $(6, 6)$

2. $(3, 6)$

3. $(6, 3)$

4. $(3, 3)$

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

The value of

$$\cos^3\left(\frac{\pi}{8}\right) \cdot \cos\left(\frac{3\pi}{8}\right) + \sin^3\left(\frac{\pi}{8}\right) \cdot \sin\left(\frac{3\pi}{8}\right)$$

is :

Options :

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

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

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

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

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

$\cos^3\left(\frac{\pi}{8}\right) \cdot \cos\left(\frac{3\pi}{8}\right) + \sin^3\left(\frac{\pi}{8}\right) \cdot \sin\left(\frac{3\pi}{8}\right)$

का मान है :

Options :

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

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

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

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

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

$\cos^3\left(\frac{\pi}{8}\right)\cdot\cos\left(\frac{3\pi}{8}\right)+\sin^3\left(\frac{\pi}{8}\right)\cdot\sin\left(\frac{3\pi}{8}\right)$

નું મૂલ્ય કેટલું થાય?

Options :

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

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

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

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

Question Number : 70 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Negation of the statement :

'$\sqrt{5}$ is an integer or 5 is irrational' is :

Options :

1. $\sqrt{5}$ is irrational or 5 is an integer.

2. $\sqrt{5}$ is not an integer or 5 is not irrational.

3. $\sqrt{5}$ is not an integer and 5 is not irrational.

4. $\sqrt{5}$ is an integer and 5 is irrational.

Question Number : 70 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

कथन,

'$\sqrt{5}$ एक पूर्णांक है या 5 अपरिमेय है' का निषेधन है :

Options :

1. $\sqrt{5}$ अपरिमेय है या 5 एक पूर्णांक है।

2. $\sqrt{5}$ एक पूर्णांक नहीं है या 5 अपरिमेय नहीं है।

3. $\sqrt{5}$ एक पूर्णांक नहीं है और 5 अपरिमेय नहीं है।

4. $\sqrt{5}$ एक पूर्णांक है और 5 अपरिमेय है।

Question Number : 70 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

વિધાન

'$\sqrt{5}$ એ પૂર્ણાંક સંખ્યા છે અથવા 5 એ અસંમેય સંખ્યા છે' નું નિષેધ શું થાય?

Options :

1. $\sqrt{5}$ એ અસંમેય સંખ્યા છે અથવા 5 એ પૂર્ણાંક સંખ્યા છે.

2. $\sqrt{5}$ એ પૂર્ણાંક સંખ્યા નથી અથવા 5 એ અસંમેય સંખ્યા નથી.

3. $\sqrt{5}$ એ પૂર્ણાંક સંખ્યા નથી અને 5 એ અસંમેય સંખ્યા નથી.

4. $\sqrt{5}$ એ પૂર્ણાંક સંખ્યા છે અને 5 એ અસંમેય સંખ્યા છે.

Sub-Section Number: 2
Sub-Section Id: 405036127
Question Shuffling Allowed : Yes

Question Number : 71 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The coefficient of x^4 in the expansion of $(1+x+x^2)^{10}$ is _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
615 to 615

Question Number : 71 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

$(1+x+x^2)^{10}$ के प्रसार में x^4 का गुणांक है _____।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
615 to 615

Question Number : 71 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

$(1+x+x^2)^{10}$ નાં વિસ્તરણમાં x^4 નો સહગુણક _____છે.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
615 to 615

Question Number : 72 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The number of distinct solutions of the equation, $\log_{\frac{1}{2}}|\sin x| = 2 - \log_{\frac{1}{2}}|\cos x|$ in the interval $[0, 2\pi]$, is _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
8 to 8

Question Number : 72 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

समीकरण $\log_{\frac{1}{2}}|\sin x| = 2 - \log_{\frac{1}{2}}|\cos x|$ के अंतराल $[0, 2\pi]$ में भिन्न हलों की संख्या है _____।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
8 to 8

Question Number : 72 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

અંતરાલ $[0, 2\pi]$ માં સમીકરણ $\log_{\frac{1}{2}}|\sin x| = 2 - \log_{\frac{1}{2}}|\cos x|$ નાં ભિન્ન ઉકેલો ની સંખ્યા _____ છે.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
8 to 8

Question Number : 73 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

If the vectors, $\vec{p} = (a+1)\hat{i} + a\hat{j} + a\hat{k}$,

$\vec{q} = a\hat{i} + (a+1)\hat{j} + a\hat{k}$ and

$\vec{r} = a\hat{i} + a\hat{j} + (a+1)\hat{k}$ $(a \in R)$ are

coplanar and $3\left(\vec{p} \cdot \vec{q}\right)^2 - \lambda\left|\vec{r} \times \vec{q}\right|^2 = 0$,

then the value of λ is _____.

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

Question Number : 73 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

यदि सदिश $\vec{p} = (a+1)\hat{i} + a\hat{j} + a\hat{k}$,

$\vec{q} = a\hat{i} + (a+1)\hat{j} + a\hat{k}$ तथा

$\vec{r} = a\hat{i} + a\hat{j} + (a+1)\hat{k}$, $(a \in R)$ सहतलीय

हैं तथा $3\left(\vec{p} \cdot \vec{q}\right)^2 - \lambda\left|\vec{r} \times \vec{q}\right|^2 = 0$ है, तो λ

का मान है _____।

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

Question Number : 73 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

જો સદિશો $\vec{p} = (a+1)\hat{i} + a\hat{j} + a\hat{k}$,

$\vec{q} = a\hat{i} + (a+1)\hat{j} + a\hat{k}$ અને

$\vec{r} = a\hat{i} + a\hat{j} + (a+1)\hat{k}$, $(a \in R)$ સમતલીય

હોય, અને $3\left(\vec{p} \cdot \vec{q}\right)^2 - \lambda\left|\vec{r} \times \vec{q}\right|^2 = 0$ હોય,

તો λ ની કિંમત _____ થાય.

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

Answers Type: Range
Possible Answers :
1 to 1

Question Number : 74 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

If for $x \geq 0$, $y = y(x)$ is the solution of the differential equation,

$(x+1)dy = ((x+1)^2 + y - 3)dx$, $y(2) = 0$,

then $y(3)$ is equal to _____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
3 to 3

Question Number : 74 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

यदि $x \geq 0$ के लिए $y = y(x)$, अवकल समीकरण $(x+1)dy = ((x+1)^2 + y - 3)dx$, $y(2) = 0$, का हल है, तो $y(3)$ का मान है _____।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
3 to 3

Question Number : 74 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

જો $x \geq 0$ માટે $y = y(x)$ એ વિકલ સમીકરણ $(x+1)dy = ((x+1)^2 + y - 3)dx$, $y(2) = 0$ નો ઉકેલ હોય, તો $y(3)$=_____.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
3 to 3

Question Number : 75 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The projection of the line segment joining the points $(1, -1, 3)$ and $(2, -4, 11)$ on the line joining the points $(-1, 2, 3)$ and $(3, -2, 10)$ is _____.

Response Type: Numeric
Evaluation Required For SA: Yes

Show Word Count: Yes
Answers Type: Range
Possible Answers :
8 to 8

Question Number : 75 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

बिंदुओं $(1, -1, 3)$ तथा $(2, -4, 11)$ को मिलाने वाले रेखाखण्ड का बिंदुओं $(-1, 2, 3)$ तथा $(3, -2, 10)$ को मिलाने वाली रेखा पर प्रक्षेप है _____।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
8 to 8

Question Number : 75 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

બિંદુઓ $(1, -1, 3)$ અને $(2, -4, 11)$ ને જોડતા રેખાખંડ નો બિંદુઓ $(-1, 2, 3)$ અને $(3, -2, 10)$ જોડતી રેખા પરનો પ્રક્ષેપ _____ થાય.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :
8 to 8