

National Testing Agency

Question Paper Name: BTECH 8th Jan 2020 Shift 1
Subject Name: BTECH
Creation Date: 2020-01-08 15:09:15
Duration: 180
Total Marks: 300
Display Marks: Yes

BTECH

Group Number : 1
Group Id : 40503618
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 : 40503657
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: 40503686
Question Shuffling Allowed : Yes

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

The dimension of stopping potential V_0 in photoelectric effect in units of Planck's constant 'h', speed of light 'c' and Gravitational constant 'G' and ampere A is :

1. $h^2 G^{3/2} c^{1/3} A^{-1}$

2. $h^{1/3} G^{2/3} c^{1/3} A^{-1}$

3. $h^{2/3} c^{5/3} G^{1/3} A^{-1}$

4. $h^{-2/3} c^{-1/3} G^{4/3} A^{-1}$

Question Number : 1 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

प्रकाश विद्युत प्रभाव में निरोधी विभव V_0 (stopping potential) की विमाएँ प्लांक स्थिरांक 'h', प्रकाश की गति 'c' और गुरुत्वाकर्षण स्थिरांक 'G', तथा एम्पीयर A में निम्न में से किससे व्यक्त होगा ?

Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.

Options :

1. $h^2 G^{3/2} c^{1/3} A^{-1}$

2. $h^{1/3} G^{2/3} c^{1/3} A^{-1}$

3. $h^{2/3} c^{5/3} G^{1/3} A^{-1}$

4. $h^{-2/3} c^{-1/3} G^{4/3} A^{-1}$

Question Number : 1 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

ફોટોઇલેક્ટ્રિક અસરમાં સ્ટોપિંગ પોટેન્શીયલ V_0 નું પરિમાણ
પ્લાન્ક અચળાંક 'h', પ્રકાશની ઝડપ 'c' ગુરુત્વાકર્ષણ

Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.

Options :

1. $h^2 G^{3/2} c^{1/3} A^{-1}$

2. $h^{1/3} G^{2/3} c^{1/3} A^{-1}$

3. $h^{2/3} c^{5/3} G^{1/3} A^{-1}$

4. $h^{-2/3} c^{-1/3} G^{4/3} A^{-1}$

Question Number : 2 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

A particle of mass m is fixed to one end of a light spring having force constant k and unstretched length l . The other end is fixed.

The system is given an angular speed ω about the fixed end of the spring such that it rotates in a circle in gravity free space.

Then the stretch in the spring is :

Options :

1. $\frac{ml\omega^2}{k + m\omega^2}$

2. $\frac{ml\omega^2}{k - m\omega^2}$

3. $\frac{ml\omega^2}{k + m\omega}$

4. $\frac{ml\omega^2}{k - \omega m}$

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

m द्रव्यमान का एक कण बल स्थिरांक k एवं अतानित लम्बाई l वाली एक हल्की कमानी (spring) के एक छोर से जुड़ा हुआ है। कमानी का दूसरा छोर बद्ध है। इस निकाय को कोणीय गति ω देकर कमानी के बद्धछोर के चारों ओर घुमाया जाता है और यह कण गुरुत्वाकर्षण मुक्त क्षेत्र में एक वृत्त में घूमने लगता है। इस स्थिति में कमानी में होने वाला खिंचाव है :

Options :

1. $\frac{ml\omega^2}{k + m\omega^2}$

2. $\frac{ml\omega^2}{k - m\omega^2}$

3. $\frac{ml\omega^2}{k + m\omega}$

4. $\frac{ml\omega^2}{k - \omega m}$

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

એક m દળ ધરાવતો કણ k જેટલો દળ અચળાંક અને l જેટલી ખેંચાણમુક્ત લંબાઈ ધરાવતી હલકી સ્પ્રિંગના એક છેડા આગળ જડવામાં આવેલ છે. બીજો છેડો જડિત છે. આ તંત્રને સ્પ્રિંગના બીજા છેડાને કરતે એવી રીતે કોણીય ઝડપ ω આપવામાં આવે છે કે જેથી તે ગુરૂત્વાકર્ષણ થી મુક્ત અવકાશમાં વર્તુળાકાર ગતિ કરે, તો સ્પ્રિંગમાં ઉત્પન્ન વિકૃતિ (ખેંચાણ) _____ થશે.

Options :

1. $\frac{ml\omega^2}{k+m\omega^2}$

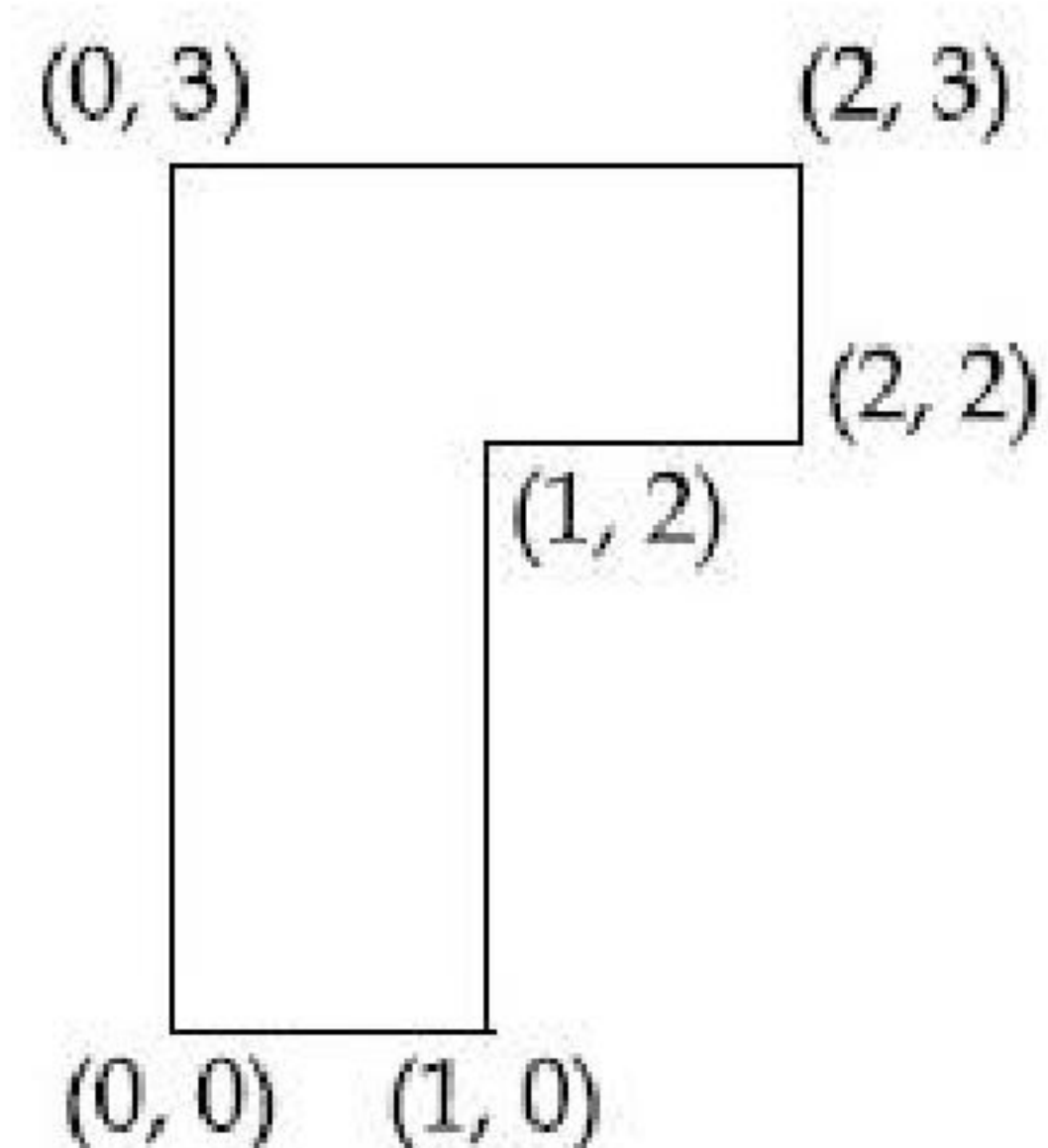
2. $\frac{ml\omega^2}{k-m\omega^2}$

3. $\frac{ml\omega^2}{k+m\omega}$

4. $\frac{ml\omega^2}{k-\omega m}$

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

The coordinates of centre of mass of a uniform flag shaped lamina (thin flat plate) of mass 4 kg. (The coordinates of the same are shown in figure) are :

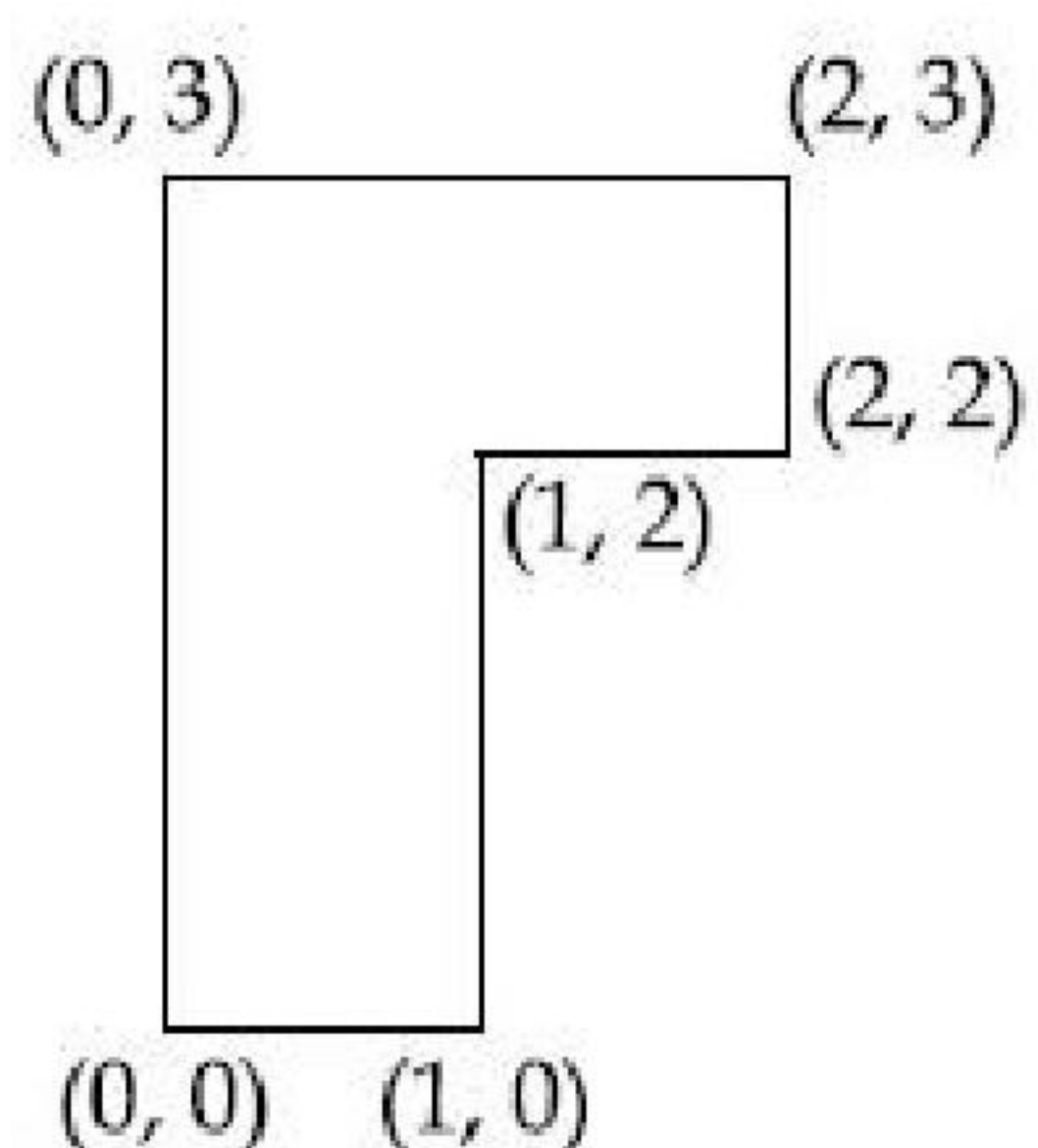


Options :

1. (0.75 m, 1.75 m)
2. (0.75 m, 0.75 m)
3. (1 m, 1.75 m)
4. (1.25 m, 1.50 m)

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

चित्र में दिखाये गये झण्डे के आकार के 4 kg द्रव्यमान वाले एक समतल एकसमान प्लेट के संहति केन्द्र के निर्देशक बिन्दु होंगे :



Options :

1. (0.75 m, 1.75 m)

2. (0.75 m, 0.75 m)

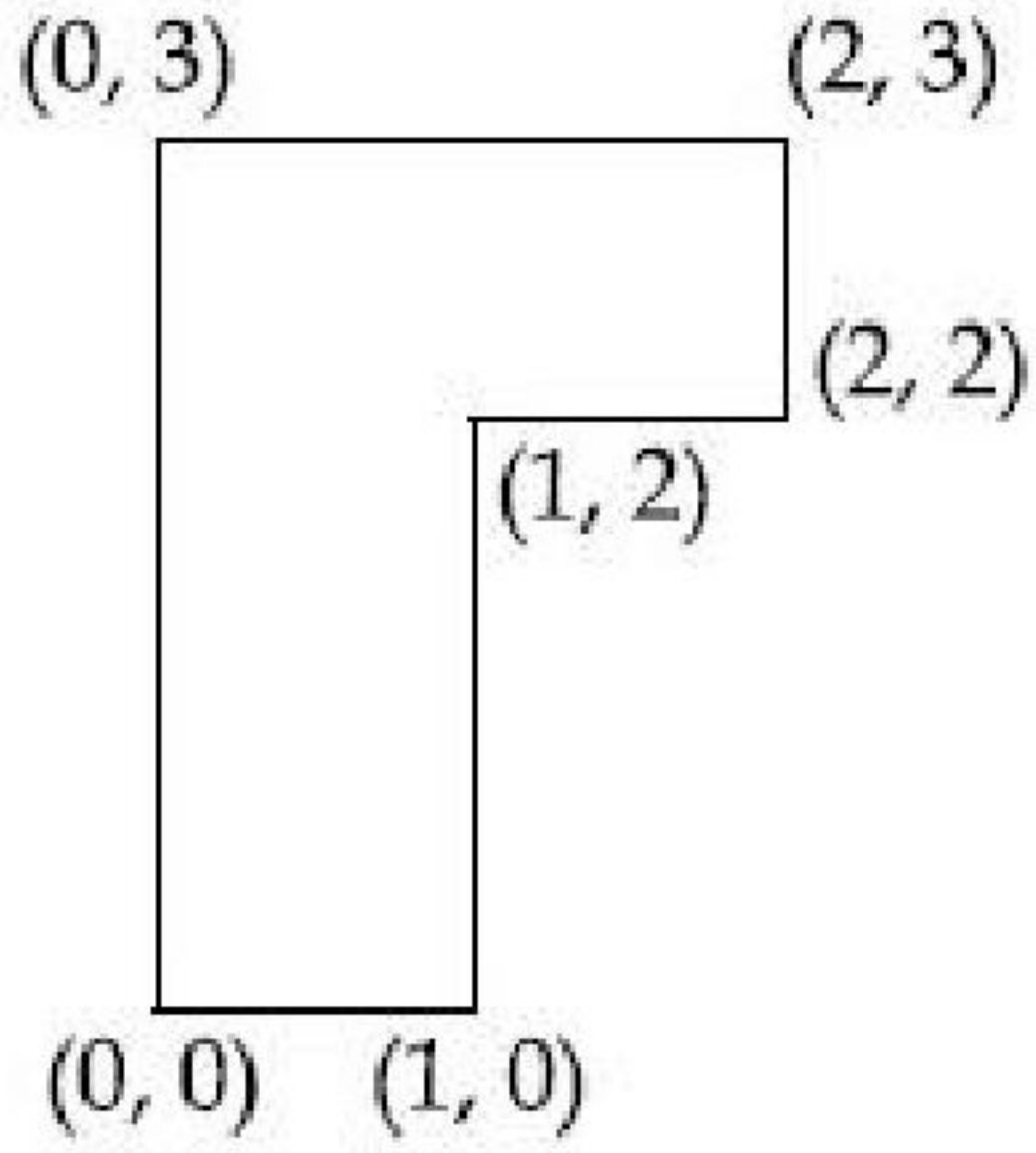
3. (1 m, 1.75 m)

4. (1.25 m, 1.50 m)

Question Number : 3 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

એક સમાન, ઝંડા (flag) આકારના અને 4 kg દળના પટલ (પાતળી સપાટ તકિત) ના દ્રવ્યમાન કેન્દ્રના ચામો _____ છે. (આકૃતિમાં પટલ ના પરિમાણ દર્શાવેલ છે)



Options :

1. (0.75 m, 1.75 m)

2. (0.75 m, 0.75 m)

3. (1 m, 1.75 m)

4. (1.25 m, 1.50 m)

Question Number : 4 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Consider a uniform rod of mass $M = 4m$ and length l pivoted about its centre. A mass m moving with velocity v making

angle $\theta = \frac{\pi}{4}$ to the rod's long axis collides with one end of the rod and sticks to it. The angular speed of the rod-mass system just after the collision is :

Options :

1. $\frac{3}{7} \frac{v}{l}$

2. $\frac{3}{7\sqrt{2}} \frac{v}{l}$

3. $\frac{3\sqrt{2}}{7} \frac{v}{l}$

4. $\frac{4}{7} \frac{v}{l}$

Question Number : 4 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

द्रव्यमान $M = 4m$ तथा l लम्बाई की एकसमान छड़ के केन्द्र पर धुराग्रस्त (pivoted) है। v गति से चलता हुआ m द्रव्यमान का एक कण, छड़ के लम्बे अक्ष से

$\theta = \frac{\pi}{4}$ कोण बनाता हुआ छड़ के एक सिरे से टकराता

है और इससे चिपक जाता है। छड़-कण निकाय की टक्कर के बाद कोणीय गति होगी :

1. $\frac{3}{7} \frac{v}{l}$

2. $\frac{3}{7\sqrt{2}} \frac{v}{l}$

3. $\frac{3\sqrt{2}}{7} \frac{v}{l}$

4. $\frac{4}{7} \frac{v}{l}$

Question Number : 4 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

એક $M = 4m$ દળ ધરાવતા અને l લંબાઈના એકસમાન સળિયાને તેના કેન્દ્રથી કિલકિત (ટકેવલે) કરેલ છે. એક m દળનો અને v જેટલા વેગથી ગતિ કરતો કણ સળિયાની

લંબાઈને અનુરૂપ અક્ષ સાથે $\theta = \frac{\pi}{4}$ નો કોણ બનાવે તે રીતે સળિયાના એક છેડા સાથે સંઘાત (અથડામણ) અનુભવે છે અને તેને ચોંટી જાય છે. આ અથડામણ બાદ તુરંત જ સળિયા-દળ સંયુક્ત તંત્રની કોણીય ઝડપ _____ છે.

Options :

1. $\frac{3}{7} \frac{v}{l}$

2. $\frac{3}{7\sqrt{2}} \frac{v}{l}$

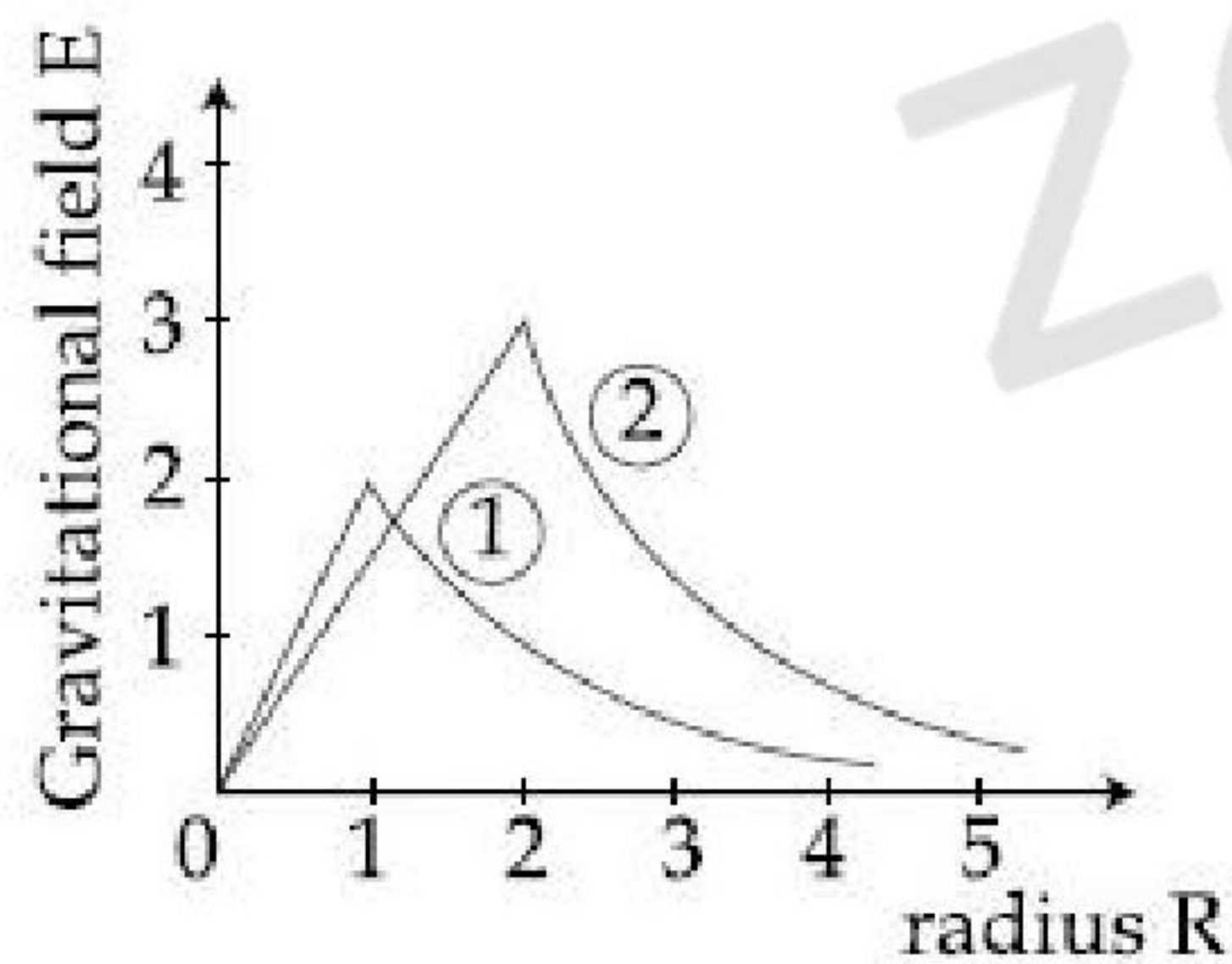
3. $\frac{3\sqrt{2}}{7} \frac{v}{l}$

4. $\frac{4}{7} \frac{v}{l}$

Question Number : 5 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Consider two solid spheres of radii $R_1 = 1\text{m}$, $R_2 = 2\text{m}$ and masses M_1 and M_2 , respectively. The gravitational field due to sphere ① and ② are shown. The value of $\frac{M_1}{M_2}$ is :



Options :

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

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

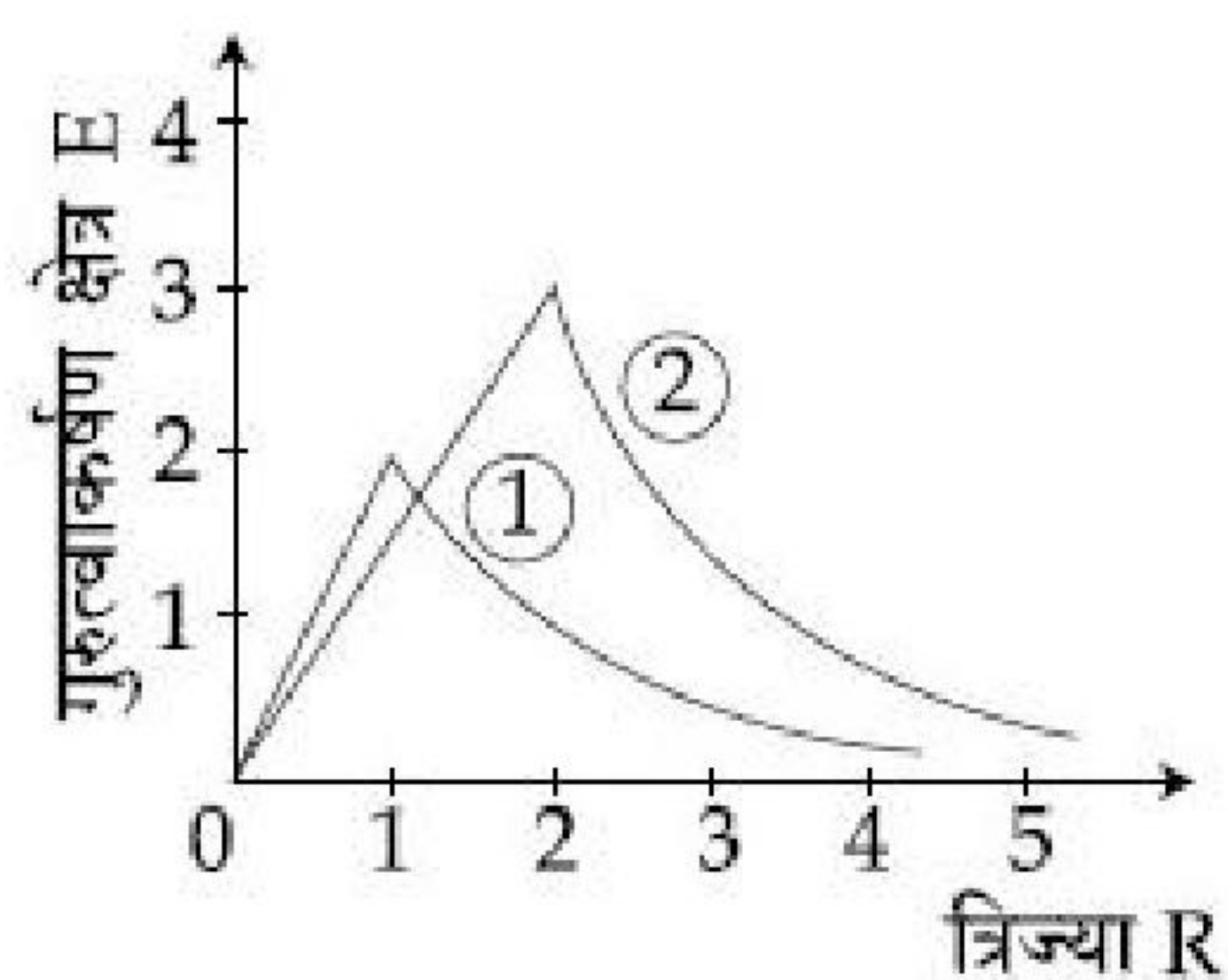
3. $\frac{1}{2}$

Question Number : 5 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

दो ठोस गोले जिनकी त्रिज्याएँ $R_1 = 1\text{m}$ और $R_2 = 2\text{m}$ है और जिनके द्रव्यमान क्रमशः M_1 और M_2 है, को संज्ञान में लें। गोले ① एवं ② द्वारा जनित गुरुत्वाकर्षण क्षेत्र चित्र में दिखाये गये हैं। तब

$\frac{M_1}{M_2}$ का मान है :



Options :

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

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

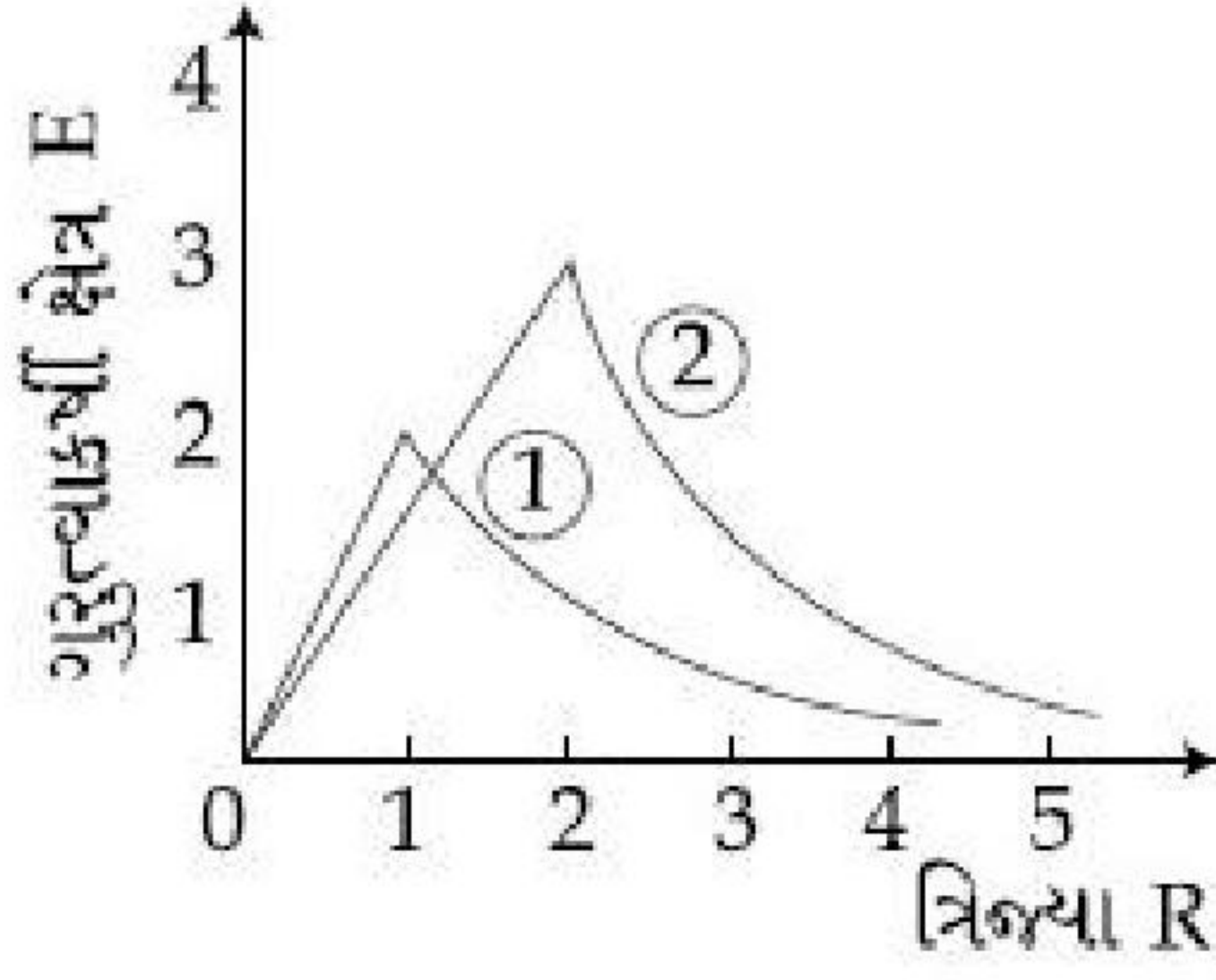
3. $\frac{1}{2}$

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

Question Number : 5 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

અનુક્રમે ત્રિજ્યાઓ $R_1 = 1\text{m}$ અને $R_2 = 2\text{m}$ અને દળો M_1 અને M_2 ધરાવતા બે ઘન ગોળાઓ ધ્યાનમાં લો. ગોળા ① અને ② ને કારણે મળતા ગુરુત્વાકર્ષી ક્ષેત્ર ને દર્શાવેલ છે. $\frac{M_1}{M_2}$ નું મૂલ્ય _____ છે.



Options :

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

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

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

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

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

Consider a solid sphere of radius R and

mass density $\rho(r) = \rho_0 \left(1 - \frac{r^2}{R^2} \right),$

$0 \leq r \leq R$. The minimum density of a liquid

1. $\frac{\rho_0}{5}$

2. $\frac{\rho_0}{3}$

3. $\frac{2\rho_0}{5}$

4. $\frac{2\rho_0}{3}$

Question Number : 6 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

एक ठोस गोले की त्रिज्या R है और इसका घनत्व

$$\rho(r) = \rho_0 \left(1 - \frac{r^2}{R^2} \right), 0 < r \leq R \text{ है। जिस द्रव में}$$

यह प्लवन (तैर) कर सके उस द्रव का न्यूनतम घनत्व होगा :

Options :

1. $\frac{\rho_0}{5}$

2. $\frac{\rho_0}{3}$

3. $\frac{2\rho_0}{5}$

4. $\frac{2\rho_0}{3}$

Question Number : 6 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

R ત્રિજ્યાના અને $\rho(r) = \rho_0 \left(1 - \frac{r^2}{R^2} \right), 0 < r \leq R,$

ઘનતા ધરાવતા એક ઘન ગોળાને ધ્યાનમાં લો. આ ગોળો તરીકે તે માટે પ્રાવહીની લઘુત્તમ ઘનતા _____ છે.

Options :

1. $\frac{\rho_0}{5}$

2. $\frac{\rho_0}{3}$

3. $\frac{2\rho_0}{5}$

4. $\frac{2\rho_0}{3}$

Question Number : 7 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

A leak proof cylinder of length 1 m, made of a metal which has very low coefficient of expansion is floating vertically in water at 0°C such that its height above the water surface is 20 cm. When the temperature of water is increased to 4°C , the height of the cylinder above the water surface becomes 21 cm. The density of water at $T = 4^\circ\text{C}$, relative to the density at $T = 0^\circ\text{C}$ is close to :

Options :

2. 1.01

3. 1.26

4. 1.03

Question Number : 7 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

एक लीक प्रूफ 1 m लम्बा बेलनाकार बर्तन एक ऐसी धातु का बना हुआ है जिसका प्रसार गुणांक नगण्य है। यह सीधा होकर 0°C तापमान के पानी में तैर रहा है और इसकी लम्बाई का 20 cm भाग पानी के बाहर है। जब पानी का तापमान 4°C तक बढ़ा दिया जाता है तो इसके बाहर रहने वाले भाग की लम्बाई 21 cm हो जाती है। तब 0°C के सापेक्ष 4°C पर पानी का घनत्व निम्न में से किसके निकट है?

Options :

1. 1.04

2. 1.01

3. 1.26

4. 1.03

Question Number : 7 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

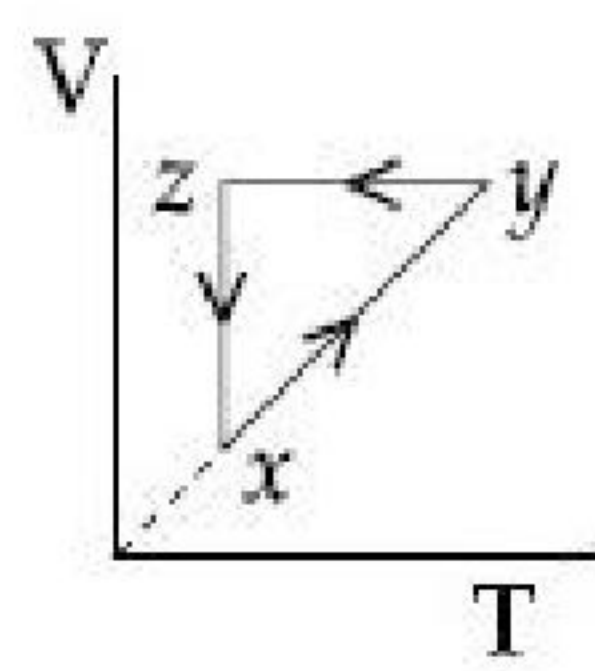
એક ખૂબ નાના પ્રસરણાંક ધરાવતી ધાતુમાંથી બનેલી અને ક્ષરણ-રહિત (leak proof) નળાકારની લંબાઈ 1 m છે, કે જે 0°C તાપમાને રહેલ પાણીમાં ડિબો એવી રીતે તરે છે કે જેથી તેનો, 20 cm ભાગ પાણીની સપાટીની ઉપર રહે. જ્યારે પાણીનું તાપમાન વધારીને 4°C કરવામાં આવે છે ત્યારે પાણીની સપાટીની બહાર રહેલા નળાકારનો ભાગ 21 cm થાય છે. $T = 0^{\circ}\text{C}$ તાપમાનની સરખામણીમાં $T = 4^{\circ}\text{C}$ તાપમાને પાણીની ઘનતા _____ ની નજીક હશે.

Options :

1. 1.04
2. 1.01
3. 1.26
4. 1.03

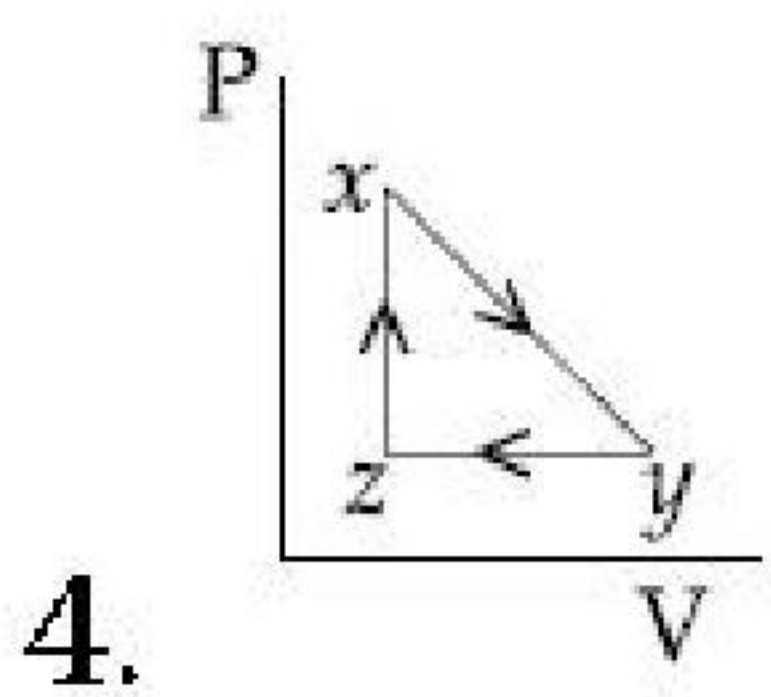
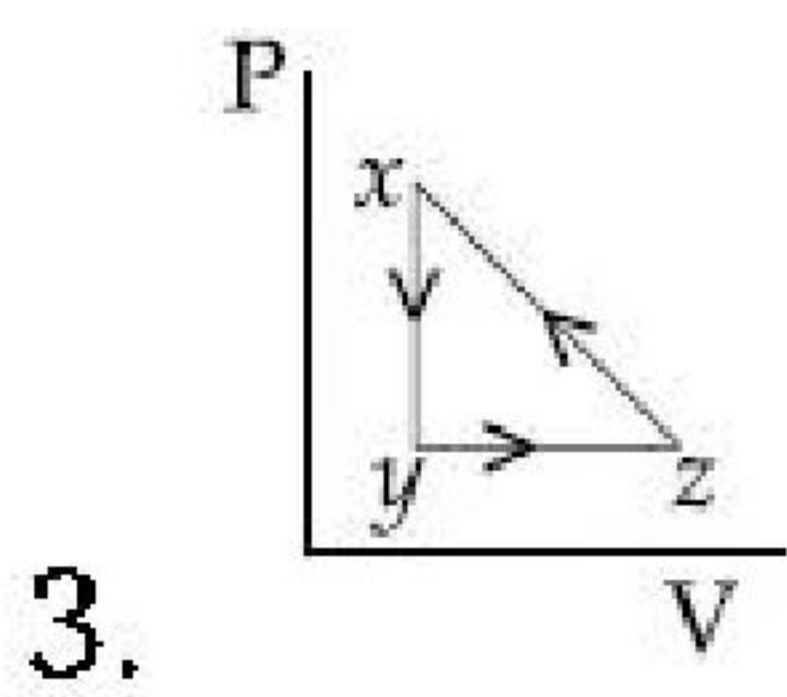
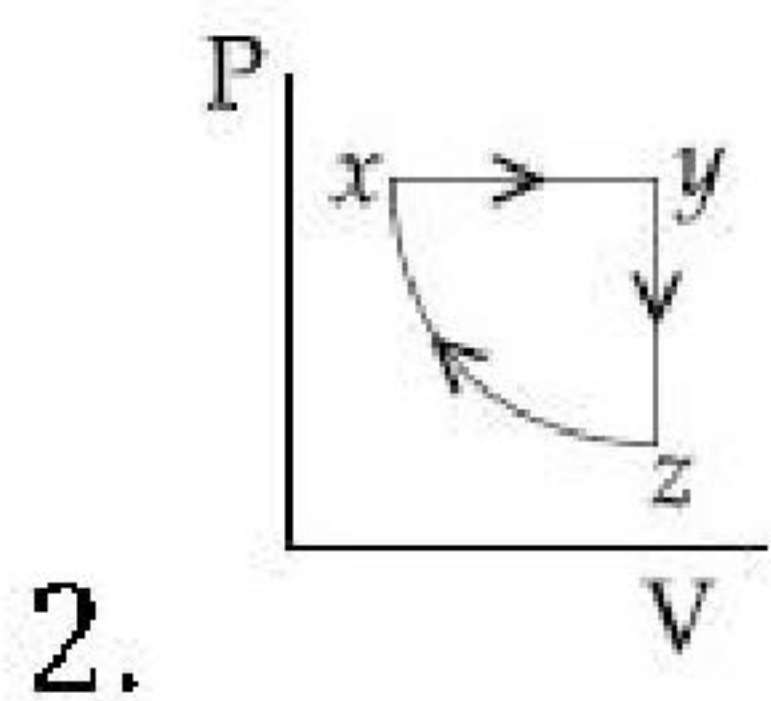
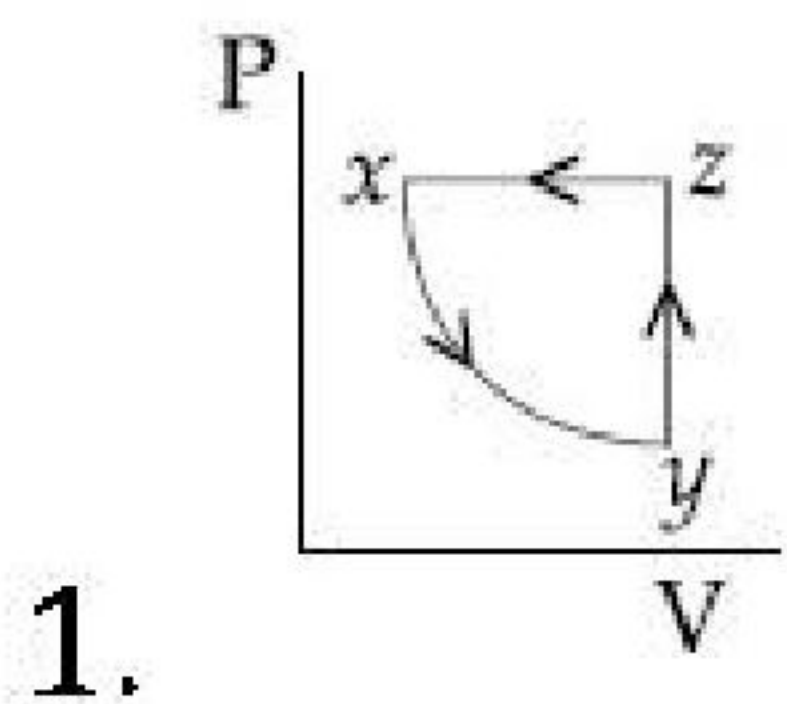
Question Number : 8 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

A thermodynamic cycle $xyzx$ is shown on a V-T diagram.



The P-V diagram that best describes this cycle is : (Diagrams are schematic and not to scale)

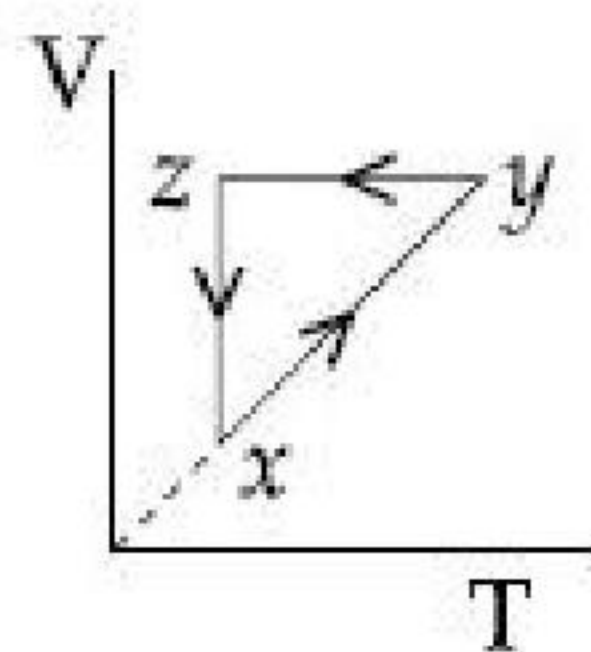
Options :



Question Number : 8 Question Type : MCQ Option Shuffling : Yes

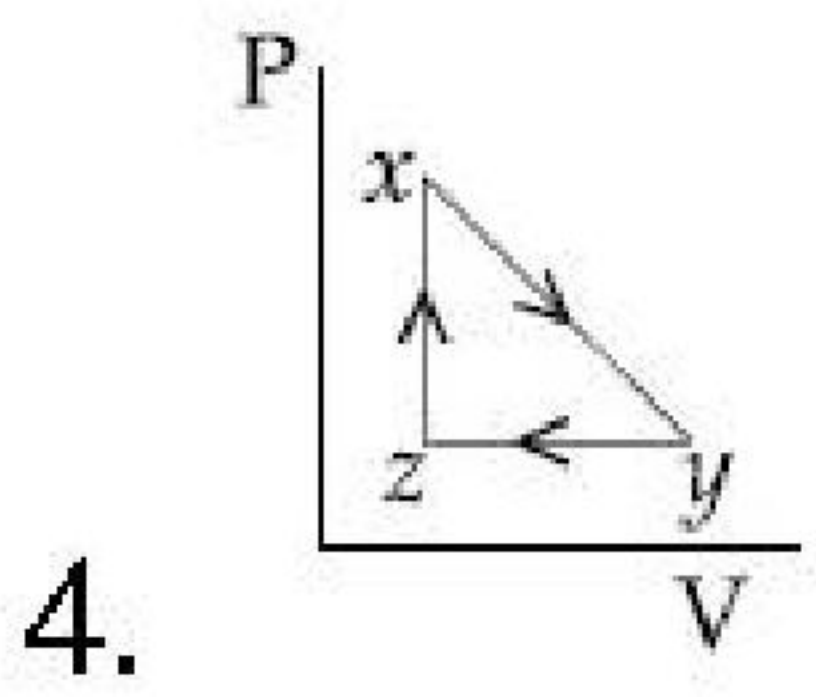
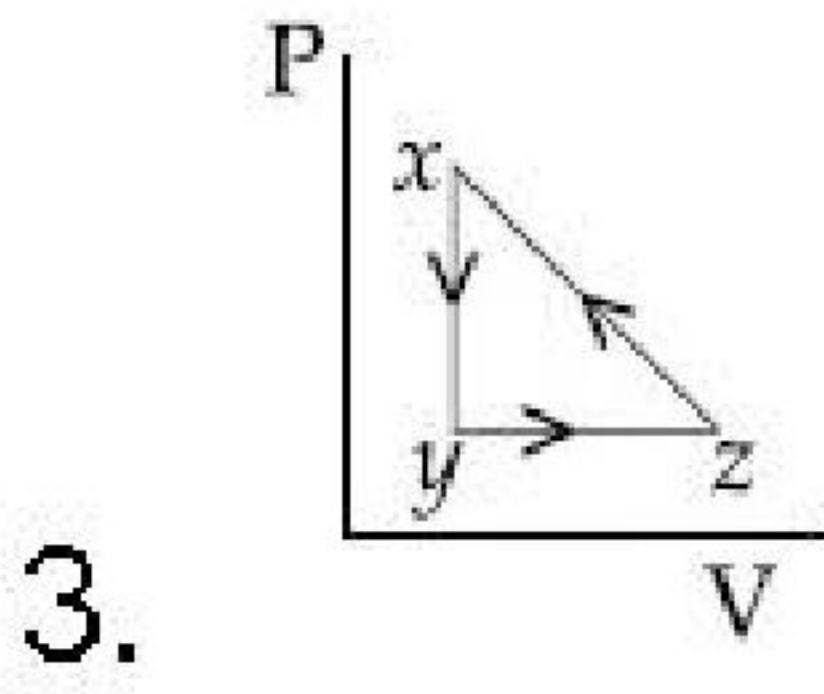
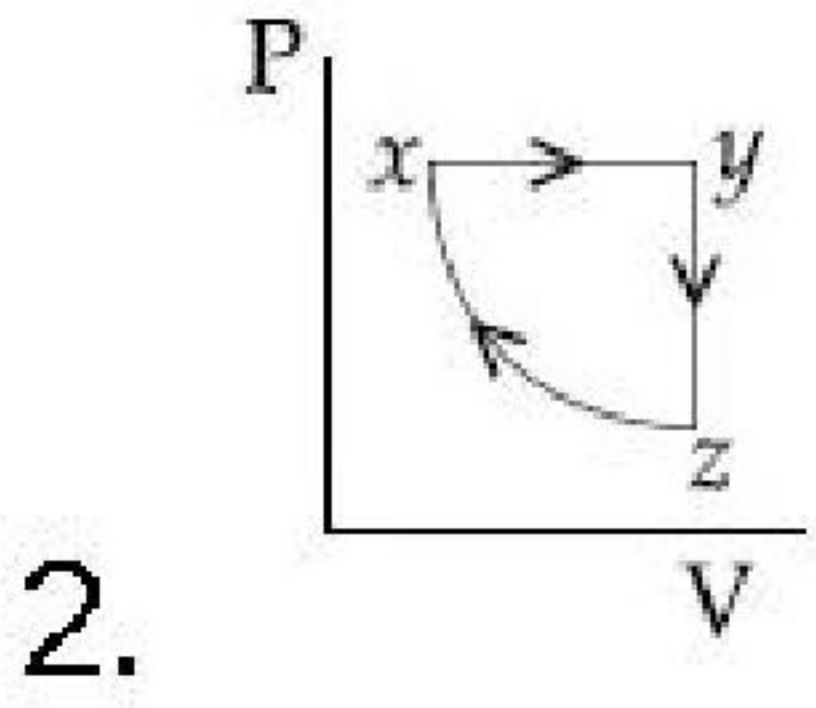
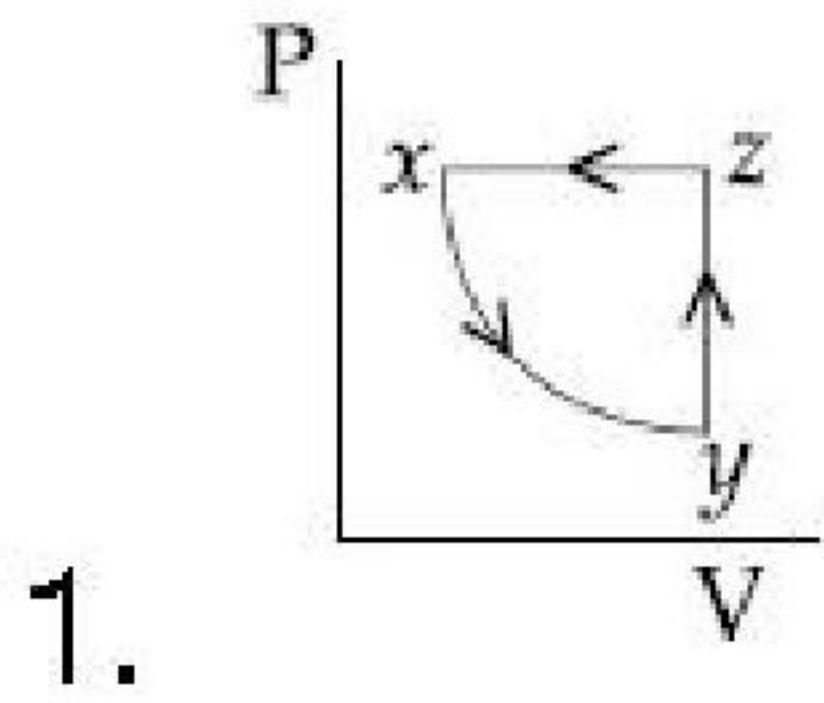
Correct Marks : 4 Wrong Marks : 1

एक ऊष्मागतिक चक्र $xyzx$ का (V-T) ग्राफ चित्र में दिखाया गया है।



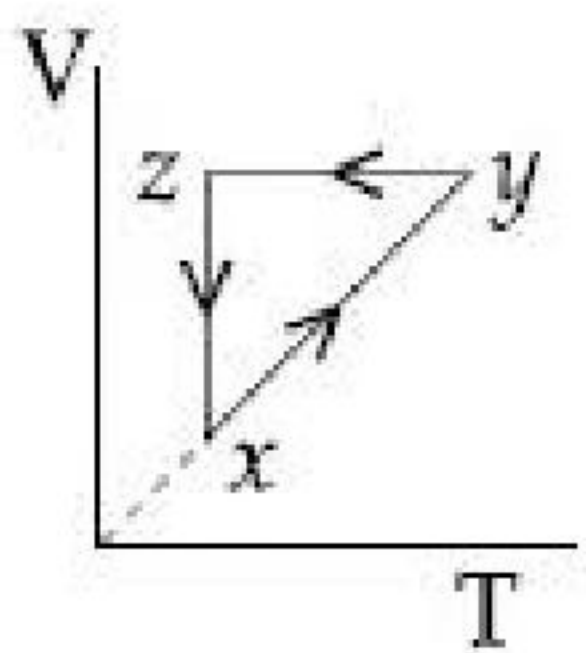
इस चक्र का सर्वोचित (P-V) ग्राफ निम्न में से कौन सा है? (चित्र सांकेतिक हैं)

Options :

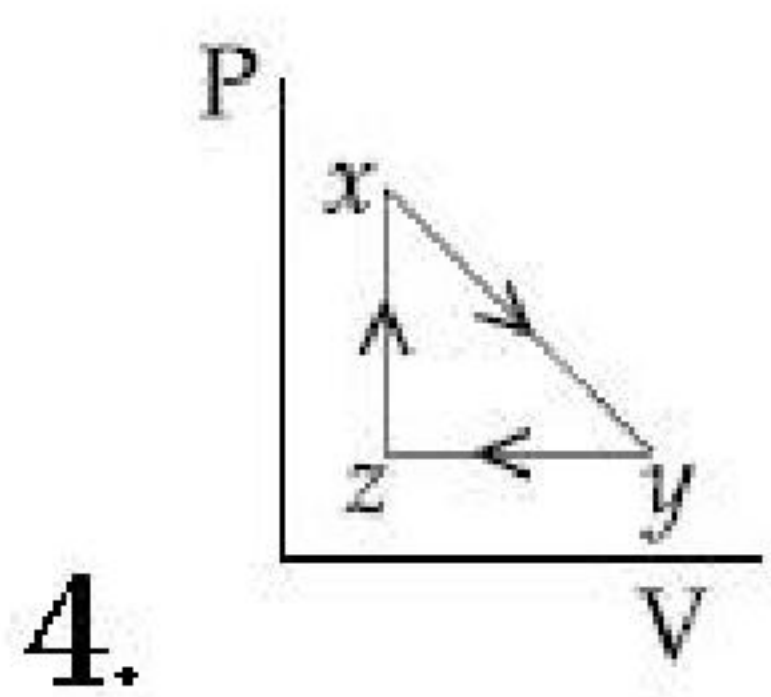
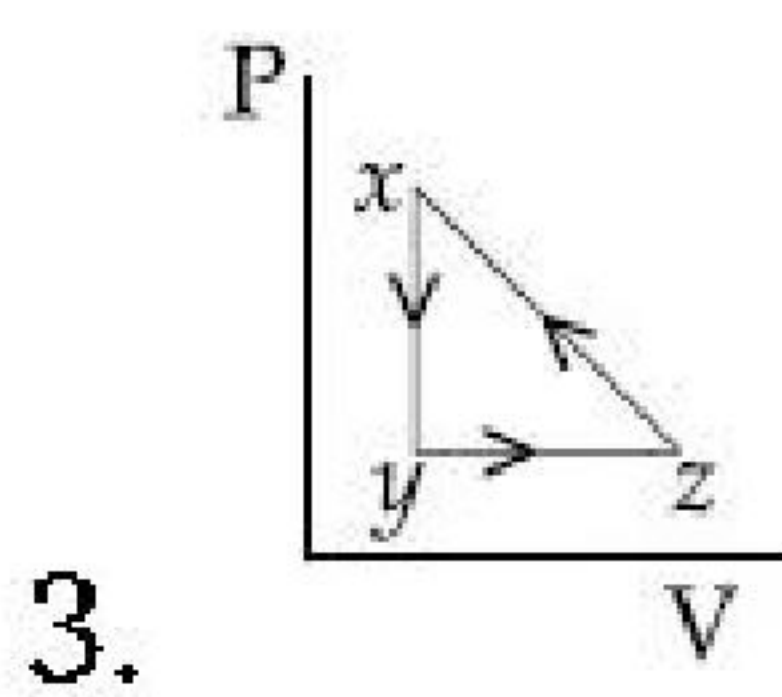
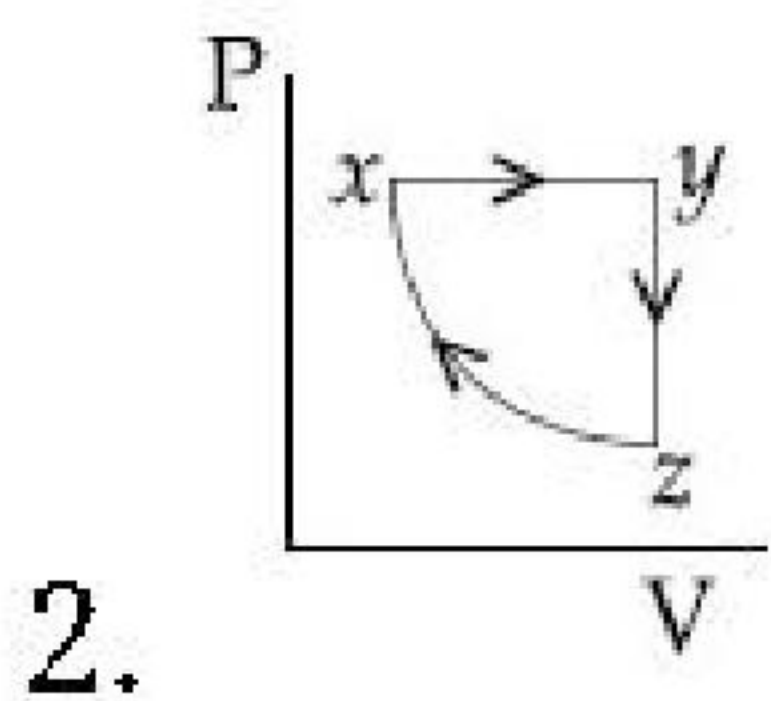
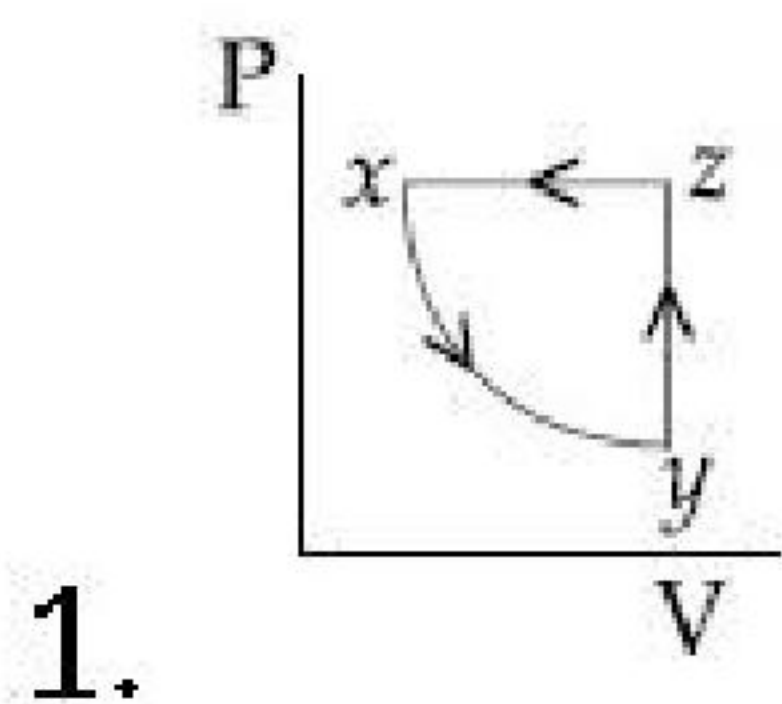


Question Number : 8 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

એક ઉષ્મીય ચક્રિયા પ્રક્રિયા $xyzx$ ને (V-T) આલેખમાં દર્શાવેલ છે.



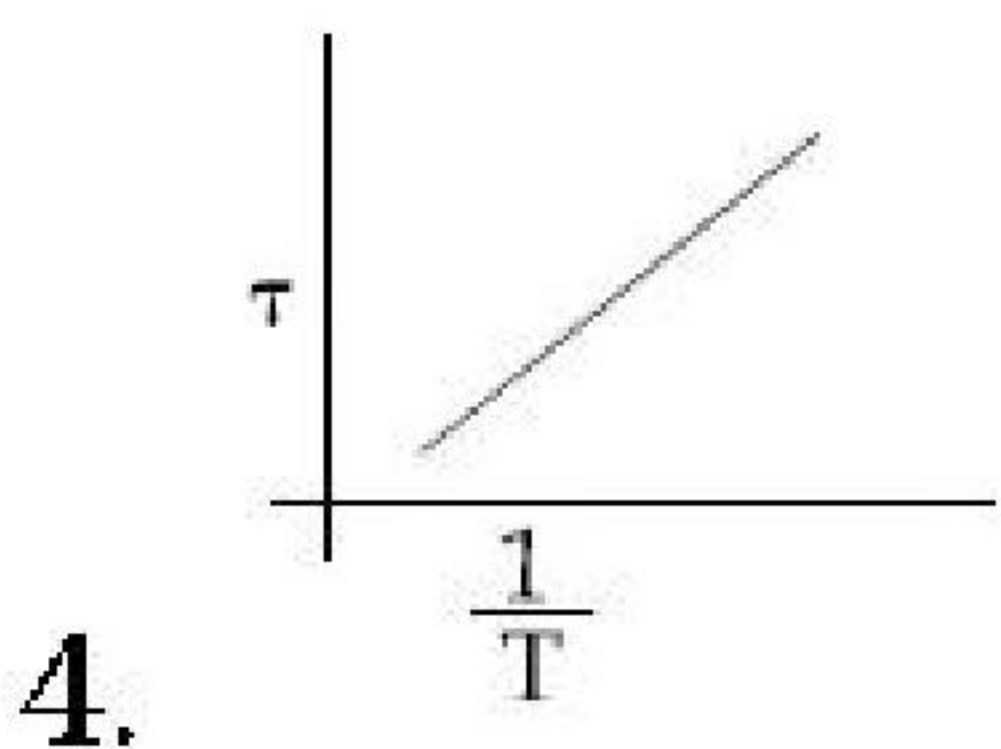
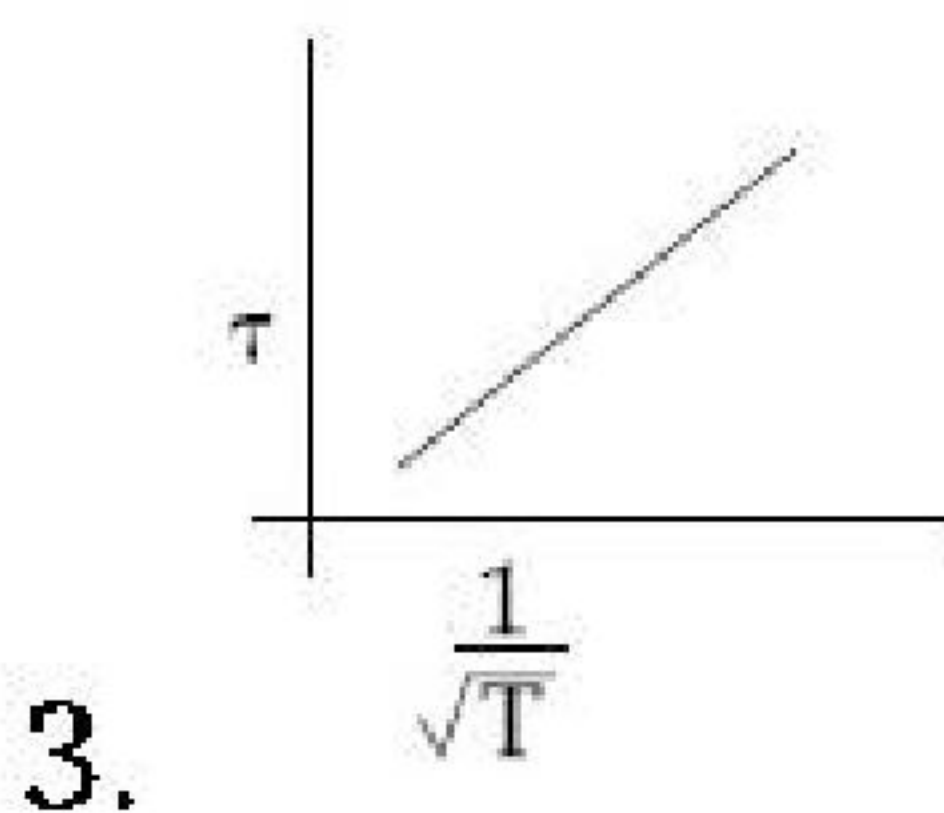
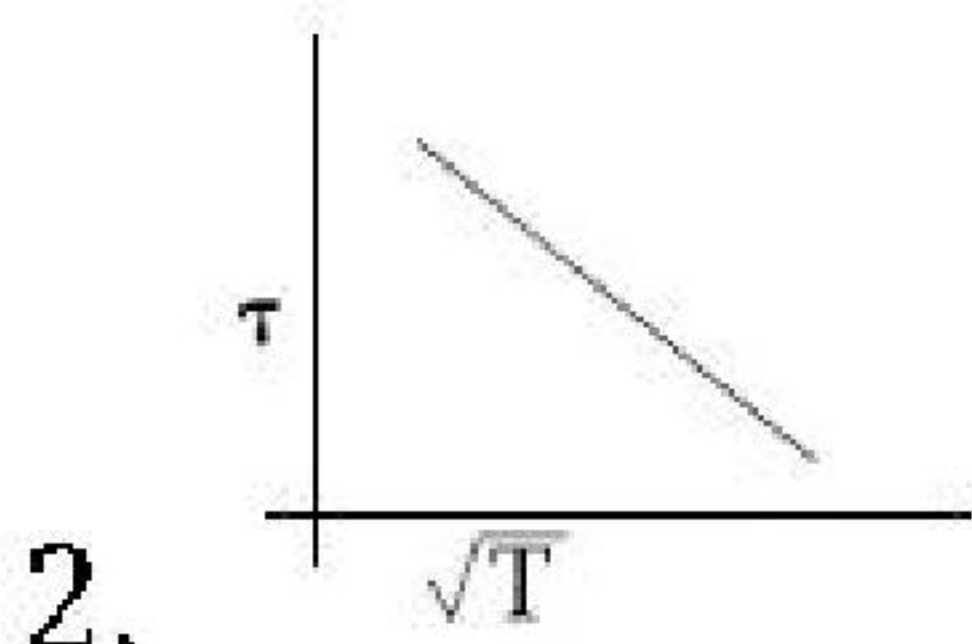
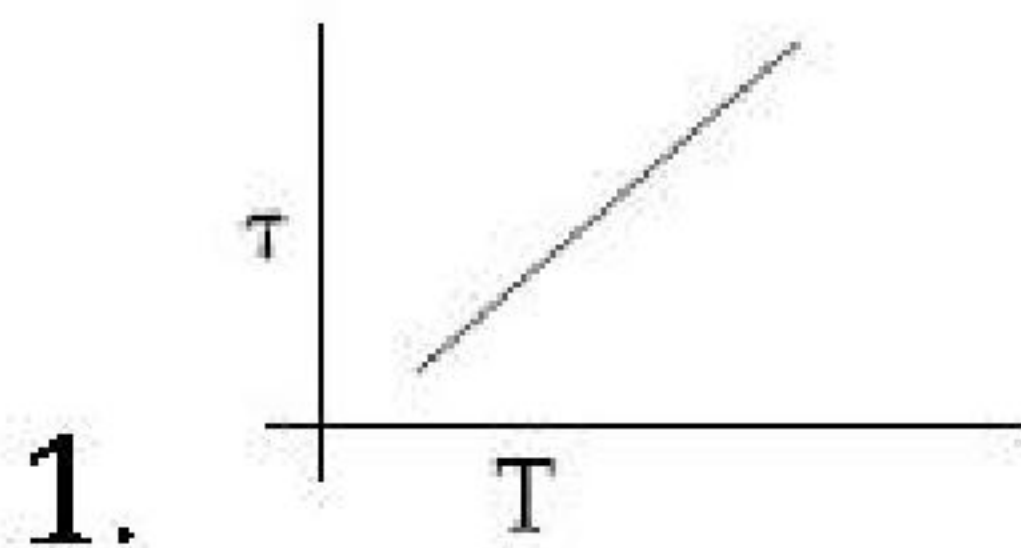
(P-V) રેખાકૃતિ કે જે આ ચક્રિય પ્રક્રિયાને સૌથી સારી રીતે દર્શાવી શકે તે _____ છે. (આલેખ રેખાકૃતિ



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

The plot that depicts the behavior of the mean free time τ (time between two successive collisions) for the molecules of an ideal gas, as a function of temperature (T), qualitatively, is : (Graphs are schematic and not drawn to scale)

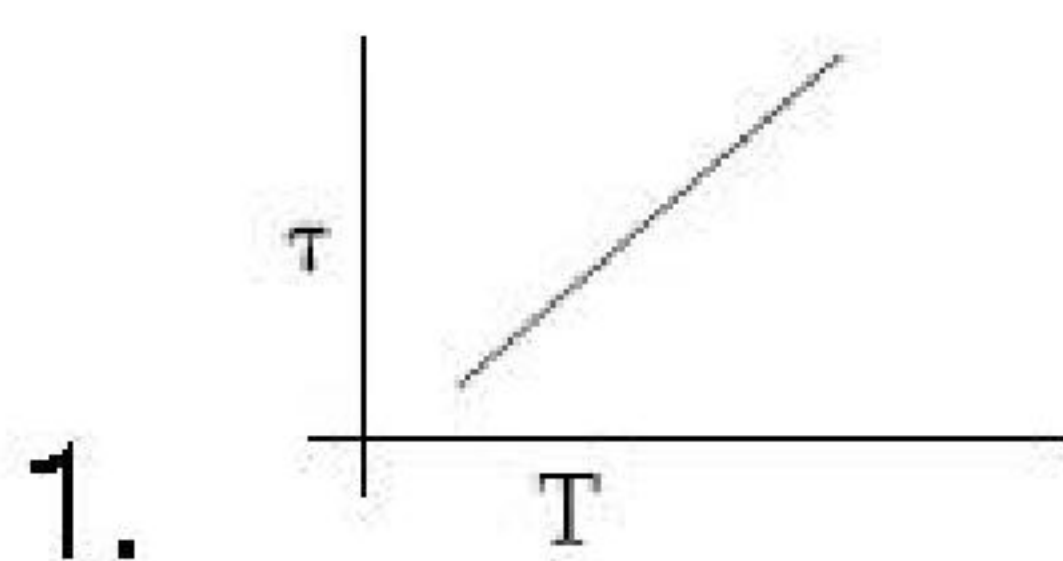
Options :



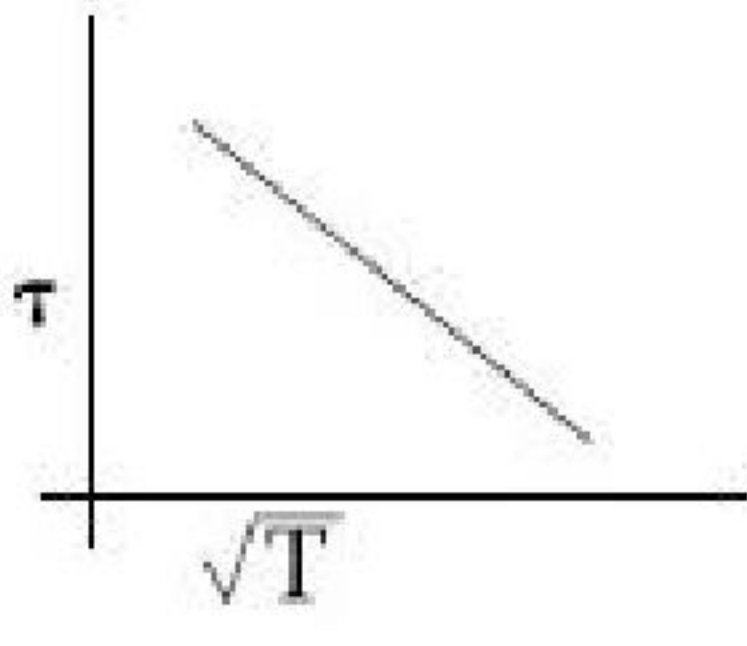
Question Number : 9 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

नीचे दिये गये चित्रों में से कौन सा चित्र आदर्श गैस के अणुओं का औसत मुक्त काल τ (दो उत्तरोत्तर टक्करों के बीच का समय) का तापमान (T) के साथ विचरण दिखाता है? (रेखाचित्र सांकेतिक है)

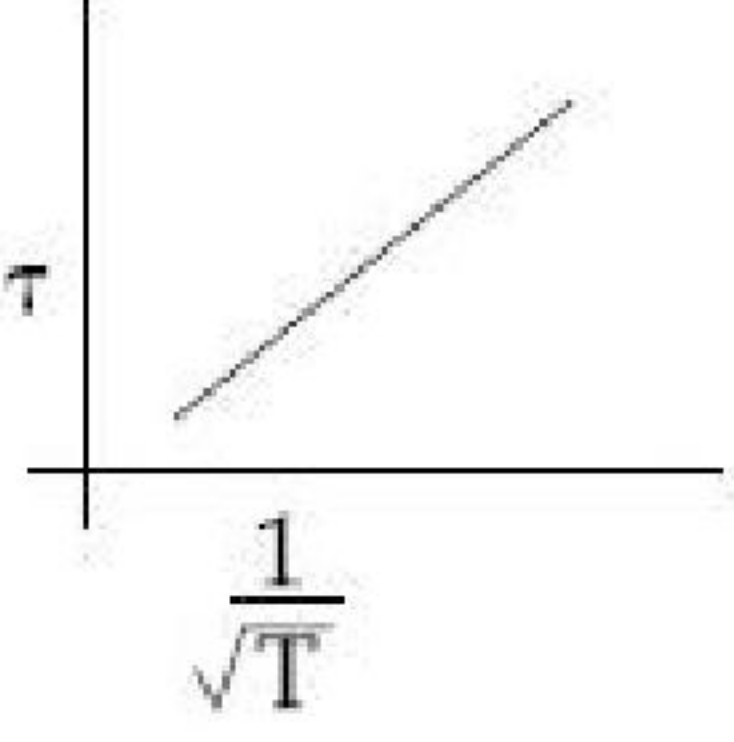
Options :



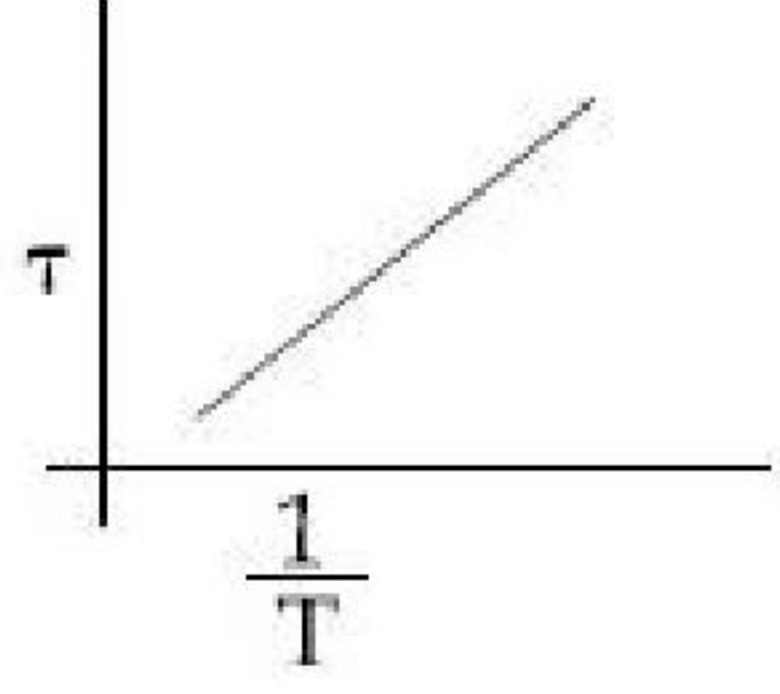
2.



3.



4.



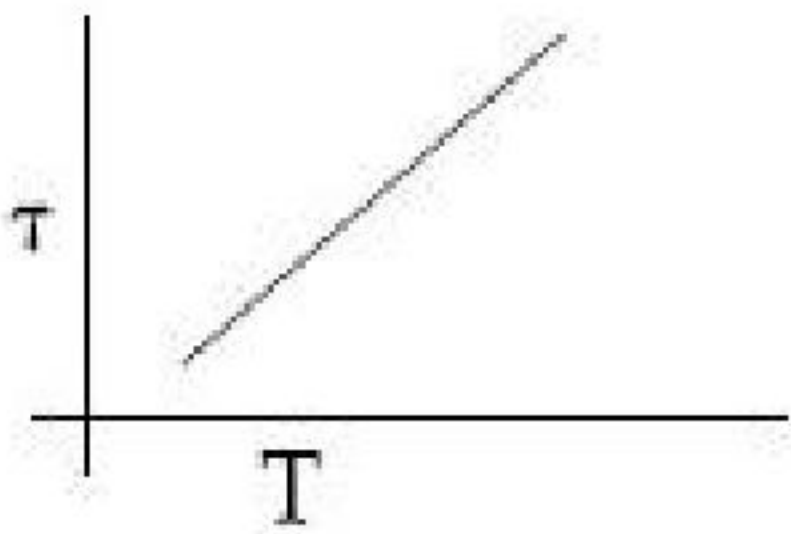
Question Number : 9 Question Type : MCQ Option Shuffling : Yes

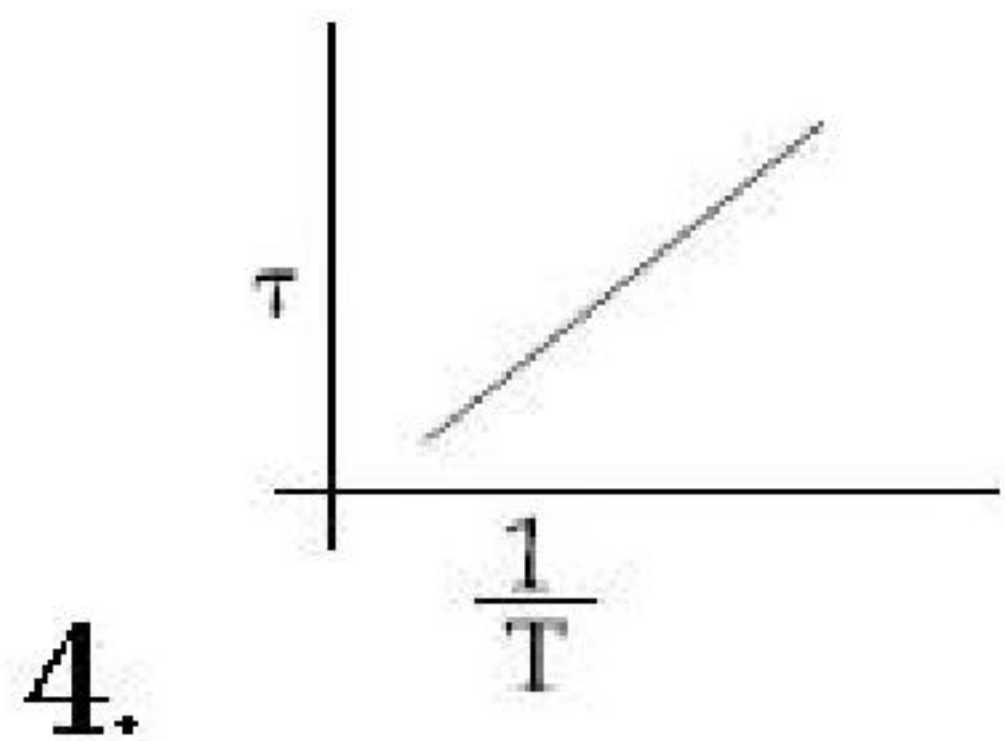
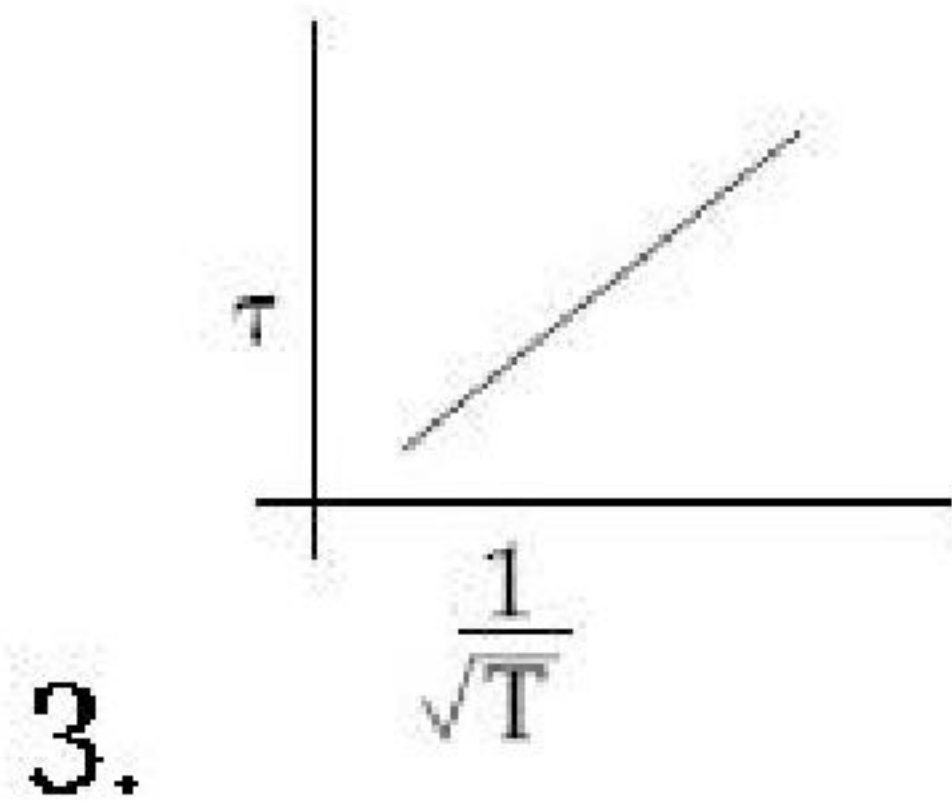
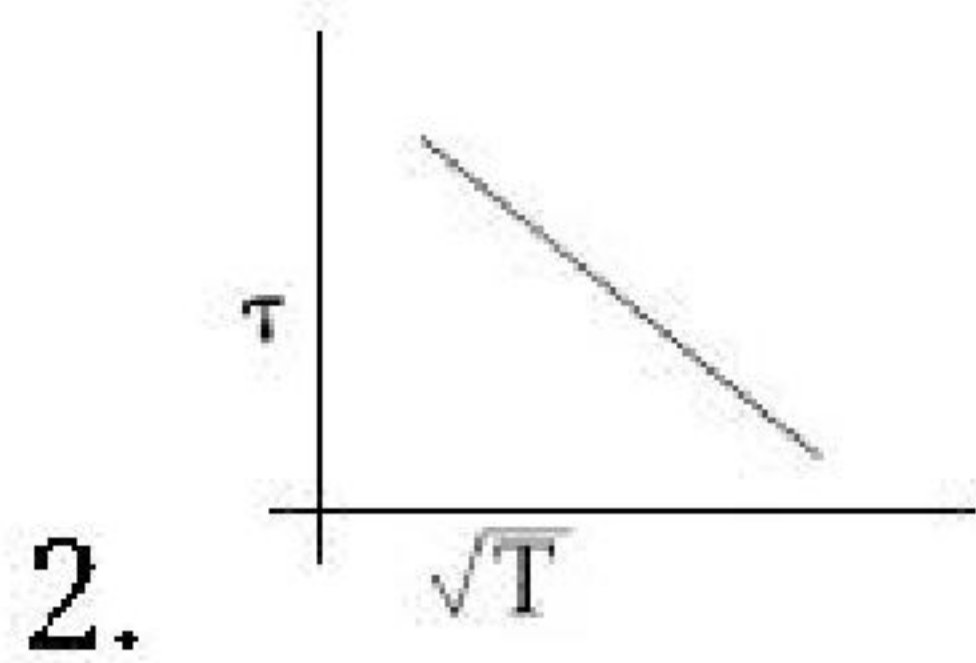
Correct Marks : 4 Wrong Marks : 1

એક આદર્શવાયુ માટે સરેરાશ મુક્ત સમય (બે ક્રમિક અથડામણો વચ્ચેનો સમય) τ ની તાપમાન (T) ના વિધેય તરિક્કની ગુણાત્મક રીતે સૌથી સારી રીતે વર્ણવી શકે તેવો આલેખ _____ છે. (આલેખ રેખાકૃતિ સૂચવે છે અને તે માપક્રમમાં નથી)

Options :

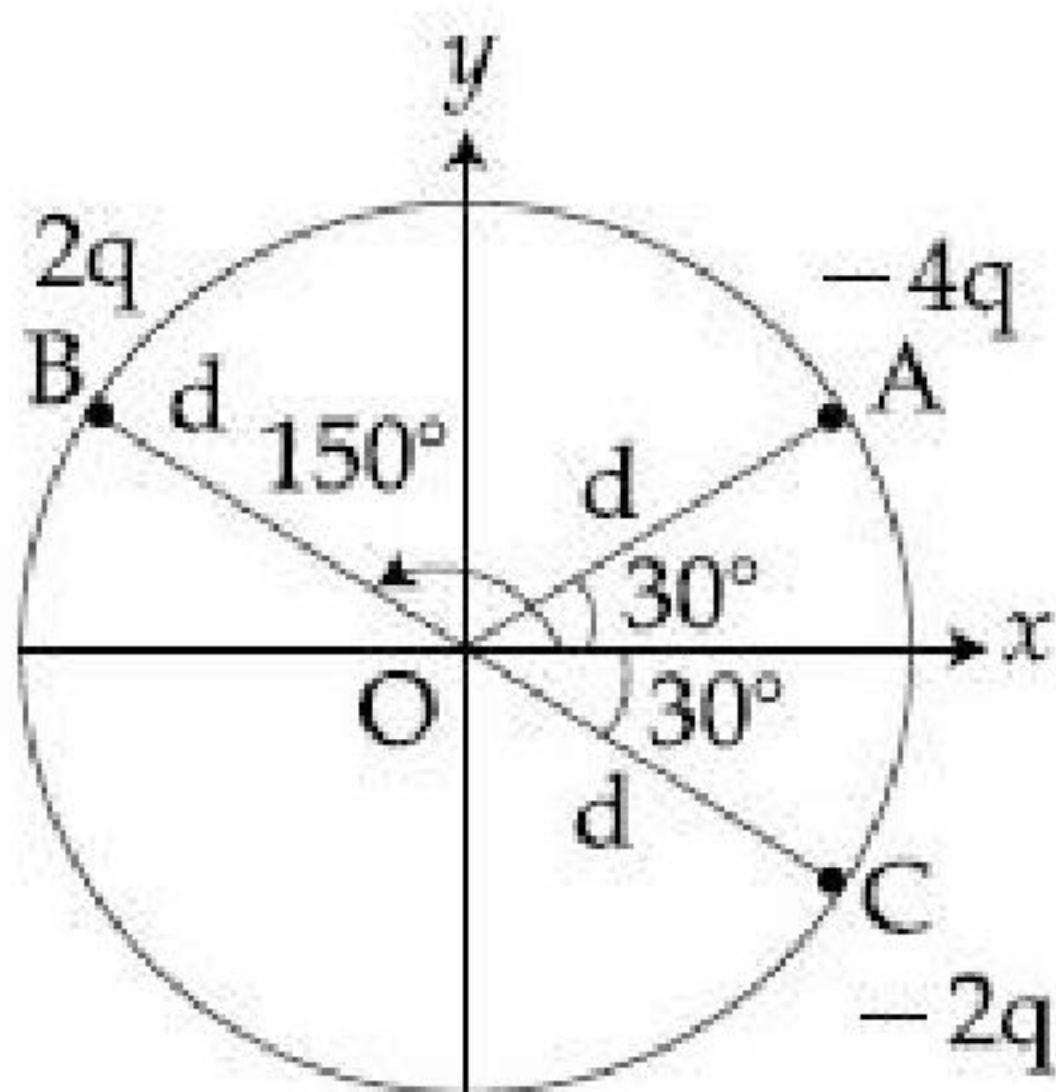
1.





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

Three charged particles A, B and C with charges $-4q$, $2q$ and $-2q$ are present on the circumference of a circle of radius d . The charged particles A, C and centre O of the circle formed an equilateral triangle as shown in figure. Electric field at O along x -direction is :



$$1. \frac{\sqrt{3}q}{4\pi\epsilon_0 d^2}$$

$$2. \frac{3\sqrt{3}q}{4\pi\epsilon_0 d^2}$$

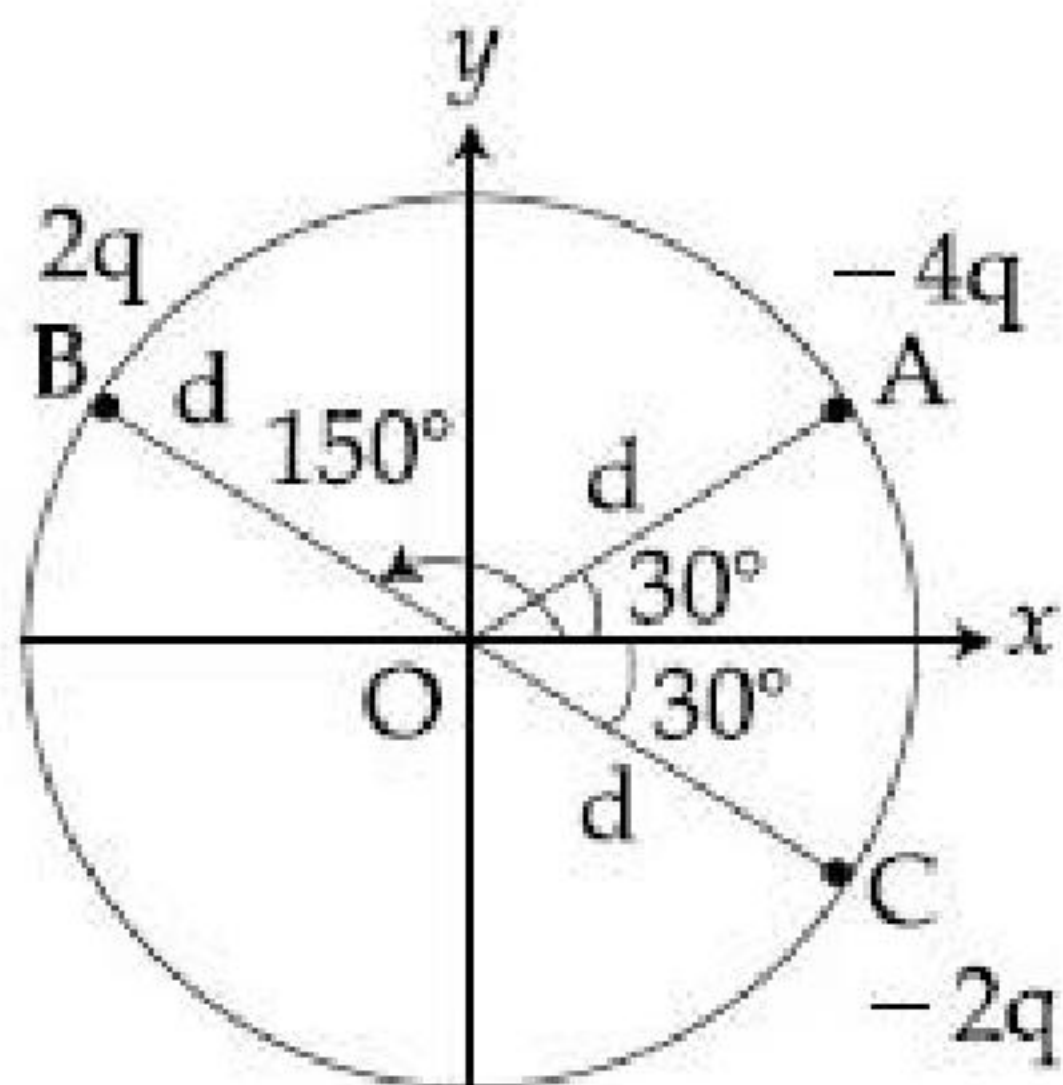
$$3. \frac{2\sqrt{3}q}{\pi\epsilon_0 d^2}$$

$$4. \frac{\sqrt{3}q}{\pi\epsilon_0 d^2}$$

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

Correct Marks : 4 Wrong Marks : 1

A, B और C आवेशित कण, जिन पर आवेश क्रमशः $-4q$, $2q$ और $-2q$ है, d त्रिज्या के एक वृत्त की परिधि पर रखे हुए है। कण A, C और वृत्त का केन्द्र O एक समबाहु त्रिभुज बनाते हैं। (चित्र देखें)। तब O पर x -दिशा में विद्युत क्षेत्र का मान है :



Options :

$$1. \frac{\sqrt{3}q}{4\pi\epsilon_0 d^2}$$

2. $\frac{3\sqrt{3}q}{4\pi\epsilon_0 d^2}$

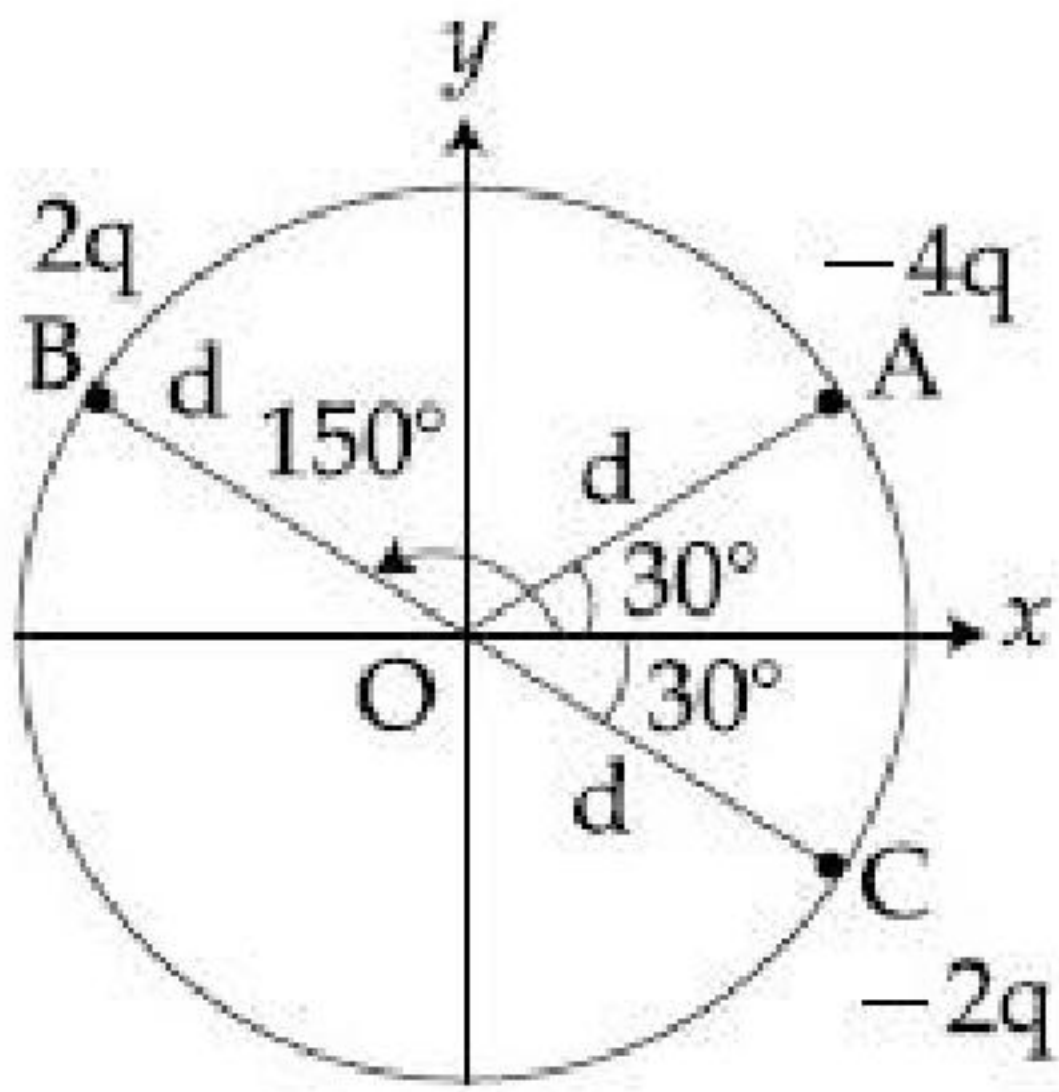
3. $\frac{2\sqrt{3}q}{\pi\epsilon_0 d^2}$

4. $\frac{\sqrt{3}q}{\pi\epsilon_0 d^2}$

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

Correct Marks : 4 Wrong Marks : 1

અનુક્રમે $-4q$, $2q$ અને $-2q$ જેટલો વિજભાર ધરાવતા ત્રણ વિદ્યુતભારિત કણો A, B અને C, d જેટલો વ્યાસ ધરાવતા વર્તુળના પરીધ પર આવેલા છે. વિદ્યુતભારિત કણો A અને C, અને વર્તુળ O આકૃતિમાં દર્શાવ્યા અનુસાર સમબાજુ ત્રિકોણ રચે છે. O આગળ વિદ્યુતક્ષેત્ર x -દિશામાં _____ થશે.



Options :

1. $\frac{\sqrt{3}q}{4\pi\epsilon_0 d^2}$

2. $\frac{3\sqrt{3}q}{4\pi\epsilon_0 d^2}$

3. $\frac{2\sqrt{3}q}{\pi\epsilon_0 d^2}$

4. $\frac{\sqrt{3}q}{\pi\epsilon_0 d^2}$

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

Effective capacitance of parallel combination of two capacitors C_1 and C_2 is $10 \mu\text{F}$. When these capacitors are individually connected to a voltage source of 1 V , the energy stored in the capacitor C_2 is 4 times that of C_1 . If these capacitors are connected in series, their effective capacitance will be :

Options :

1. $8.4 \mu\text{F}$

2. $4.2 \mu\text{F}$

3. $3.2 \mu\text{F}$

4. $1.6 \mu\text{F}$

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

પાશ્વ સંબંધન સે જુડે દો સંધારિત્રો C_1 ઓર C_2 કી પ્રભાવી ધારિતા $10 \mu\text{F}$ હૈ। જબ इन संधारित्रों को अलग-अलग 1 V के स्रोत से जोड़ा जाता है, तो C_2 में संचित ऊर्जा C_1 में संचित ऊर्जा के 4 गुना होती है। यदि इन संधारित्रों को श्रेणीबद्ध संबंधन में जोड़ा जाये, तो इनकी प्रभावी धारिता होगी :

Options :

1. $8.4 \mu\text{F}$

2. $4.2 \mu\text{F}$

3. $3.2 \mu\text{F}$

4. $1.6 \mu\text{F}$

Question Number : 11 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

બે સંધારકો C_1 અને C_2 ના સમાંતર જોડાણ ની અસરકારક સંધારકતા $10 \mu\text{F}$ છે. આ સંધારકોને 1 V ના વોલ્ટેજ ઉદ્ગમ સ્થાન સાથે જોડવામાં આવે જે ત્યારે C_2 માં સંગ્રહિત ઊર્જા C_1 કરતા 4 ગણી છે. જો સંધારકોને સમાંતરમાં જોડવામાં આવે તો તેમની અસરકારક સંધારકતા _____ થશે.

Options :

1. $8.4 \mu\text{F}$

2. $4.2 \mu\text{F}$

3. $3.2 \mu\text{F}$

4. $1.6 \mu\text{F}$

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

Proton with kinetic energy of 1 MeV moves from south to north. It gets an acceleration of 10^{12} m/s^2 by an applied magnetic field (west to east). The value of magnetic field : (Rest mass of proton is $1.6 \times 10^{-27} \text{ kg}$)

Options :

1. 71 mT

2. 7.1 mT

3. 0.71 mT

4. 0.071 mT

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

1 MeV गतिज ऊर्जा वाला एक प्रोटॉन दक्षिण से उत्तर की ओर चल रहा है। पश्चिम से पूर्व की ओर दिशा के एक चुम्बकीय क्षेत्र से इस पर 10^{12} m/s^2 का त्वरण पैदा होता है। चुम्बकीय क्षेत्र का परिमाण होगा : (प्रोटॉन का विराम द्रव्यमान $= 1.6 \times 10^{-27} \text{ kg}$)

Options :

1. 71 mT

2. 7.1 mT

3. 0.71 mT

4. 0.071 mT

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

Correct Marks : 4 Wrong Marks : 1

1 MeV જેટલી ગતિઊર્જા ધરાવતો પ્રોટોન દક્ષિણથી ઉત્તર તરફ ગતિ કરે છે અને તે લગાવેલ ચુંબકીયક્ષેત્ર (પશ્ચિમથી પૂર્વ) ને કારણે 10^{12} m/s^2 થી પ્રવેગિત થાય છે. ચુંબકીય ક્ષેત્રનું મૂલ્ય _____ થશે. (પ્રોટોનનું સ્થિર દળ $= 1.6 \times 10^{-27} \text{ kg}$)

Options :

1. 71 mT

2. 7.1 mT

3. 0.71 mT

4. 0.071 mT

Question Number : 13 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

In finding the electric field using Gauss law

the formula $\left| \vec{E} \right| = \frac{q_{\text{enc}}}{\epsilon_0 A}$ is applicable. In

the formula ϵ_0 is permittivity of free space,

A is the area of Gaussian surface and q_{enc} is charge enclosed by the Gaussian surface.

This equation can be used in which of the

1. For any choice of Gaussian surface.

2. Only when the Gaussian surface is an equipotential surface.

3. Only when the Gaussian surface is an equipotential surface and $|\vec{E}|$ is constant on the surface.

4. Only when $|\vec{E}| = \text{constant}$ on the surface.

Question Number : 13 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

गॉस के नियम का प्रयोग कर विद्युत क्षेत्र का मान

$|\vec{E}| = \frac{q_{\text{enc}}}{\epsilon_0 A}$ से दिया जाता है। यहाँ पर ϵ_0 निर्वात

की विद्युत्शीलता है, A गॉस सतह का क्षेत्रफल है और q_{enc} गॉस सतह द्वारा घिरा हुआ आवेश है। इस समीकरण का प्रयोग निम्न में से किस परिस्थिति में किया जा सकता है?

Options :

1. किसी भी गॉस सतह के लिये।

2. केवल तब ही जब गॉस सतह समविभव सतह हो।

3. केवल तब ही जब गॉस सतह समविभव सतह हो और $|\vec{E}|$ का मान इस सतह पर अचर हो।

કેવલ તબ હી જબ $|\vec{E}|$ કા માન ઇસ સતહ પર

4. અચર હો।

Question Number : 13 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

ગોસના નિયમની મદદથી વિદ્યુતક્ષેત્ર શોધવા માટે સૂત્ર

$$|\vec{E}| = \frac{q_{enc}}{\epsilon_0 A}$$
 લાગુ પાડી શકાય છે. આ સૂત્રમાં ϵ_0 એક

મુક્ત અવકાશની પરમિટિવિટી, A એ ગોસીયન સપાટીનું ક્ષેત્રફળ અને q_{enc} એ ગોસીયન સપાટીની અંદર ઘેરાતો વિદ્યુતભાર છે. નીચેનામાંથી કયા કિસ્સામાં આ સમીકરણનો ઉપયોગ કરી શકાય?

Options :

1. કોઈપણ પ્રકારના ગોસીયન પૃષ્ઠ માટે

2. ફક્ત જ્યારે ગોસીયન પૃષ્ઠ સમસ્થિતિમાન પૃષ્ઠ હોય ત્યારે.

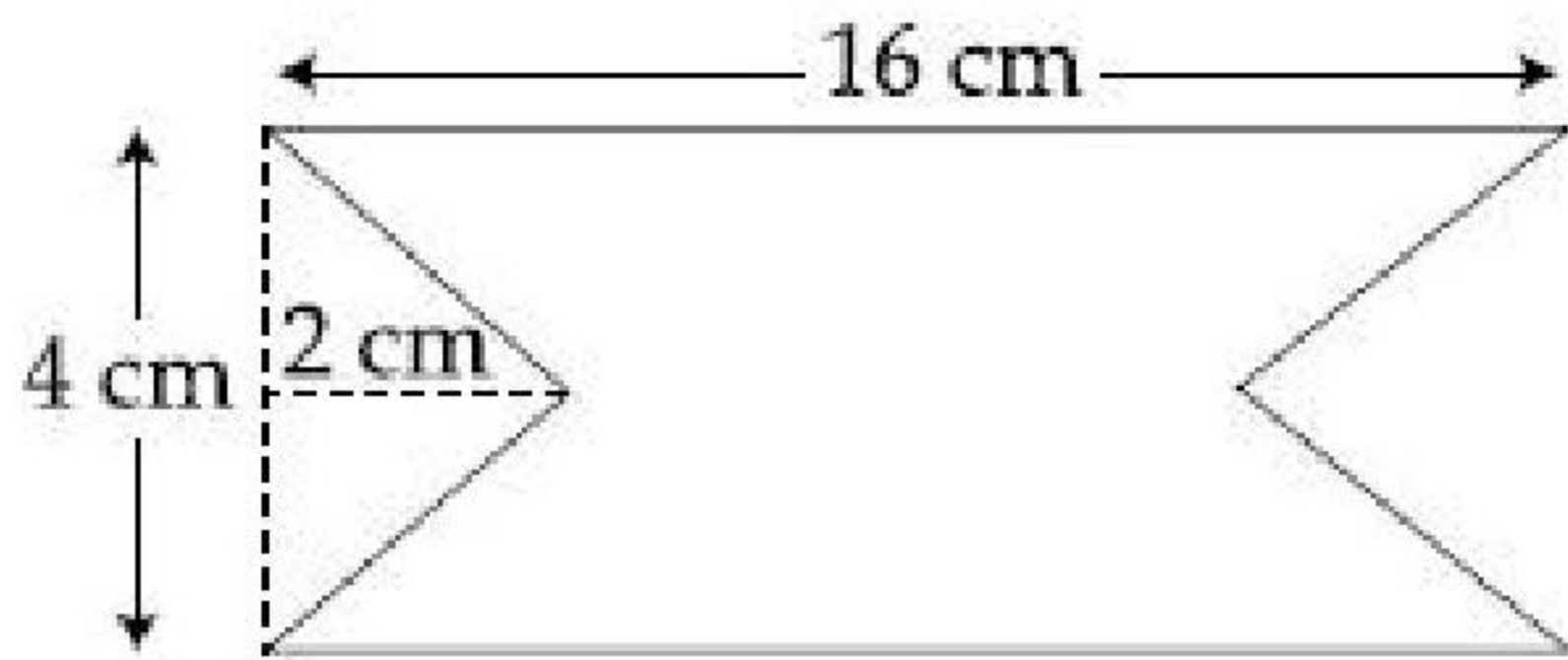
3. ફક્ત જ્યારે ગોસીયન પૃષ્ઠ સમસ્થિતિમાન પૃષ્ઠ હોય અને પૃષ્ઠ ઉપર $|\vec{E}|$ અચળ હોય ત્યારે.

4. ફક્ત જ્યારે પૃષ્ઠ ઉપર $|\vec{E}|$ અચળ હોય.

Question Number : 14 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

At time $t = 0$ magnetic field of 1000 Gauss is passing perpendicularly through the area defined by the closed loop shown in the figure. If the magnetic field reduces linearly to 500 Gauss, in the next 5 s, then induced EMF in the loop is :



Options :

1. $28 \mu\text{V}$

2. $36 \mu\text{V}$

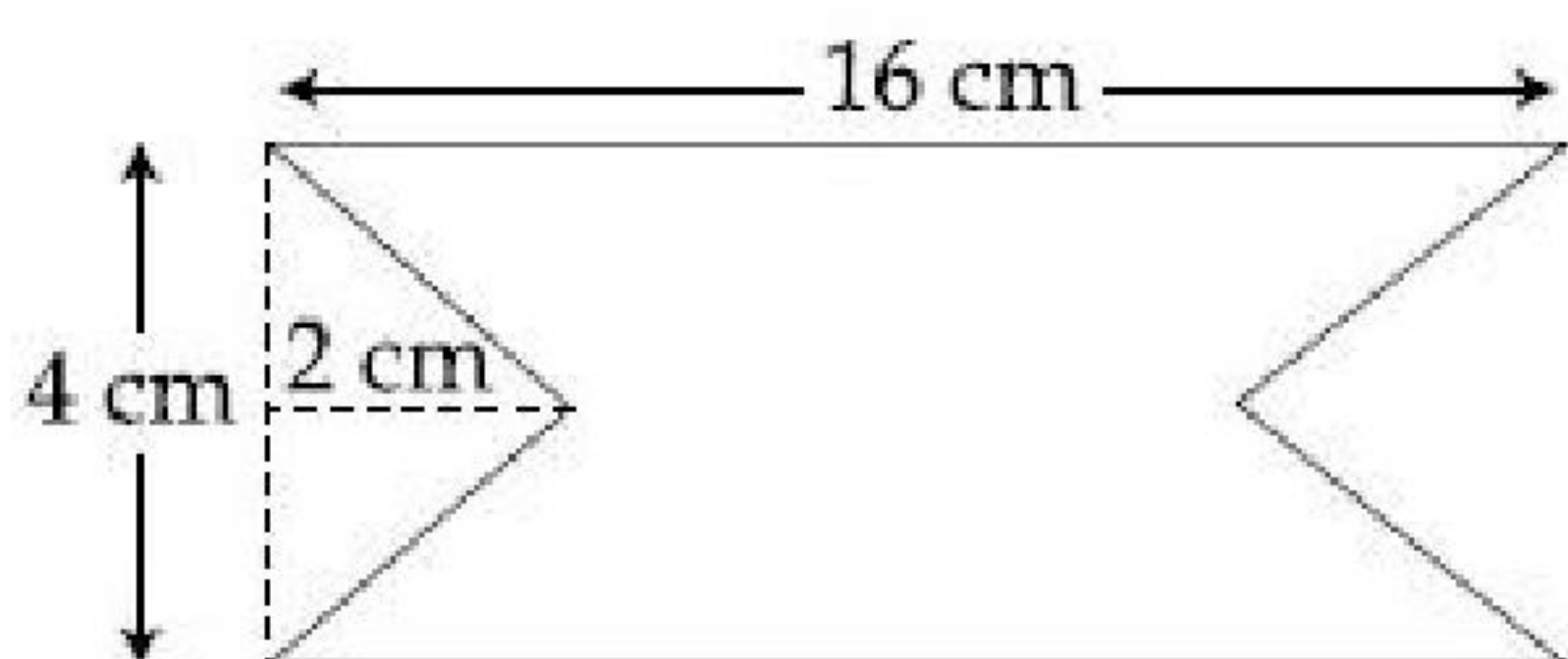
3. $48 \mu\text{V}$

4. $56 \mu\text{V}$

Question Number : 14 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

समय $t = 0$ पर चित्र में दिखाये गये एक पूर्ण लूप से होकर 1000 गॉस मान का चुम्बकीय क्षेत्र इसके लम्बत निकलता है। यदि अगले 5 s में चुम्बकीय क्षेत्र का मान रेखीय (linear) रूप से घटकर 500 गॉस हो जाता है, तो लूप में उत्प्रेरित विद्युत-वाहक बल का मान होगा :



Options :

1. $28 \mu\text{V}$

2. $36 \mu\text{V}$

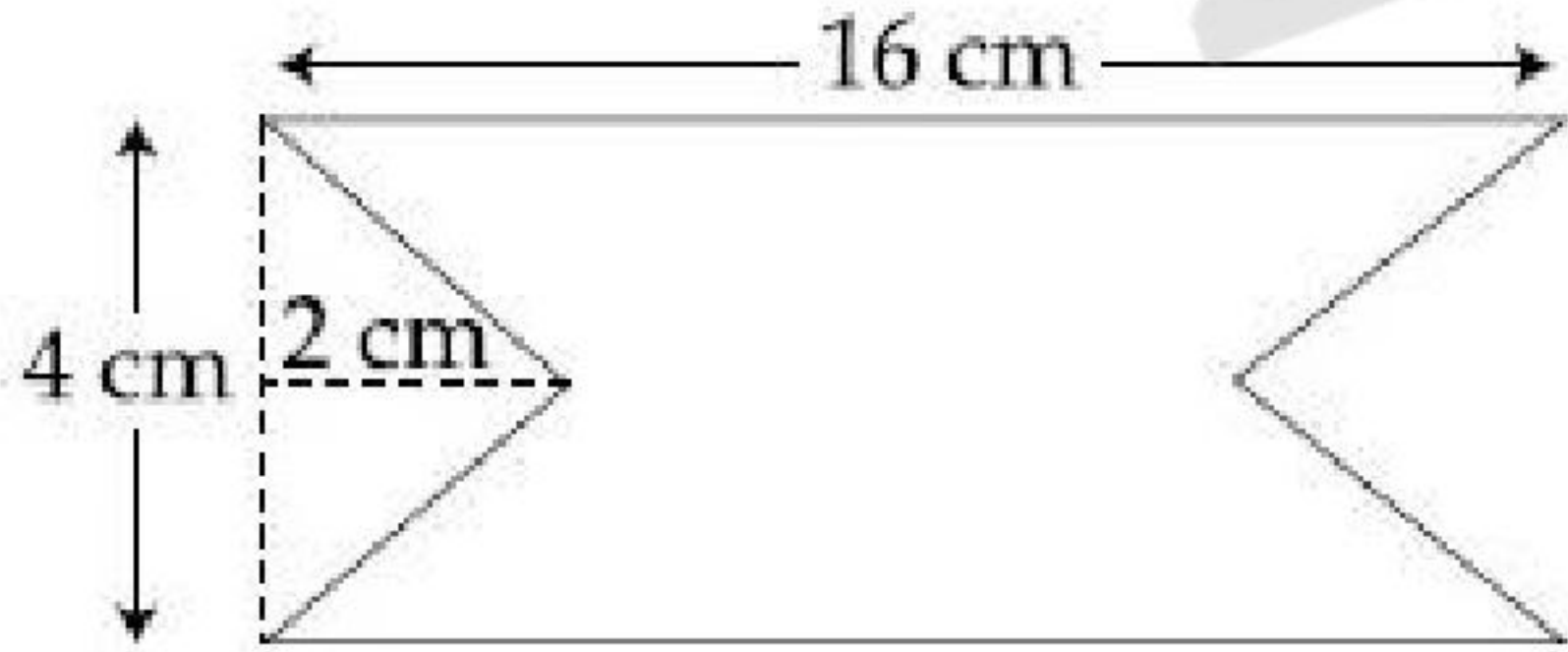
3. $48 \mu\text{V}$

4. $56 \mu\text{V}$

Question Number : 14 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

$t=0$ સમયે, 1000 ગોસનું ચુંબકીય ક્ષેત્ર ગાળાના ક્ષેત્રફળમાંથી લંબરૂપે પસાર થાય છે, જુઓ આકૃતિ. જો બીજા 5 સેકન્ડમાં ચુંબકીય ક્ષેત્ર રેખીય રીતે ઘટીને 500 ગોસ થાય તો ગાળામાં પ્રેરિત EMF કેટલું થશે?



Options :

1. $28 \mu\text{V}$

2. $36 \mu\text{V}$

3. $48 \mu\text{V}$

4. $56 \mu\text{V}$

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

Correct Marks : 4 Wrong Marks : 1

The critical angle of a medium for a specific wavelength, if the medium has relative permittivity 3 and relative permeability $\frac{4}{3}$ for this wavelength, will be :

Options :

1. 30°

2. 45°

3. 60°

4. 15°

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

Correct Marks : 4 Wrong Marks : 1

एक माध्यम को, एक विशेष तरंगदैर्घ्य के लिये सापेक्ष

विद्युत्शीलता 3 है और सापेक्ष चुंबकशीलता $\frac{4}{3}$ है।

इस तरंगदैर्घ्य के लिये माध्यम के क्रांतिक कोण का मान है :

Options :

1. 30°

2. 45°

3. 60°

4. 15°

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

Correct Marks : 4 Wrong Marks : 1

જો ચોક્કસ તરંગલંબાઈ એ માધ્યમની સાપેક્ષ પરમીટીવીટી
(પૈરાવૈદ્યુતાંક) 3 અને સાપેક્ષ પારગ્મ્યતા
(પરમીઆબીલીટી) $\frac{4}{3}$ હોય તો માધ્યમ માટેના ક્રાંતિકોણ
_____ થશે.

Options :

1. 30°

2. 45°

3. 60°

4. 15°

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

Correct Marks : 4 Wrong Marks : 1

The magnifying power of a telescope with
tube length 60 cm is 5. What is the focal
length of its eye piece ?

Options :

1. 10 cm

2. 20 cm

3. 30 cm

4. 40 cm

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

Correct Marks : 4 Wrong Marks : 1

यदि एक टेलीस्कोप की ट्यूब की लम्बाई 60 cm है और इसका आवर्धन 5 हो तो इसके नेत्रिका (eye piece) की फोकस दूरी है :

Options :

1. 10 cm

2. 20 cm

3. 30 cm

4. 40 cm

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

Correct Marks : 4 Wrong Marks : 1

60 cm જેટલી ટ્યુબલંબાઈ ધરાવતા ટેલીસ્કોપની મોટવણી 5 છે. નેત્રકાય ની કેન્દ્રલંબાઈ કેટલી હશે?

Options :

1. 10 cm

2. 20 cm

3. 30 cm

4. 40 cm

Question Number : 17 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

When photon of energy 4.0 eV strikes the surface of a metal A, the ejected photoelectrons have maximum kinetic energy T_A eV and de-Broglie wavelength λ_A . The maximum kinetic energy of photoelectrons liberated from another metal B by photon of energy 4.50 eV is $T_B = (T_A - 1.5)$ eV. If the de-Broglie wavelength of these photoelectrons $\lambda_B = 2\lambda_A$, then the work function of metal B is :

Options :

1. 1.5 eV

2. 4 eV

3. 3 eV

4. 2 eV

Question Number : 17 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

जब 4.0 eV ऊर्जा के फोटॉन धातु A की सतह पर पड़ते हैं, तो इससे उत्सर्जित इलेक्ट्रॉनों की अधिकतम गतिज ऊर्जा T_A eV है और इनका डी-ब्रोग्ली तरंगदैर्घ्य λ_A है। एक दूसरी धातु B पर 4.50 eV ऊर्जा के फोटॉनों के पड़ने पर उत्सर्जित इलेक्ट्रॉनों की अधिकतम गतिज ऊर्जा $T_B = (T_A - 1.5)$ eV है। यदि इनका डी-ब्रोग्ली तरंगदैर्घ्य $\lambda_B = 2\lambda_A$ है, तो धातु B के कार्य

1. 1.5 eV

2. 4 eV

3. 3 eV

4. 2 eV

Question Number : 17 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

જ્યારે 4.0 eV ઊર્જા ધરાવતો ફોટોન ધાતુ A ની સપાટી ને અથડાય છે ત્યારે ઉત્સર્જિત ફોટોઇલેક્ટ્રોન પાસે મહત્તમ ગતિઊર્જા T_A eV અને ડી-બ્રોગ્લી તરંગલંબાઈ λ_A છે. બીજા ધાતુ B દ્વારા 4.50 eV ઊર્જાવાળા ફોટોનથી ફોટોઇલેક્ટ્રોનની મહત્તમ ગતિઊર્જા $T_B = (T_A - 1.5)$ eV છે. જો આ ફોટોઇલેક્ટ્રોનની ડી-બ્રોગ્લી તરંગલંબાઈ $\lambda_B = 2\lambda_A$ હોય તો B નું વર્કફંક્શન (કાર્યવિધેય) _____ હશે.

Options :

1. 1.5 eV

2. 4 eV

3. 3 eV

4. 2 eV

Correct Marks : 4 Wrong Marks : 1

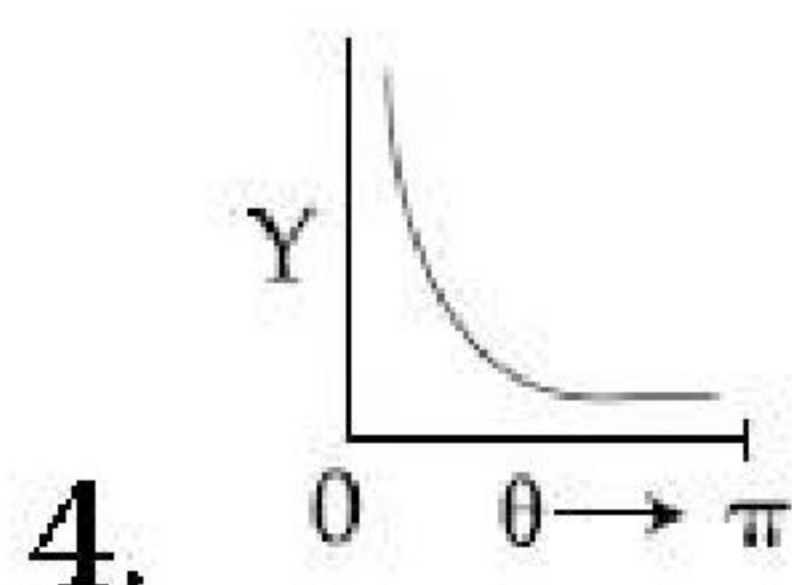
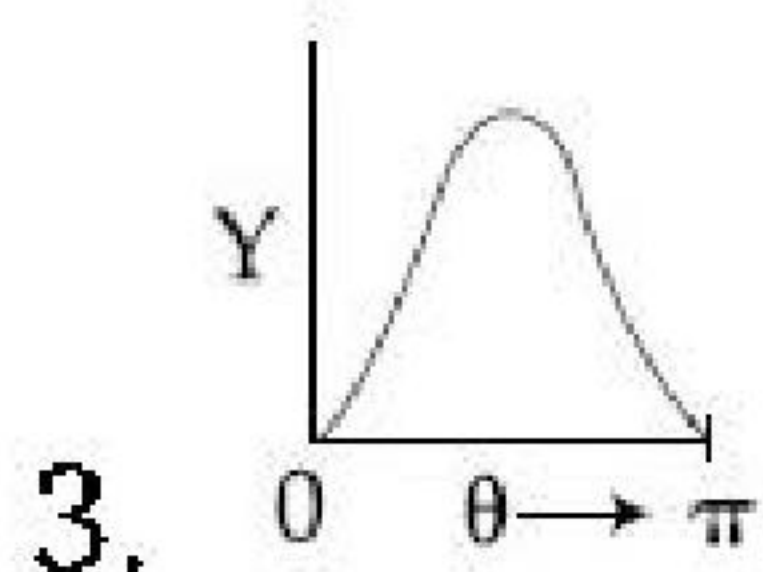
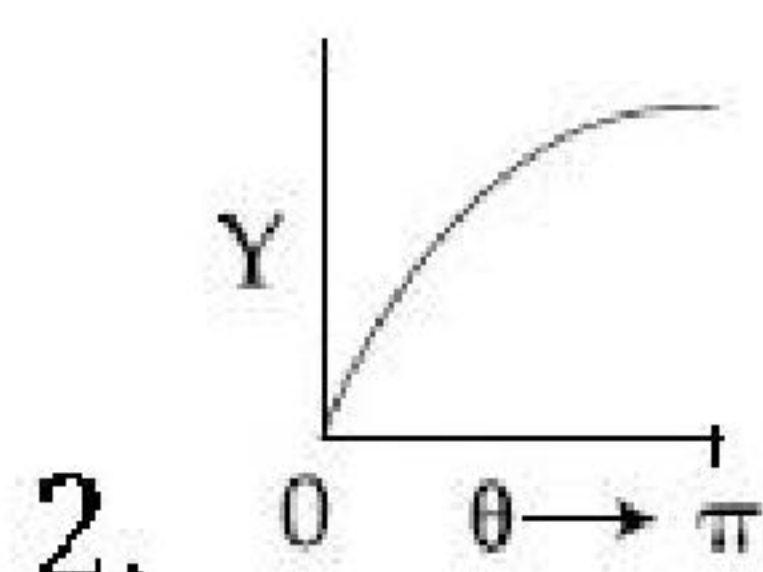
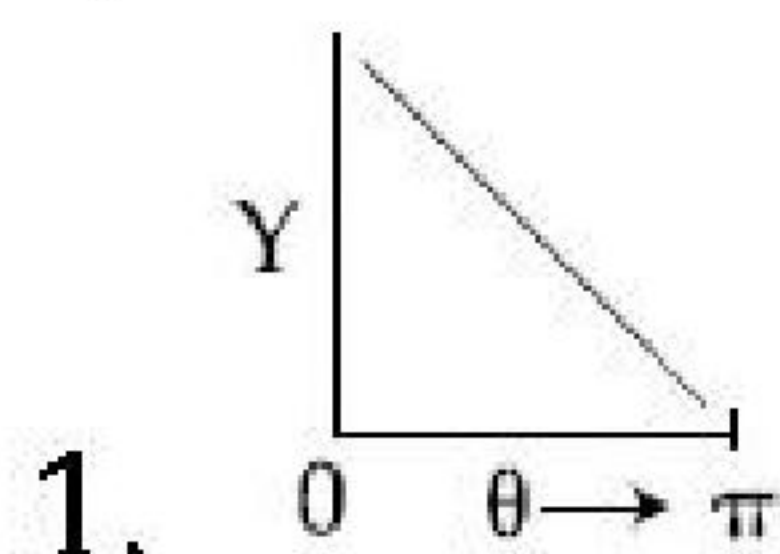
The graph which depicts the results of Rutherford gold foil experiment with α -particles is :

θ : Scattering angle

Y : Number of scattered α -particles detected

(Plots are schematic and not to scale)

Options :



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

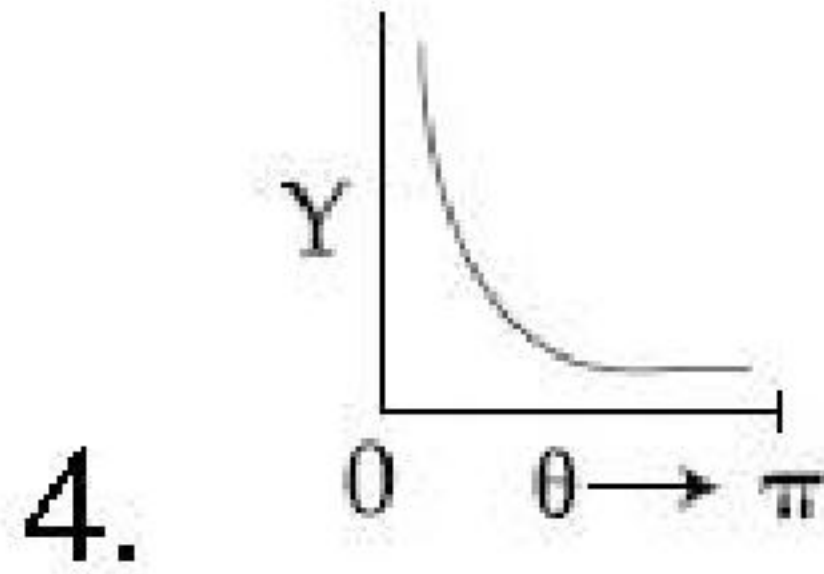
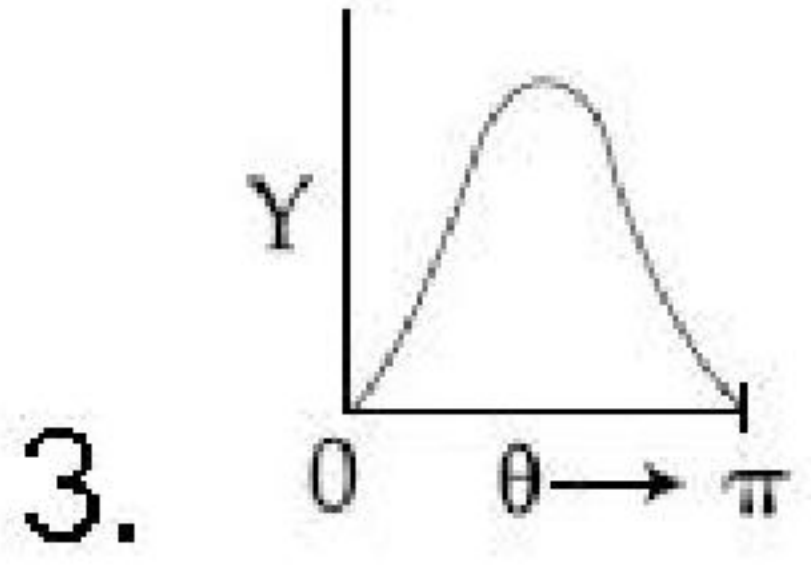
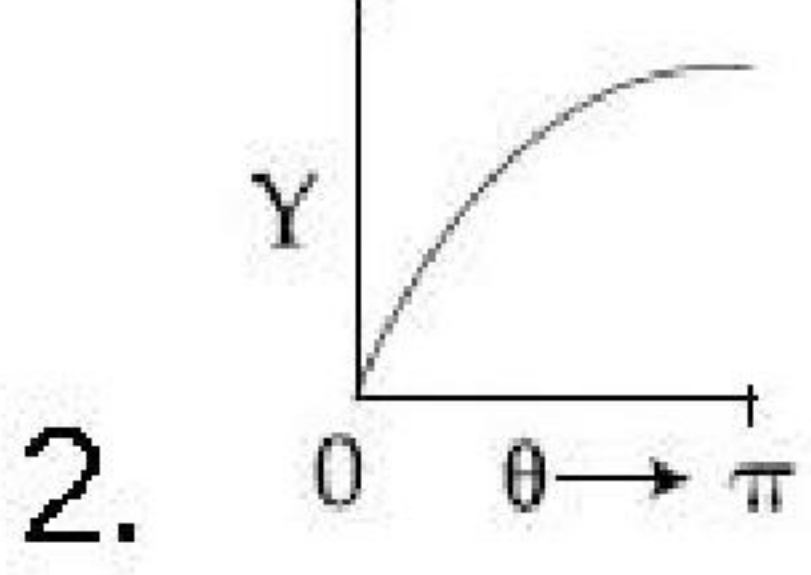
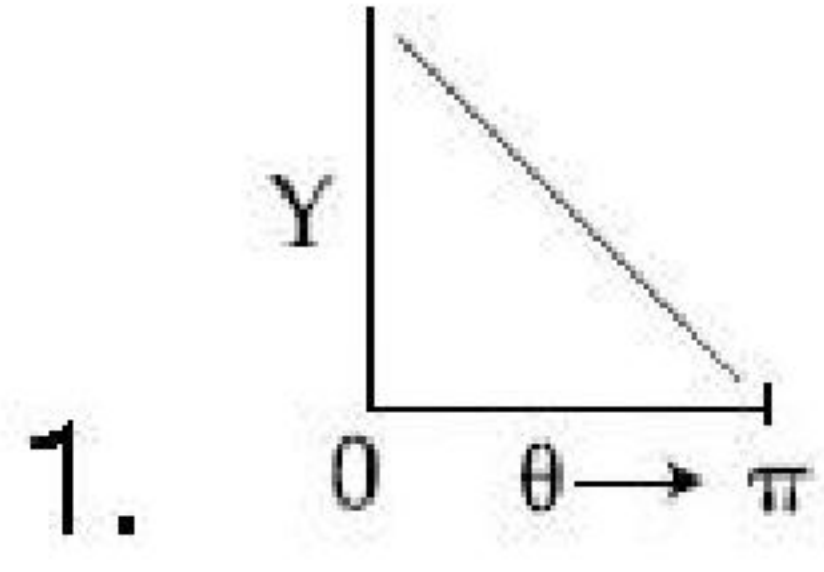
Correct Marks : 4 Wrong Marks : 1

नीचे दिये गये चित्रों में से कौन सा ग्राफ रदरफोर्ड के स्वर्ण पन्नी पर α -कणों द्वारा किये गये प्रयोग के परिणाम को दर्शाता है? यहां पर

θ : प्रकीर्णन कोण (Scattering angle)

Y : प्रकीर्णित α -कणों की संख्या

(चित्र सांकेतिक है)



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

Correct Marks : 4 Wrong Marks : 1

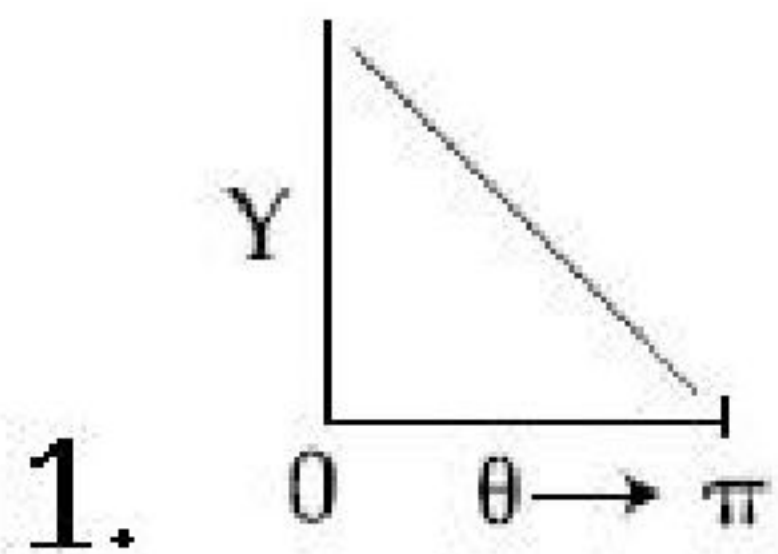
ફેઝરફોર્ડ સોનાના વરખ માટે α - કણ નો પ્રયોગ ના પરિણામ વર્ણવી શકે તે આલેખ _____ છે.

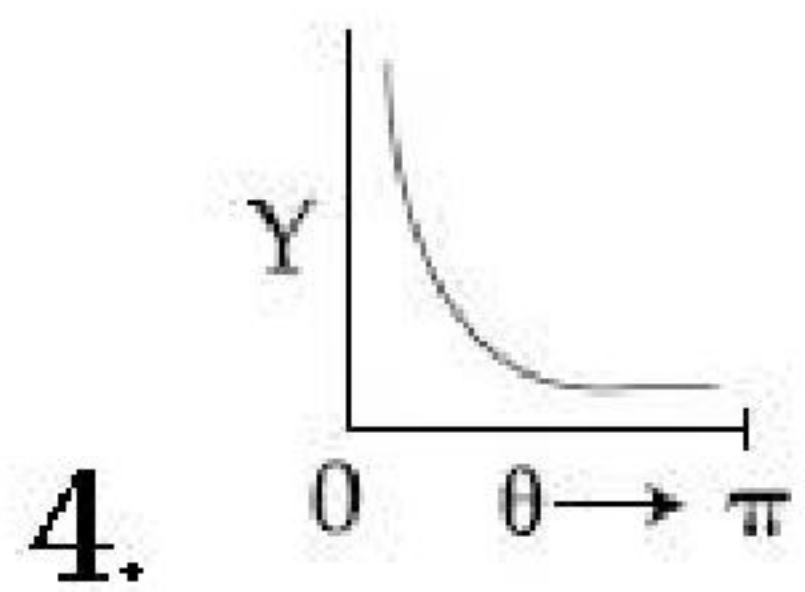
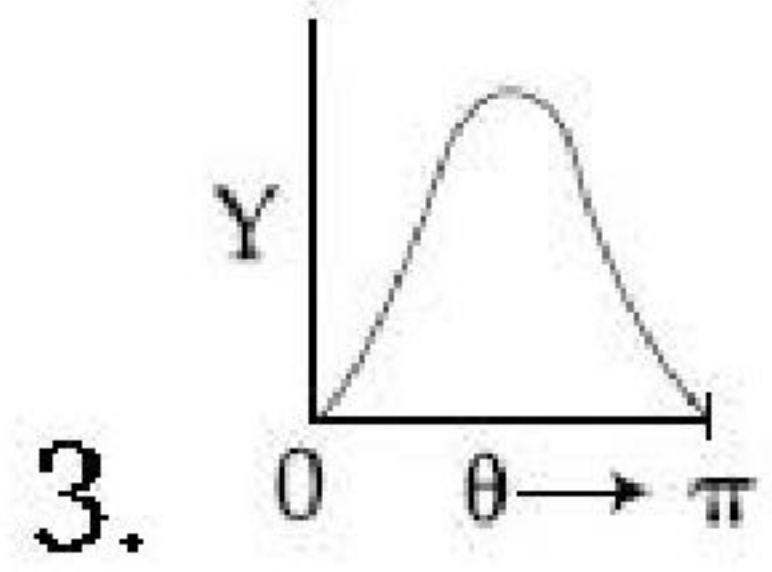
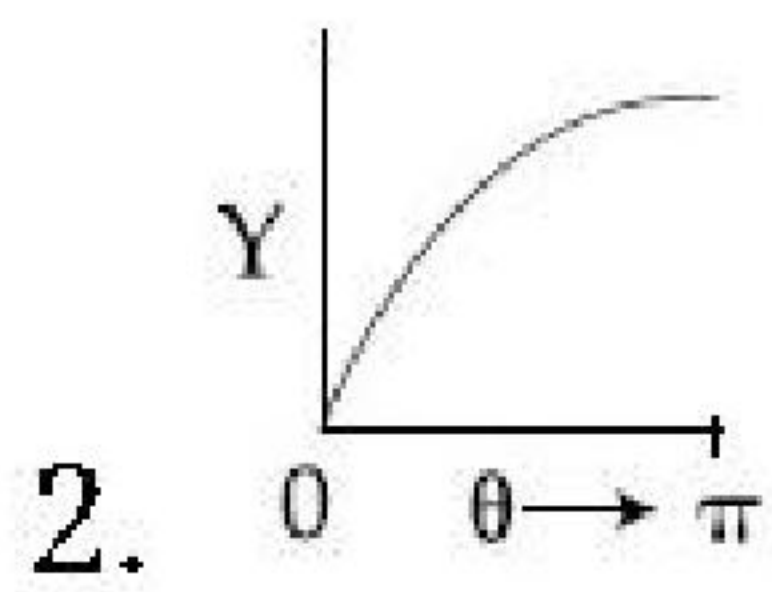
θ : પ્રકિર્ણન કોણ

Y : નોંધાયેલા અને પ્રકિર્ણન પામેલા α -કણોની સંખ્યા

(અત્રે આલેખો ફક્ત રેખાકૃતિ સૂચવે છે, માપ-પ્રમાણો દોરવા નથી)

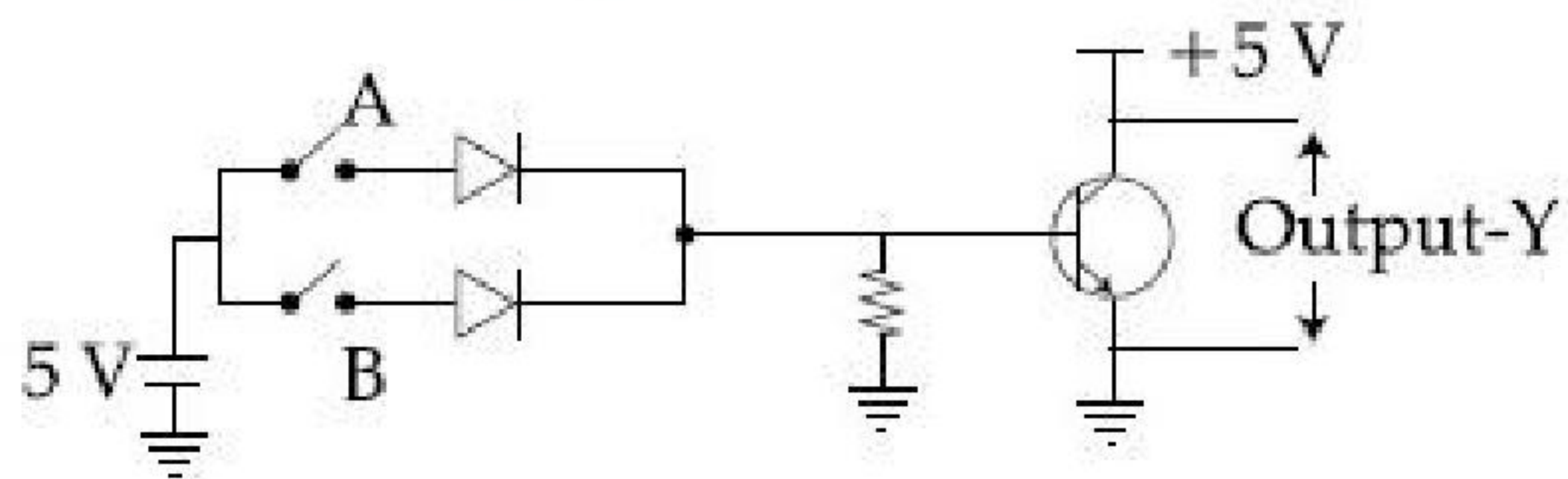
Options :





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

Boolean relation at the output stage-Y for the following circuit is :



Options :

1. $A + B$

2. $A \cdot B$

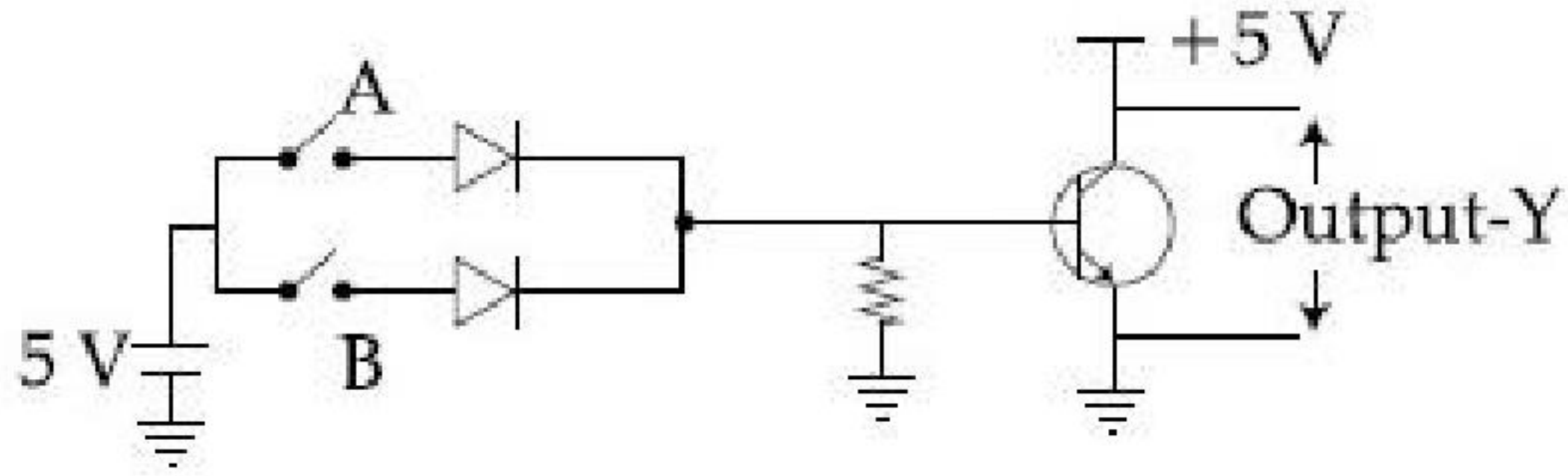
3. $\bar{A} + \bar{B}$

4. $\bar{A} \cdot \bar{B}$

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

Correct Marks : 4 Wrong Marks : 1

नीचे दिये गये परिपथ के निर्गत Y के लिये बूलियन सम्बन्ध होगा :



Options :

1. $A + B$

2. $A \cdot B$

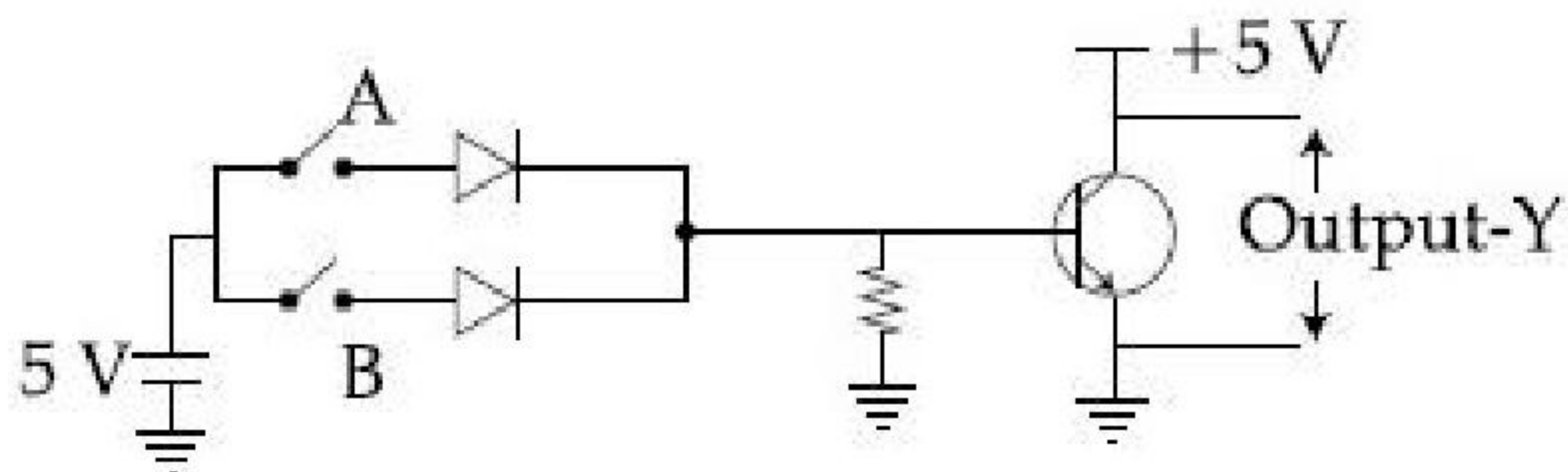
3. $\bar{A} + \bar{B}$

4. $\bar{A} \cdot \bar{B}$

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

Correct Marks : 4 Wrong Marks : 1

આપેલા પરિપથ માટે આઉટપુટ Y માટે બુલીયન સંબંધ
_____ થશે.



Options :

1. $A + B$

2. $A \cdot B$

3. $\overline{A} + \overline{B}$

4. $\overline{A} \cdot \overline{B}$

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

Correct Marks : 4 Wrong Marks : 1

The length of a potentiometer wire is 1200 cm and it carries a current of 60 mA. For a cell of emf 5 V and internal resistance of 20Ω , the null point on it is found to be at 1000 cm. The resistance of whole wire is :

Options :

1. 60Ω

2. 80Ω

3. 100Ω

4. 120Ω

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

Correct Marks : 4 Wrong Marks : 1

एक पोटेंशियोमीटर के तार की लम्बाई 1200 cm है और इसमें 60 mA की विद्युत धारा प्रवाहित हो रही है। एक 5 V विद्युत-वाहक बल तथा 20Ω आंतरिक प्रतिरोधक वाले सैल के लिये इस पर संतुलन बिन्दु 1000 cm पर आता है। तब पोटेंशियोमीटर के तार का प्रतिरोध है :

Options :

1. 60Ω

2. 80Ω

3. 100Ω

4. 120Ω

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

પોટેન્શીયોમીટરની લંબાઈ 1200 cm છે અને તેમાંથી 60 mA નો પ્રવાહ પસાર થાય છે. 5 V જેટલો emf ધરાવતા અને 20Ω આંતરિક અવરોધ ધરાવતા વિદ્યુતકોષ (cell) માટે તેના પર મળતું સંતુલન બિંદુ 1000 cm આગળ મળે છે. આખાય તારનો અવરોધ _____ થશે.

Options :

1. 60Ω

2. 80Ω

3. 100Ω

4. 120Ω

Sub-Section Number:

2

Sub-Section Id:

40503687

Question Shuffling Allowed :

Yes

A particle is moving along the x -axis with its coordinate with time ' t ' given by $x(t) = 10 + 8t - 3t^2$. Another particle is moving along the y -axis with its coordinate as a function of time given by $y(t) = 5 - 8t^3$. At $t = 1$ s, the speed of the second particle as measured in the frame of the first particle is given as $\sqrt{v}$. Then v (in m/s) is _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

580.0 to 580.0

Question Number : 21 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

एक कण x -अक्ष पर इस प्रकार चल रहा है कि इसका समय t के साथ x निर्देशक (coordinate) का मान $x(t) = 10 + 8t - 3t^2$ है। एक दूसरा कण y -अक्ष पर चल रहा है और इसका y निर्देशक $y(t) = 5 - 8t^3$ द्वारा दिया जाता है। यदि $t = 1$ s पर पहले कण के सापेक्ष दूसरे कण की गति $\sqrt{v}$ हो, तो v का मान (m/s में) है _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

580.0 to 580.0

Question Number : 21 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

એક કણ x - અક્ષની દિશામાં સમય t સાથે તેનો યામ $x(t) = 10 + 8t - 3t^2$ વડે આપાય તેમ ગતિ કરે છે. બીજો કણ y -અક્ષની દિશામાં, સમયના વિધેય રૂપે યામ $y(t) = 5 - 8t^3$ થી આપવામાં આવે છે. $t = 1$ s પ્રથમ કણની સ્થિર નિર્દેશકોમાં બીજા કણની મપાતી ઝડપ $\sqrt{v}$ વડે આપવામાં આવે છે. તો v (m/s માં) _____ થશે.

Response Type: Numeric

Evaluation Required For SA: Yes

580.0 to 580.0

Question Number : 22 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A body A, of mass $m = 0.1 \text{ kg}$ has an initial velocity of $3\hat{i} \text{ ms}^{-1}$. It collides elastically with another body, B of the same mass which has an initial velocity of $5\hat{j} \text{ ms}^{-1}$. After collision, A moves with a velocity $\vec{v} = 4(\hat{i} + \hat{j})$. The energy of B after collision is written as $\frac{x}{10} \text{ J}$. The value of x is _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

1.0 to 1.0

Question Number : 22 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

द्रव्यमान $m = 0.1 \text{ kg}$ का एक पिण्ड A का आरम्भिक वेग $3\hat{i} \text{ ms}^{-1}$ है। यह प्रत्यास्थ तरीके से समान द्रव्यमान के दूसरे पिण्ड B से टकराता है जिसका आरम्भिक वेग $5\hat{j} \text{ ms}^{-1}$ है। टकराने के बाद, पिण्ड A $\vec{v} = 4(\hat{i} + \hat{j})$ वेग से चल रहा है और पिण्ड B की ऊर्जा $\frac{x}{10} \text{ J}$ है। x का मान है _____।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

1.0 to 1.0

Question Number : 22 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

એક વસ્તુ A નું દળ $m = 0.1 \text{ kg}$ અને તેના પ્રારંભિક વેગ $3\hat{i} \text{ ms}^{-1}$ છે. તે બીજા આટલું જ દળ ધરાવતા કણ B, કે જેનો પ્રારંભિક વેગ $5\hat{j} \text{ ms}^{-1}$ છે તેની સાથે સ્થિતિસ્થાપક સંઘાત અનુભવે છે. સંઘાત બાદ A, $\vec{v} = 4(\hat{i} + \hat{j})$ જેટલા વેગથી ગતિ કરે છે. અથડામણ બાદ B ની ઉર્જા $\frac{x}{10} \text{ J}$ વડે અપાય છે. x નું મૂલ્ય _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

1.0 to 1.0

Question Number : 23 **Question Type :** SA

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

A one metre long (both ends open) organ pipe is kept in a gas that has double the density of air at STP. Assuming the speed of sound in air at STP is 300 m/s , the frequency difference between the fundamental and second harmonic of this pipe is _____ Hz.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

106 to 107.2

Question Number : 23 **Question Type :** SA

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

एक मीटर लम्बे व दोनों छोरों पर खुले हुए एक ऑर्गन पाइप को एक ऐसी गैस में रखा गया है, जिसका घनत्व वायु के मानक ताप व दाब पर घनत्व से दो गुना है। यह मानते हुए कि मानक ताप व दाब पर वायु में ध्वनि की गति 300 m/s , गैस में रखे पाइप की मूल आवृत्ति और द्वितीय हारमोनिक की आवृत्ति में अन्तर होगा _____ Hz.

Possible Answers :

106 to 107.2

Question Number : 23 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

એક મીટર લાંબી (બંને છેડેથી ખુલ્લી) નળી (organ pipe) ને જેની ધનતા STP એ હવાની ધનતા કરતા બમણી હોય તેવા વાયુમાં રાખવામાં આવે છે. હવામાં STP એ ધ્વનિની ઝડપ 300 m/s ધારતાં, મૂળભૂત અને દ્વિતીય આવર્તની આવૃત્તિનો તફાવત _____ Hz થશે.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

106 to 107.2

Question Number : 24 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Four resistances of 15Ω , 12Ω , 4Ω and 10Ω respectively in cyclic order to form Wheatstone's network. The resistance that is to be connected in parallel with the resistance of 10Ω to balance the network is _____ Ω .

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

15Ω , 12Ω , 4Ω और 10Ω के चार प्रतिरोधकों को क्रमबद्ध जोड़कर एक व्हीटस्टोन परिपथ बनाया जाता है। इस परिपथ को संतुलन में लाने के लिये 10Ω के प्रतिरोधक पर कितने Ω का एक प्रतिरोधक पार्श्व संबंधन में जोड़ा जाना चाहिये _____ Ω ।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

10 to 10

ચાર અવરોધો, અનુક્રમે $15\ \Omega$, $12\ \Omega$, $4\ \Omega$ અને $10\ \Omega$ ને ક્રમિક (ચક્રીય રીતે) જોડીને વહીસ્ટોન બ્રિજ બનાવવામાં આવેલ છે. આ નેટવર્ક (જાળ તંત્ર) ને સમતોલન કરવા, $10\ \Omega$ અવરોધને સમાંતર જોડવો પડતો અવરોધ _____ Ω 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

A point object in air is in front of the curved surface of a *plano-convex* lens. The radius of curvature of the curved surface is 30 cm and the refractive index of the lens material is 1.5, then the focal length of the lens (in cm) is _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

60 to 60

Question Number : 25 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

एक बिन्दु के आकार की वस्तु एक समतल-उत्तल लेंस की उत्तल सतह के सामने रखा हुआ है। उत्तल सतह की त्रिज्या 30 cm है और लेंस जिससे बना है उस पदार्थ का अपवर्तनांक 1.5 है। लेंस की फोकस दूरी का मान cm में कितना होगा _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

60 to 60

Question Number : 25 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

એક બિંદુવત્ પદાર્થ એક સમતલ-બહિર્ગોળ લેન્સની વક્રસપાટીની સામે હવામાં છે. વક્રસપાટીની વક્રત્રિજ્યા 30 cm છે અને લેન્સના પદાર્થનો અપવર્તનાંક 1.5 છે.

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

60 to 60

Chemistry

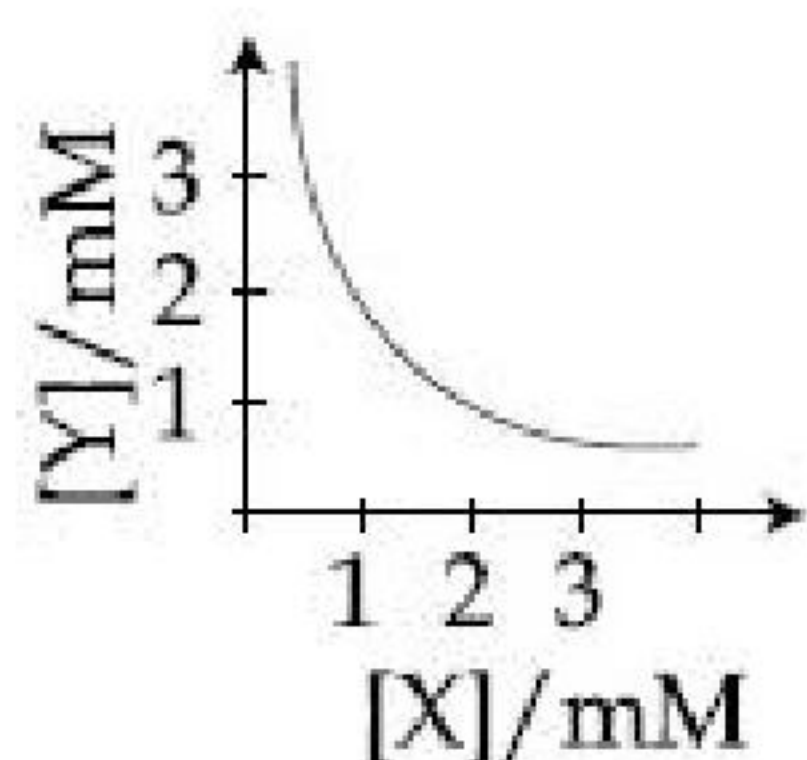
Section Id :	40503658
Section Number :	2
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	25
Number of Questions to be attempted:	25
Section Marks:	100

Sub-Section Number:	1
Sub-Section Id:	40503688
Question Shuffling Allowed :	Yes

Question Number : 26 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

The stoichiometry and solubility product of a salt with the solubility curve given below is, respectively :



Options :

1. $XY, 2 \times 10^{-6} M^3$

2. $XY_2, 4 \times 10^{-9} M^3$

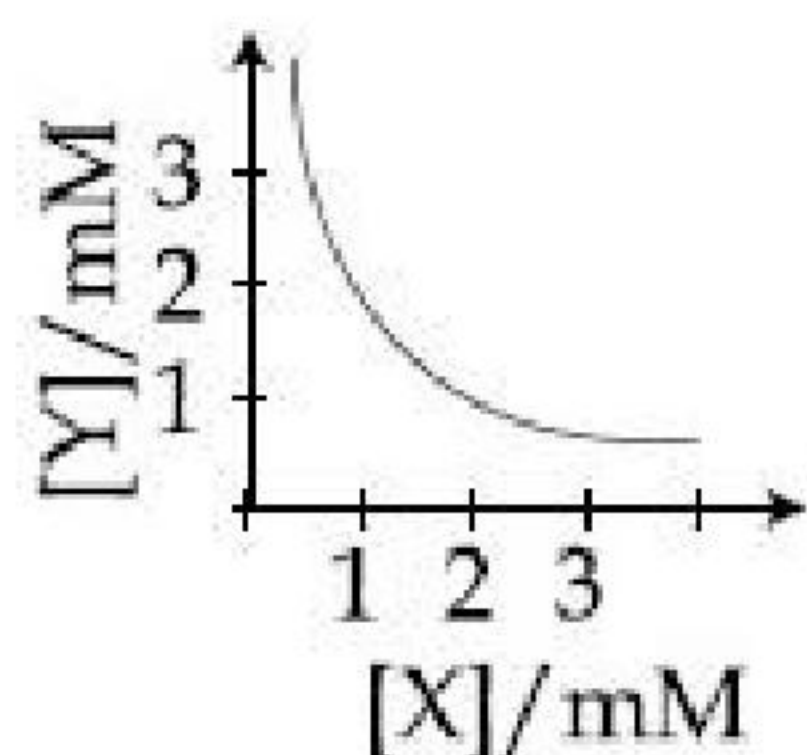
3. $X_2Y, 2 \times 10^{-9} M^3$

4. $XY_2, 1 \times 10^{-9} M^3$

Question Number : 26 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

નીચે દિયે ગયે વક્ર કે આધાર પર, એક લવણ કી સ્ટાઇકિયોમીટ્રી (રસસમીકરણમિતિ) તથા વિલેયતા ગુણનફલ, ક્રમશઃ હૈ :



Options :

1. $XY, 2 \times 10^{-6} M^3$

2. $XY_2, 4 \times 10^{-9} M^3$

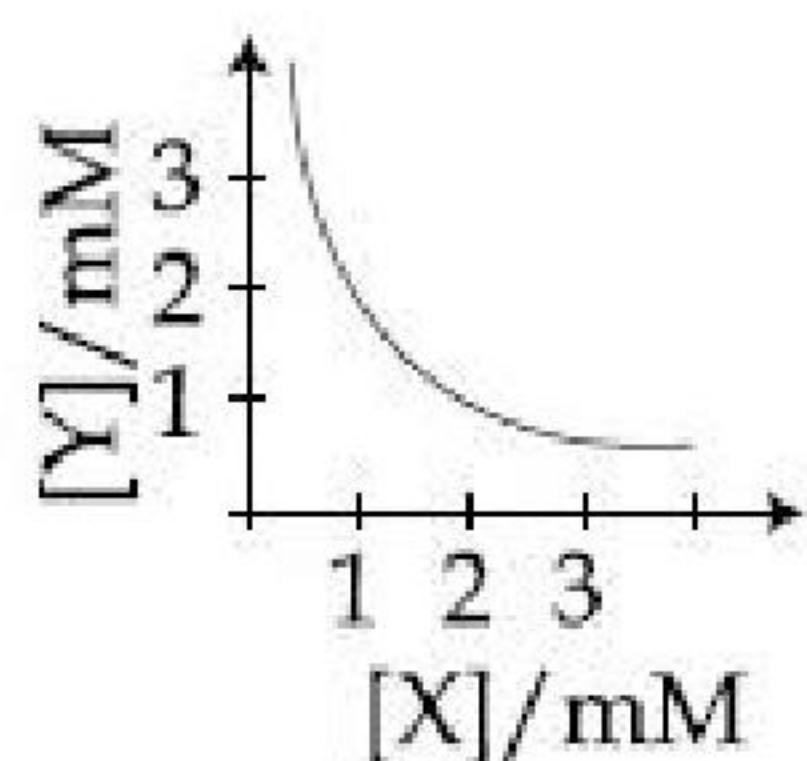
3. $X_2Y, 2 \times 10^{-9} M^3$

4. $XY_2, 1 \times 10^{-9} M^3$

Question Number : 26 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

એક ક્ષારનો દ્રાવ્યતા વક્ર નીચે આપેલો છે તો તેના તત્વયોગમીતીય અને દ્રાવ્યતા ગુણાકાર અનુક્રમે શોધો ?



Options :

1. $XY, 2 \times 10^{-6} M^3$

2. $XY_2, 4 \times 10^{-9} M^3$

3. $X_2Y, 2 \times 10^{-9} M^3$

4. $XY_2, 1 \times 10^{-9} M^3$

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

The rate of a certain biochemical reaction at physiological temperature (T) occurs 10^6 times faster with enzyme than without. The change in the activation energy upon adding enzyme is :

Options :

1. $-6RT$

2. $-6(2.303)RT$

3. $+6RT$

4. $+6(2.303)RT$

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

एक जैव-रासायनिक अभिक्रिया की दर शरीर क्रियात्मक ताप (T) पर बिना एन्जाइम की तुलना में एन्जाइम द्वारा 10^6 गुना तेज होता है। एन्जाइम के मिलाने पर सक्रियण ऊर्जा में परिवर्तन है :

Options :

1. $-6RT$

2. $-6(2.303)RT$

3. $+6RT$

4. $+6(2.303)RT$

Question Number : 27 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

કેટલીક જૈવરાસાયણીક પ્રક્રિયાઓનો દર શારીરિક તાપમાન (T) એ ઉત્સેચકોની હાજરીમાં તેઓની ગેરહાજરી કરતાં 10^6 મણી ઝડપી બને છે. તો ઉત્સેચક ઉમેરતા, સક્રિયકરણ શક્તિ માં થતો ફેરફાર શોધો?

Options :

1. $-6RT$

2. $-6(2.303)RT$

3. $+6RT$

4. $+6(2.303)RT$

Question Number : 28 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

As per Hardy-Schulze formulation, the

$$K_3[Fe(CN)_6] > AlCl_3 > K_2CrO_4 > KBr$$

1. $> KNO_3$

$$AlCl_3 > K_3[Fe(CN)_6] > K_2CrO_4 >$$

2. $KBr = KNO_3$

$$K_3[Fe(CN)_6] < K_2CrO_4 < AlCl_3 < KBr$$

3. $< KNO_3$

$$K_3[Fe(CN)_6] < K_2CrO_4 < KBr =$$

4. $KNO_3 = AlCl_3$

Question Number : 28 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

हार्डी-सुल्से संरूपण के अनुसार, फेरिक हाइड्राक्साइड
सॉल के लिए निम्न का ऊर्णन मान इस क्रम में है :

Options :

$$K_3[Fe(CN)_6] > AlCl_3 > K_2CrO_4 > KBr$$

1. $> KNO_3$

$$AlCl_3 > K_3[Fe(CN)_6] > K_2CrO_4 >$$

2. $KBr = KNO_3$

$$K_3[Fe(CN)_6] < K_2CrO_4 < AlCl_3 < KBr$$

3. $< KNO_3$

$$K_3[Fe(CN)_6] < K_2CrO_4 < KBr =$$

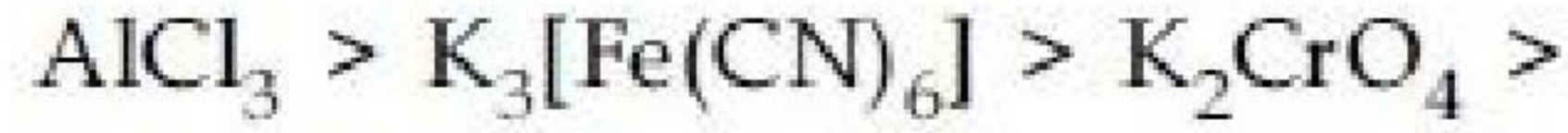
4. $KNO_3 = AlCl_3$

હાર્ડિશુલ્જ બનાવટ પ્રમાણે, ફેરીક હાઈડ્રોક્સાઈડસોલનાં
ઉર્ણન મુલ્યો નો ક્રમ શોધો :

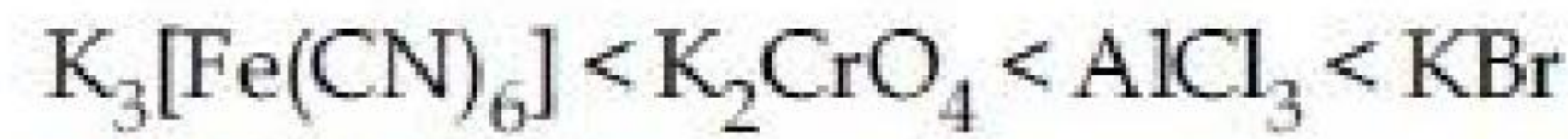
Options :



1. $> KNO_3$



2. $KBr = KNO_3$



3. $< KNO_3$



4. $KNO_3 = AlCl_3$

Question Number : 29 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

The predominant intermolecular forces
present in ethyl acetate, a liquid, are :

Options :

hydrogen bonding and London

1. dispersion

London dispersion, dipole-dipole
and hydrogen bonding

2.

Dipole-dipole and hydrogen bonding

3.

London dispersion and dipole-dipole

4.

Question Number : 29 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

દ્રવ ઇથિલ એસીટેટ મેં ઉપસ્થિત પ્રમુખ અંતરાઅણુક
બલ હેં :

Options :

1. હાઇડ્રોજન આબન્ધ તથા લન્ડન પરિક્ષેપણ

2. લન્ડન પરિક્ષેપણ, દ્વિધ્રુવ-દ્વિધ્રુવ તથા હાઇડ્રોજન
આબન્ધ

3. દ્વિધ્રુવ-દ્વિધ્રુવ તથા હાઇડ્રોજન આબન્ધ

4. લન્ડન પરિક્ષેપણ તથા દ્વિધ્રુવ-દ્વિધ્રુવ

Question Number : 29 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

પ્રવાહી, ઈથાઈલ એસિટેટમાં મુખ્ય આતરઆણ્વીય બળો
હાજર હોય છે તે :

Options :

1. હાઈડ્રોજન બંધન અને લંડન ડીપ્રેશન

2. લંડન ડીપ્રેશન, દ્વિધ્રુવીય-દ્વિધ્રુવીય અને હાઈડ્રોજન
બંધન

3. દ્વિધ્રુવીય-દ્વિધ્રુવીય અને હાઈડ્રોજન બંધન

4. લંડન ડીપ્રેશન અને દ્વિધ્રુવીય-દ્વિધ્રુવીય

Correct Marks : 4 Wrong Marks : 1

For the Balmer series in the spectrum of H

atom, $\bar{\nu} = R_H \left\{ \frac{1}{n_1^2} - \frac{1}{n_2^2} \right\}$, the correct

statements among (I) to (IV) are :

- (I) As wavelength decreases, the lines in the series converge
- (II) The integer n_1 is equal to 2
- (III) The lines of longest wavelength corresponds to $n_2 = 3$
- (IV) The ionization energy of hydrogen can be calculated from wave number of these lines

Options :

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

2. (II), (III), (IV)

3. (I), (III), (IV)

4. (I), (II), (IV)

Question Number : 30 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

हाइड्रोजन परमाणु के स्पेक्ट्रम में बामर श्रेणी के लिए :

$\bar{\nu} = R_H \left\{ \frac{1}{n_1^2} - \frac{1}{n_2^2} \right\}$, (I) - (IV) में सही कथन

हैं :

- (I) जैसे जैसे तरंगदैर्घ्य घटती है, श्रेणी में लाइनें अभिसरित करती हैं।
- (II) पूर्णांक n_1 2 के बराबर है।
- (III) दीर्घतम तरंगदैर्घ्य की लाइनें $n_2 = 3$ के अनुरूप होती हैं।

(IV) इस लाइनों की तरंग संख्या में हाइड्रोजन के

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

2. (II), (III), (IV)

3. (I), (III), (IV)

4. (I), (II), (IV)

Question Number : 30 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

H પરમાણુના બામર-શ્રેણી વર્ણપટમાં

$$\bar{\nu} = R_H \left\{ \frac{1}{n_1^2} - \frac{1}{n_2^2} \right\}$$

(I) - (IV) માં સાચા વિધાનો છે.

(I) જો તરંગલંબાઈ ઘટે, તેમ રેખાઓ એકઠી થાય છે.

(II) પૂર્ણાંક n_1 તે 2 બરાબર છે.

(III) મહત્તમ તરંગલંબાઈ ધરાવતી રેખાઓ $n_2=3$ ને અનુરૂપ છે.

(IV) હાઈડ્રોજનની આયનીકરણ શક્તિ આ રેખાઓની તરંગસંખ્યા ઉપરથી ગણી શકાય છે.

Options :

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

2. (II), (III), (IV)

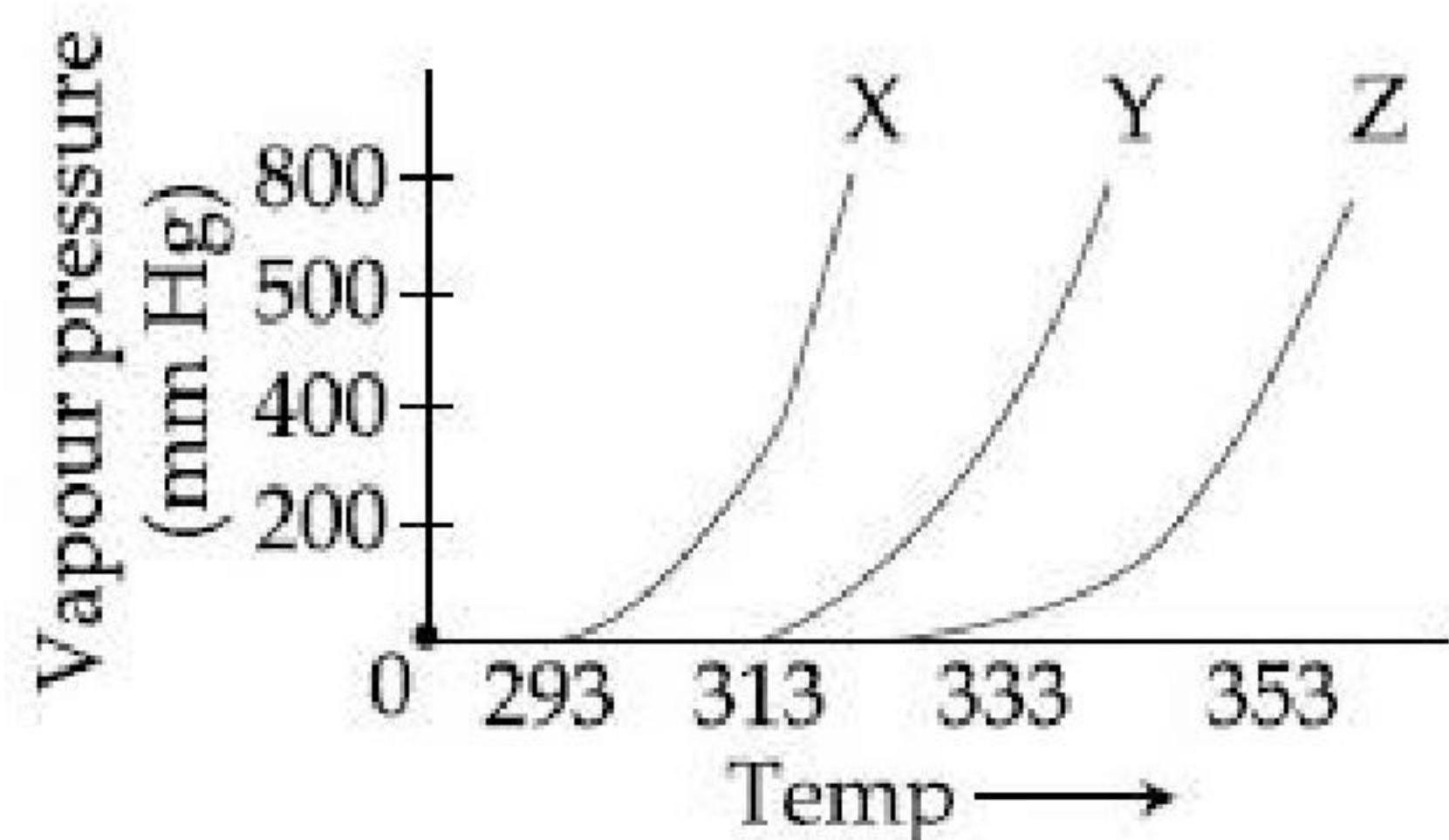
3. (I), (III), (IV)

4. (I), (II), (IV)

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

Correct Marks : 4 Wrong Marks : 1

A graph of vapour pressure and temperature for three different liquids X, Y, and Z is shown below :



The following inferences are made :

- (A) X has higher intermolecular interactions compared to Y.
- (B) X has lower intermolecular interactions compared to Y.
- (C) Z has lower intermolecular interactions compared to Y.

The correct inference(s) is/are :

Options :

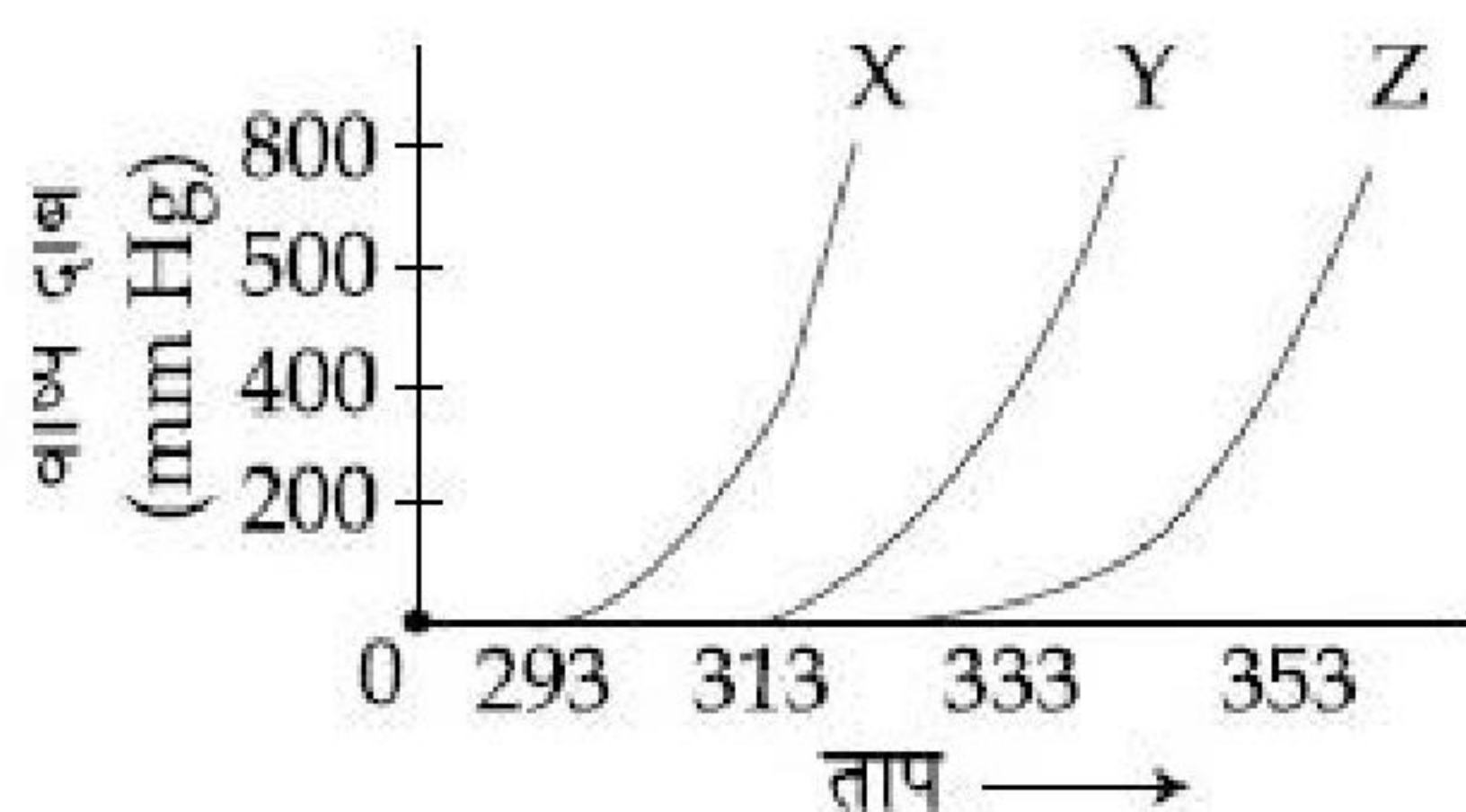
1. (A)

2. (B)

3. (C)

4. (A) and (C)

तीन अलग-अलग द्रवों X, Y एवं Z के लिए वाष्प दाब तथा ताप के बीच एक ग्राफ नीचे दिया गया है :



निम्न निष्कर्ष निकाले गये :

- (A) Y की तुलना में X का अंतराअणुक अन्योन्य क्रिया उच्चतर है।
- (B) Y की तुलना में X का अंतराअणुक अन्योन्य क्रिया निम्नतर है।
- (C) Y की तुलना में Z का अंतराअणुक अन्योन्य क्रिया निम्नतर है।

सही निष्कर्ष/निष्कर्ष है/हैं :

Options :

1. (A)

2. (B)

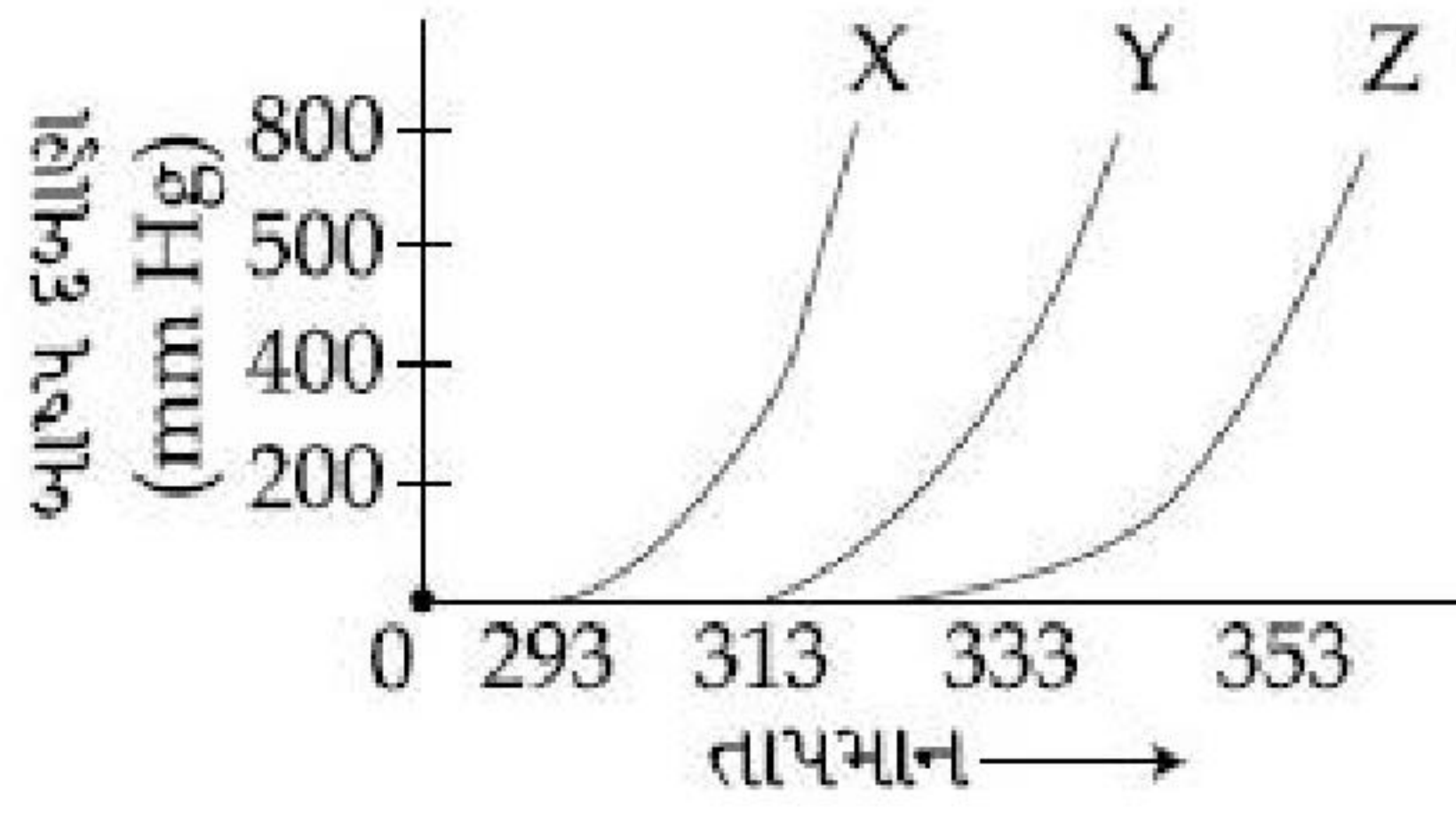
3. (C)

4. (A) तथा (C)

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

Correct Marks : 4 Wrong Marks : 1

જુદા-જુદા ત્રણ પ્રવાહી X, Y અને Z માટે બાષ્પદબાણ અને તાપમાન નો આલેખ નીચે આપેલો છે :



નીચેના તારણો કાઢ્યા :

- (A) X માં આંતર આણ્વીય, આંતરક્રિયા Y ની સરખામણીમાં વધુ છે.
- (B) X માં આંતર આણ્વીય આંતરક્રિયા Y સરખામણીમાં ઓછી છે.
- (C) Z માં આંતર આણ્વીય આંતરક્રિયા Y ની સરખામણીમાં ઓછી છે.

સચોટ તારણો શોધો :

Options :

1. (A)

2. (B)

3. (C)

4. (A) અને (C)

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

Correct Marks : 4 Wrong Marks : 1

The first ionization energy (in kJ/mol) of Na, Mg, Al and Si respectively, are :

Options :

2. 786, 737, 577, 496

3. 496, 737, 577, 786

4. 496, 577, 786, 737

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

Correct Marks : 4 Wrong Marks : 1

Na, Mg, Al તથા Si કી પ્રથમ આયનન ઊર્જા
(kJ mol^{-1} મેં) ક્રમશઃ હેં :

Options :

1. 496, 577, 737, 786

2. 786, 737, 577, 496

3. 496, 737, 577, 786

4. 496, 577, 786, 737

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

Correct Marks : 4 Wrong Marks : 1

Na, Mg, Al અને Si ની અનુક્રમે પ્રથમ આયનીકરણ
શક્તિ (kJ/mol^{-1} મેં) માં :

Options :

1. 496, 577, 737, 786

2. 786, 737, 577, 496

3. 496, 737, 577, 786

4. 496, 577, 786, 737

Question Number : 33 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

The strength of an aqueous NaOH solution is *most accurately* determined by titrating :
(Note : consider that an appropriate indicator is used)

Options :

1. Aq. NaOH in a volumetric flask and concentrated H_2SO_4 in a conical flask

2. Aq. NaOH in a burette and concentrated H_2SO_4 in a conical flask

3. Aq. NaOH in a burette and aqueous oxalic acid in a conical flask

4. Aq. NaOH in a pipette and aqueous oxalic acid in a burette

Question Number : 33 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

जलीय NaOH विलयन की सामर्थ्य सर्वाधिक यथार्थता से इस तरह अनुमापन द्वारा निकाली जाती है :
(नोट : विचार कीजिए कि एक उपयुक्त संसूचक का उपयोग किया गया है।)

Options :

1. जलीय NaOH आयतनी फ्लास्क में तथा सान्द्र H_2SO_4 एक कॉनिकल फ्लास्क में

2. જલીય NaOH એક બ્યૂરેટ મેં તથા સાન્દ્ર H_2SO_4 એક કોનિકલ ફ્લાસ્ક મેં

3. જલીય NaOH એક બ્યૂરેટ મેં તથા જલીય આક્સેલિક એસિડ એક કોનિકલ ફ્લાસ્ક મેં

4. જલીય NaOH એક પિપેટ મેં તથા જલીય આક્સેલિક એસિડ એક બ્યૂરેટ મેં

Question Number : 33 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

જલીય NaOH ના દ્વાવણનું સામર્થ્ય એકદમ ચોકસાઈ પૂર્વક શોધવા તેનું અનુમાન,
(નોંધ : ધ્યાન માં લો કે ચોચ સૂચક નો ઉપયોગ થયેલો છે.)

Options :

1. જલીય NaOH કદમાપક ફ્લાસ્ક માં અને H_2SO_4 કોનીકલ ફ્લાસ્કમાં

2. જલીય NaOH બ્યૂરેટ માં અને સાંદ્ર H_2SO_4 કોનીકલ ફ્લાસ્કમાં

3. જલીય NaOH બ્યૂરેટમાં અને જલીય ઓક્ઝલિક એસિડ કોનીકલ ફ્લાસ્કમાં

4. જલીય NaOH પિપેટમાં અને જલીય ઓક્ઝલિક એસિડ બ્યૂરેટમાં

When gypsum is heated to 393 K, it forms :

Options :

1. Anhydrous CaSO_4
2. Dead burnt plaster
3. $\text{CaSO}_4 \cdot 0.5 \text{H}_2\text{O}$
4. $\text{CaSO}_4 \cdot 5 \text{H}_2\text{O}$

Question Number : 34 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

जब जिप्सम को 393 K तक गरम किया जाता है, तो बनता है :

Options :

1. निर्जल CaSO_4
2. मृत-तापित प्लास्टर
3. $\text{CaSO}_4 \cdot 0.5 \text{H}_2\text{O}$
4. $\text{CaSO}_4 \cdot 5 \text{H}_2\text{O}$

Question Number : 34 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

જ્યારે જીપ્સમને 393 K એ ગરમ કરવામાં આવે ત્યારે, તે નીચેનામાંથી શું બનાવે છે?

Options :

1. निर्जल CaSO_4

2. भूतःपाय प्लास्टर

3. $\text{CaSO}_4 \cdot 0.5 \text{H}_2\text{O}$

4. $\text{CaSO}_4 \cdot 5 \text{H}_2\text{O}$

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

The number of bonds between sulphur and oxygen atoms in $\text{S}_2\text{O}_8^{2-}$ and the number of bonds between sulphur and sulphur atoms in rhombic sulphur, respectively, are :

Options :

1. 4 and 6

2. 4 and 8

3. 8 and 6

4. 8 and 8

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

$S_2O_8^{2-}$ में सल्फर तथा ऑक्सीजन परमाणुओं के बीच आबन्धों की संख्या तथा विषमलंबाक्ष सल्फर में सल्फर परमाणुओं तथा सल्फर के बीच आबन्धों की संख्या क्रमशः हैं :

Options :

1. 4 तथा 6

2. 4 तथा 8

3. 8 तथा 6

4. 8 तथा 8

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

$S_2O_8^{2-}$ માં સલ્ફર અને ઓક્સિજન પરમાણુ વચ્ચે રહેલા બંધોની સંખ્યા અને રહોમ્બિક સલ્ફર માં રહેલા સલ્ફર અને સલ્ફર પરમાણુની વચ્ચે રહેલા બંધોની સંખ્યા અનુક્રમે :

Options :

1. 4 અને 6

2. 4 અને 8

3. 8 અને 6

4. 8 અને 8

Question Number : 36 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

The third ionization enthalpy is minimum
for :

Options :

1. Ni

2. Mn

3. Fe

4. Co

Question Number : 36 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

जिसके लिये तृतीय आयनन एन्थैल्पी न्यूनतम है, वह
है :

Options :

1. Ni

2. Mn

3. Fe

4. Co

Question Number : 36 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Options :

1. Ni

2. Mn

3. Fe

4. Co

Question Number : 37 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

The complex that can show *fac*- and *mer*- isomers is :

Options :

1. $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$

2. $[\text{CoCl}_2(\text{en})_2]$

3. $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$

4. $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$

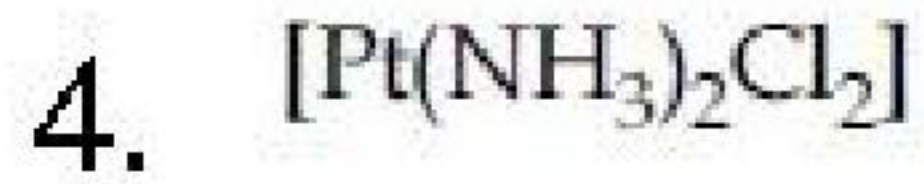
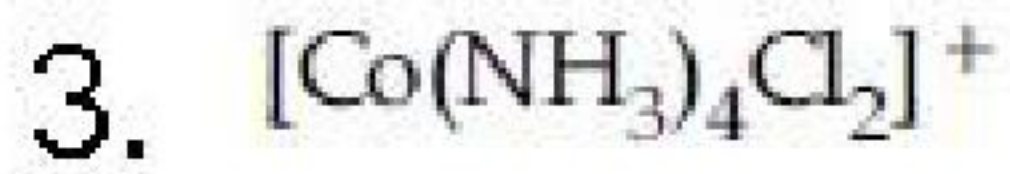
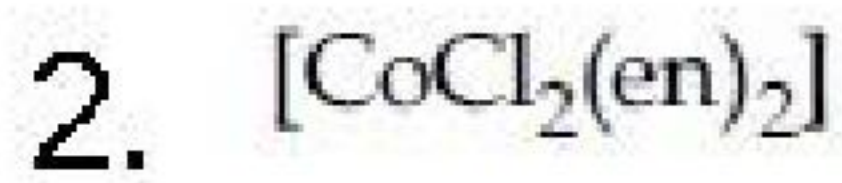
Question Number : 37 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

वह संकर जो *fac*- तथा *mer*- समावयवी प्रदर्शित करता है, है :

Options :

1. $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$

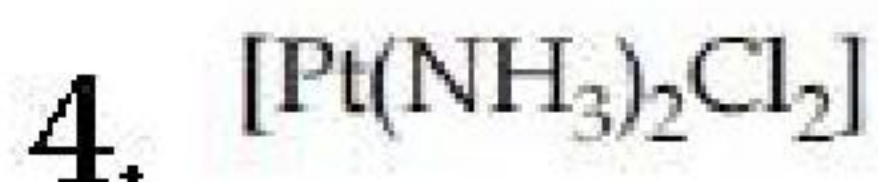
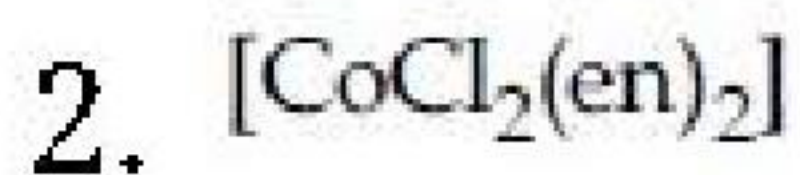


Question Number : 37 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

સંકિર્ણ કે જે *fac*- અને *mer*- સમઘટકતા દર્શાવે છે તે,

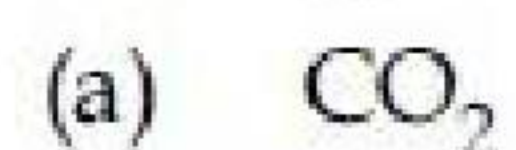
Options :



Question Number : 38 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Among the gases (a) - (e), the gases that cause greenhouse effect are :



1. (a) and (d)

2. (a), (c), (d) and (e)

3. (a), (b), (c) and (e)

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

Question Number : 38 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

गैसों (a) से (e) में, गैसों जो ग्रीनहाउस प्रभाव पैदा करती हैं, होंगी :

- (a) CO_2
- (b) H_2O
- (c) CFCs
- (d) O_2
- (e) O_3

Options :

1. (a) तथा (d)

2. (a), (c), (d) तथा (e)

3. (a), (b), (c) तथा (e)

4. (a), (b), (c) तथा (d)

Question Number : 38 Question Type : MCQ Option Shuffling : Yes

નીચે આપેલા વાયુઓ (a) - (e) માંથી જે વાયુઓ ગ્રીનહાઉસ અસર ઉત્પન્ન કરે છે :

- (a) CO_2
- (b) H_2O
- (c) CFCs
- (d) O_2
- (e) O_3

Options :

1. (a) અને (d)

2. (a), (c), (d) અને (e)

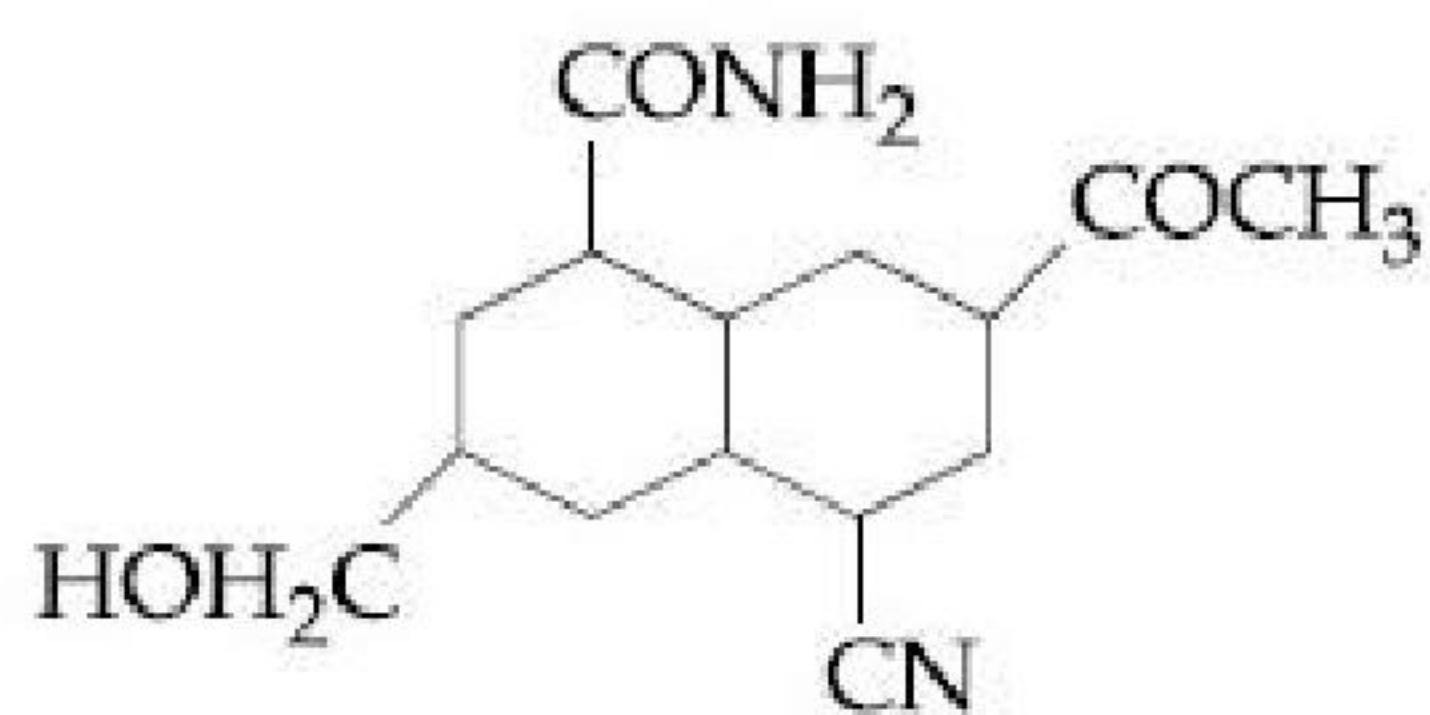
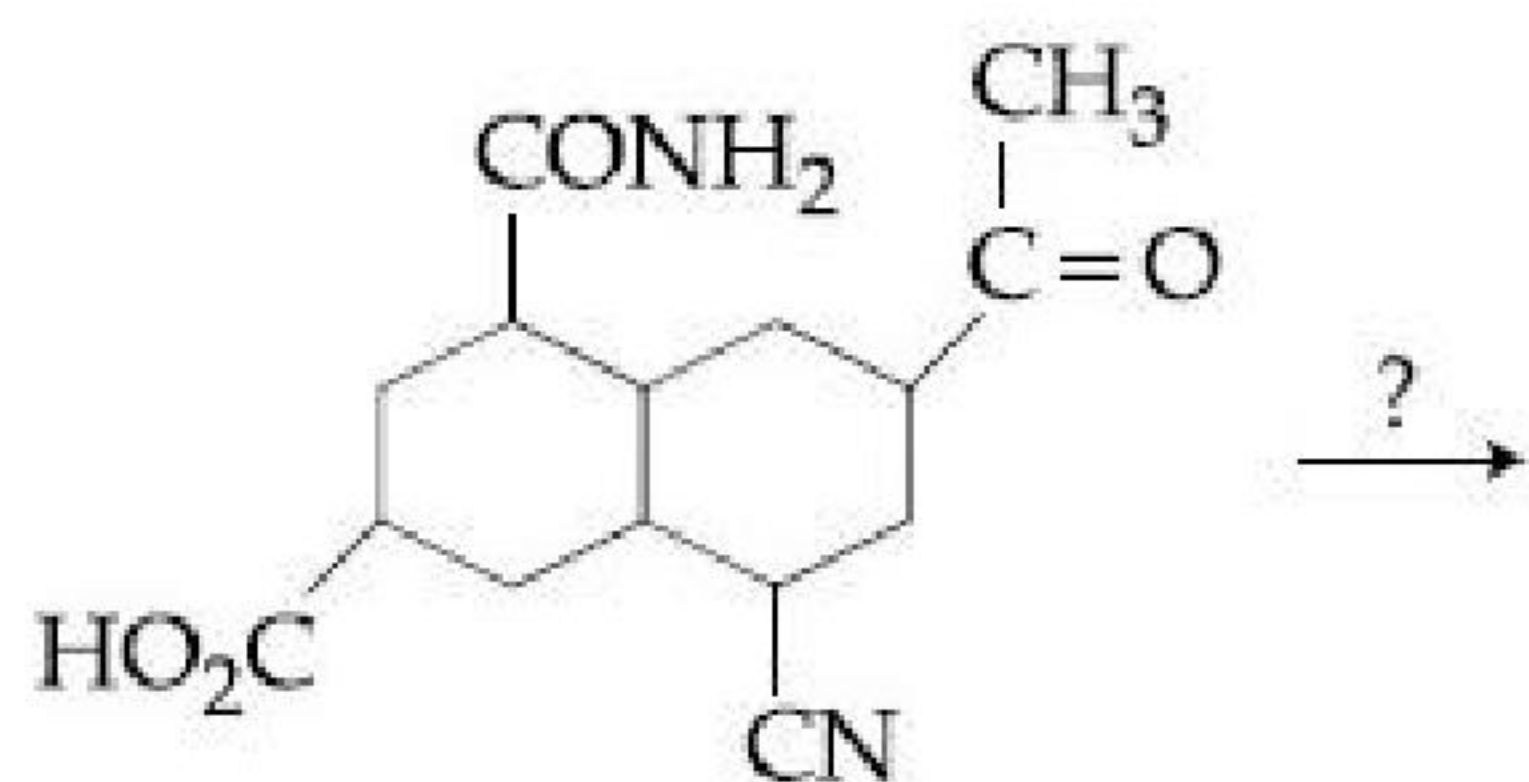
3. (a), (b), (c) અને (e)

4. (a), (b), (c) અને (d)

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

Correct Marks : 4 Wrong Marks : 1

The most suitable reagent for the given conversion is :



1. LiAlH_4

2. B_2H_6

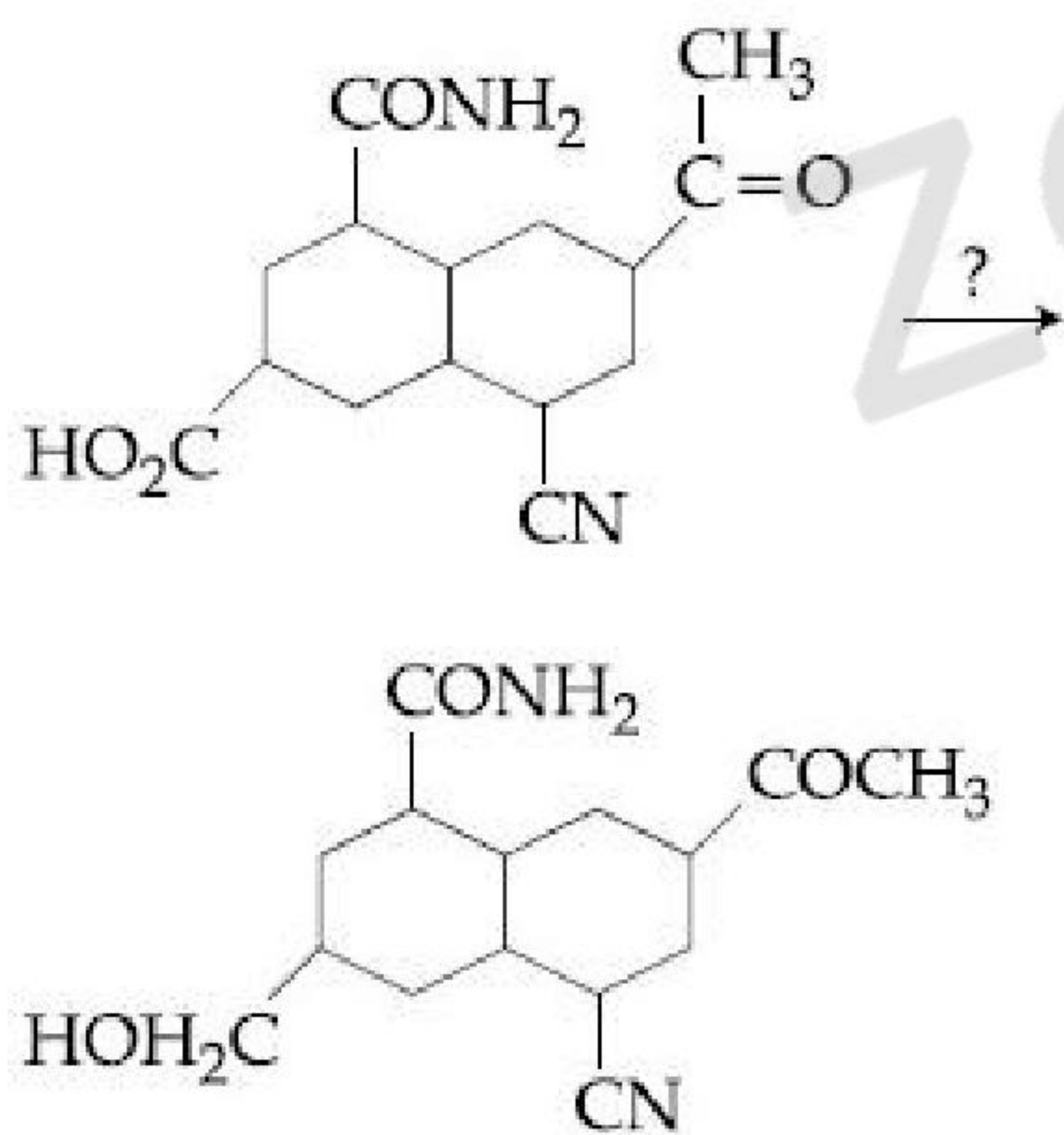
3. H_2/Pd

4. NaBH_4

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

Correct Marks : 4 Wrong Marks : 1

दिये गये रूपान्तरण के लिए सर्वाधिक उपयुक्त अभिकर्मक है :



Options :

1. LiAlH_4

2. B_2H_6

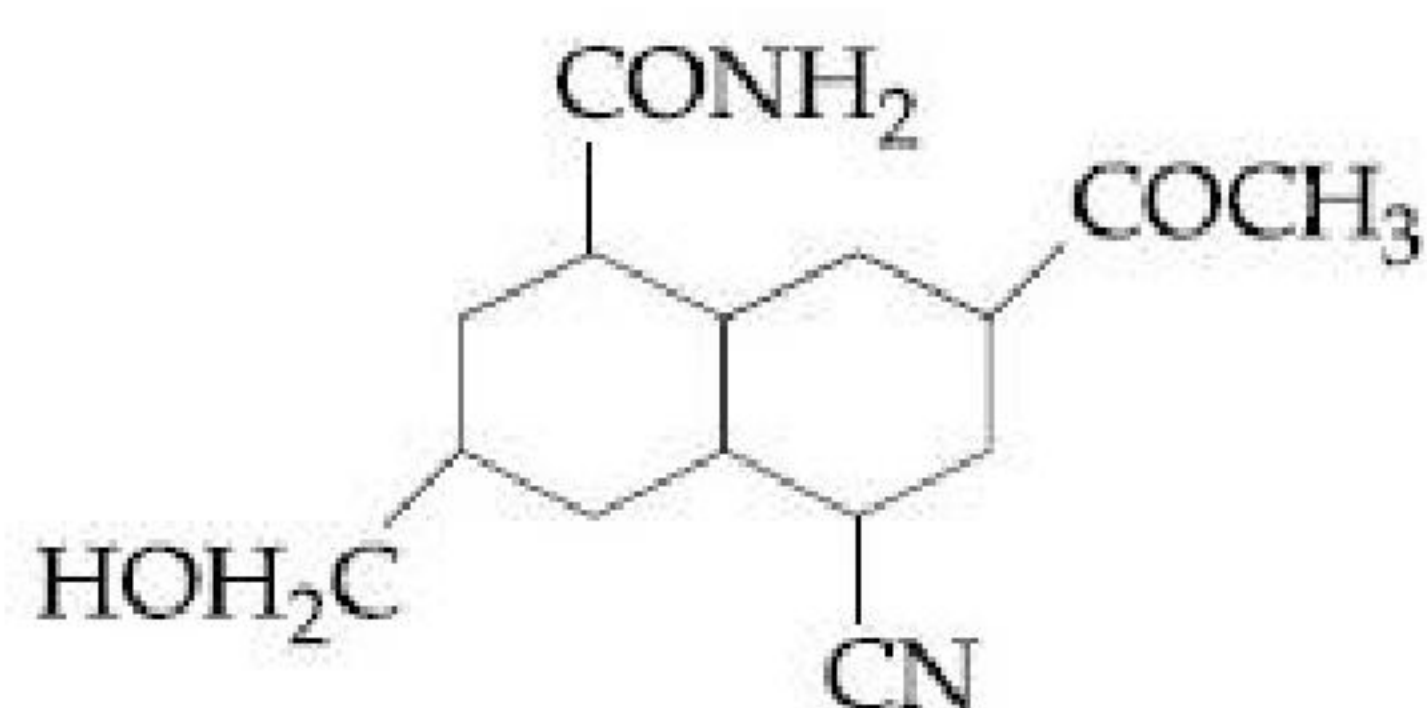
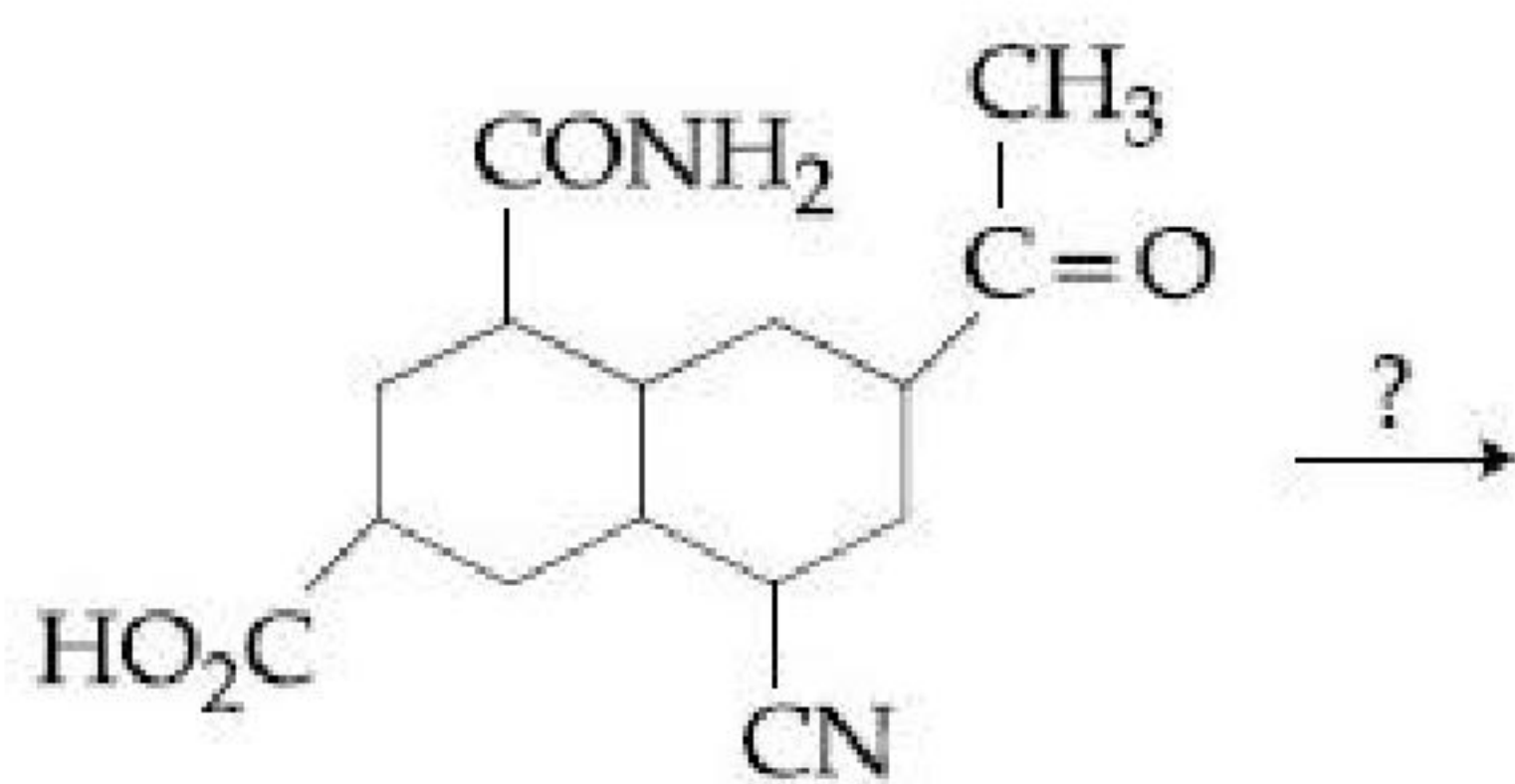
3. H_2/Pd

4. NaBH_4

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

Correct Marks : 4 Wrong Marks : 1

સૌથી વધુ સુસંગત પ્રક્રિયક, આપેલ રૂપાંતર માટે,



Options :

1. LiAlH_4

2. B_2H_6

3. H_2/Pd

4. NaBH_4

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

Correct Marks : 4 Wrong Marks : 1

A flask contains a mixture of isohexane and 3-methylpentane. One of the liquids boils at 63°C while the other boils at 60°C . What is the best way to separate the two liquids and which one will be distilled out first ?

Options :

1. fractional distillation, isohexane
2. fractional distillation, 3-methylpentane
3. simple distillation, isohexane
4. simple distillation, 3-methylpentane

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

Correct Marks : 4 Wrong Marks : 1

एक फ्लास्क में आइसोहेक्सेन तथा 3-मेथिलपेन्टेन का मिश्रण है। इन द्रवों में एक 63°C पर उबलता है जबकि दूसरा 60°C पर उबलता है। इन दो द्रवों को पृथक् करने का सबसे अच्छा उपाय क्या है तथा इनमें कौन सर्वप्रथम आसवित होगा ?

Options :

1. प्रभाजी आसवन, आइसोहेक्सेन
2. प्रभाजी आसवन, 3-मेथिलपेन्टेन
3. साधारण आसवन, आइसोहेक्सेन

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

Correct Marks : 4 Wrong Marks : 1

એક ફ્લાસ્કમાં આઈસોહેક્ઝેન અને 3-મિથાઈલપેન્ટેનનું મિશ્રણ છે. તેમાનુ એક પ્રવાહી 63 °C ઉકળે છે જ્યારે બીજુ પ્રવાહી 60 °C એ ઉકળે છે. તો સૌથી શ્રેષ્ઠ રસ્તો આ બન્ને પ્રવાહીને અલગીકરણ કરવાનો શોધો. અને સૌથી પહેલા કયું પ્રવાહી નિસ્તંદન પામશે ?

Options :

1. વિભાગીય નિસ્તંદન, આઈસોહેક્ઝેન

2. વિભાગીય નિસ્તંદન, 3-મિથાઈલ પેન્ટેન

3. સાદુ નિસ્તંદન, આઈસોહેક્ઝેન

4. સાદુ નિસ્તંદન, 3-મિથાઈલપેન્ટેન

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

Correct Marks : 4 Wrong Marks : 1

Arrange the following compounds in increasing order of C – OH bond length :

methanol, phenol, p-ethoxyphenol

Options :

1. methanol < phenol < p-ethoxyphenol

2. phenol < p-ethoxyphenol < methanol

3. phenol < methanol < p-ethoxyphenol

4. methanol < p-ethoxyphenol < phenol

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

Correct Marks : 4 Wrong Marks : 1

નિમ્ન યૌગિકોં કો C–OH આબન્ધ લમ્બાઈ કે બઢતે
ક્રમ મેં વ્યવસ્થિત કીજિએ :

મેથેનાૉલ, ફીનાૉલ, p-એથાક્સીફીનાૉલ

Options :

1. મેથેનાૉલ < ફીનાૉલ < p-એથાક્સીફીનાૉલ

2. ફીનાૉલ < p-એથાક્સીફીનાૉલ < મેથેનાૉલ

3. ફીનાૉલ < મેથેનાૉલ < p-એથાક્સીફીનાૉલ

4. મેથેનાૉલ < p-એથાક્સીફીનાૉલ < ફીનાૉલ

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

Correct Marks : 4 Wrong Marks : 1

નીચે આપેલા સંયોજનોને C–OH બંધલંબાઈના ચઢતા
ક્રમમાં ગોઠવો :

મિથેનોલ, ડિનોલ, p-ઈથોક્સિ ડિનોલ

Options :

1. મિથેનોલ < ડિનોલ < p-ઈથોક્સિ ડિનોલ

2. ડિનોલ < p-ઈથોક્સિ ડિનોલ < મિથેનોલ

3. ડિનોલ < મિથેનોલ < p-ઈથોક્સિ ડિનોલ

4. મિથેનોલ < p-ઈથોક્સિ ડિનોલ < ડિનોલ

Question Number : 42 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Which of the following statement is not true for glucose ?

Options :

1. The pentaacetate of glucose does not react with hydroxylamine to give oxime
2. Glucose reacts with hydroxylamine to form oxime
3. Glucose gives Schiff's test for aldehyde
4. Glucose exists in two crystalline forms α and β

Question Number : 42 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

ग्लूकोस के लिए कौन सा कथन सत्य नहीं है ?

Options :

1. ग्लूकोस का पेन्टाऐसीटेट ऑक्साइम बनाने के लिए हाइड्राक्सिलऐमीन से अभिक्रिया नहीं करता।
2. ग्लूकोस, हाइड्राक्सिलऐमीन के साथ अभिक्रिया करके ऑक्साइम बनाता है।
3. ग्लूकोस, एलिडहाइड के लिए शिफ परीक्षण देता है।

4. ગ્લુકોસ દો ક્રિસ્ટલીય રૂપો α તથા β મેં મિલતા હૈ।

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

નીચે આપેલા વિધાનો પૈકી કયુ એક ગ્લુકોઝ માટે સાચું નથી?

Options :

1. ગ્લુકોઝનો પેન્ટાએસિટેટ, હાઈડ્રોક્સીન એમાઈન સાથે પ્રક્રિયા કરી ઓક્સાઈમ આપતો નથી.

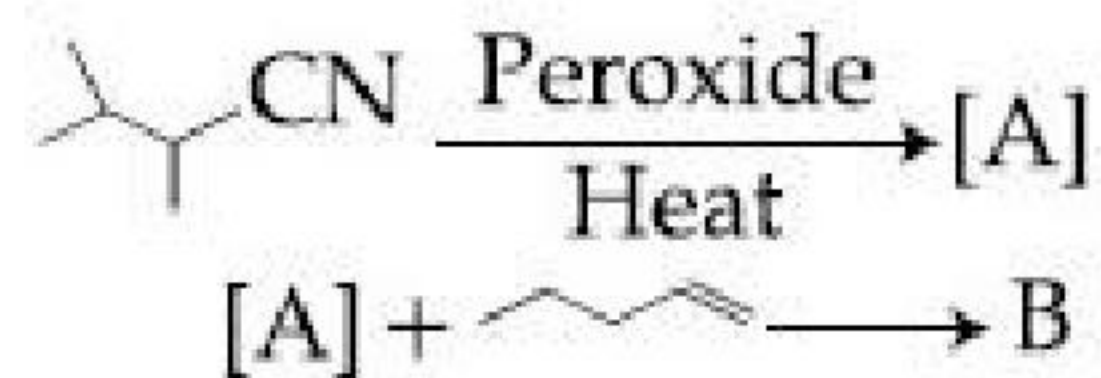
2. ગ્લુકોઝ, હાઈડ્રોક્સીન એમાઈન સાથે પ્રક્રિયા કરી ઓક્સાઈમ બનાવે છે.

3. ગ્લુકોઝ આલ્કીહાઇડની સફીફ કસૌટી આપે છે.

4. ગ્લુકોઝ બે સફીટકમય α અને β માં અસ્તિત્વ ધરાવે છે.

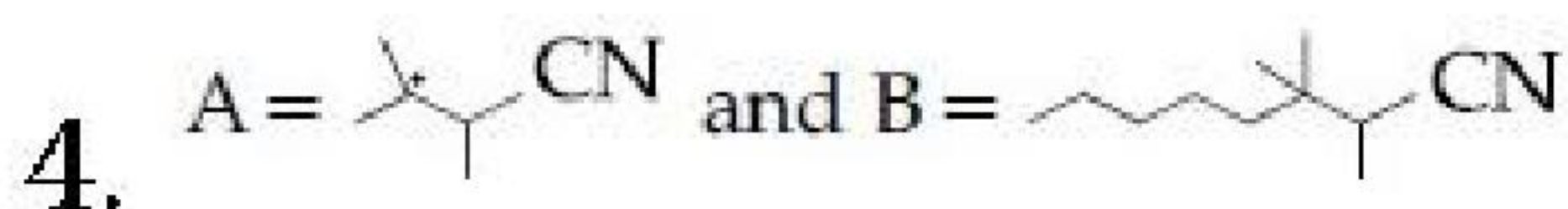
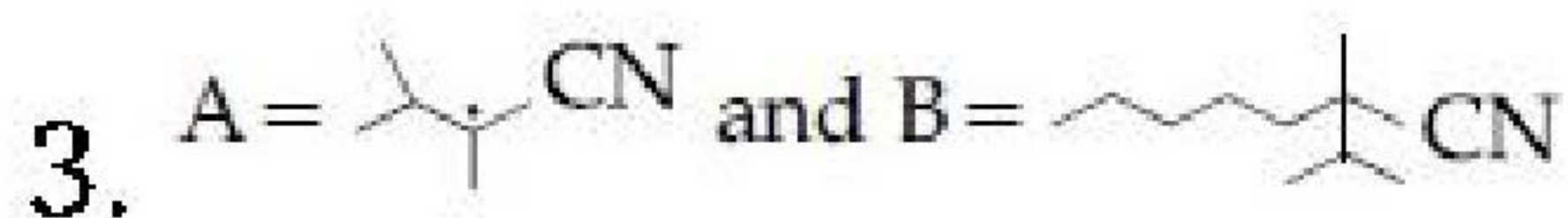
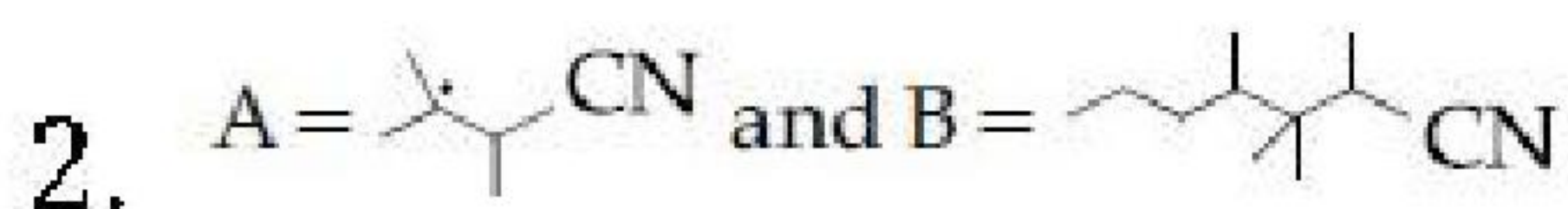
Question Number : 43 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The major products A and B in the following reactions are :



Options :

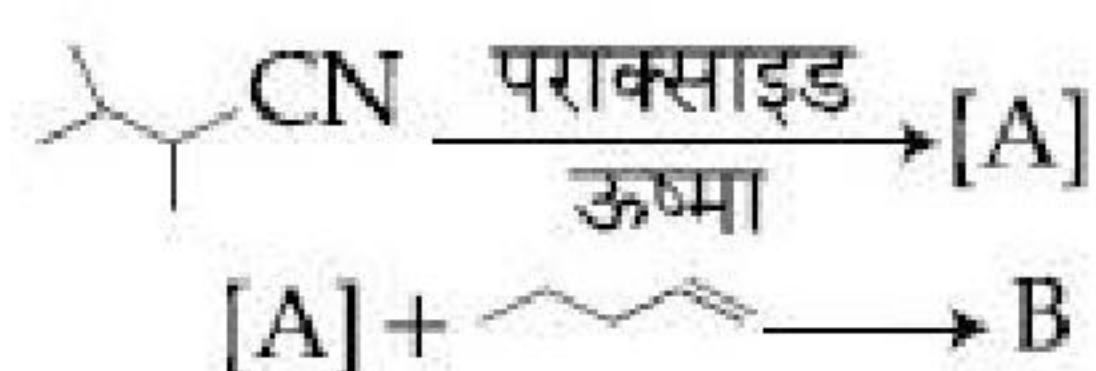
1. A = $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}-\text{CN} \end{array}$ and B = $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}-\text{CH}_2\text{CH}_2\text{CH}_3 \end{array}$



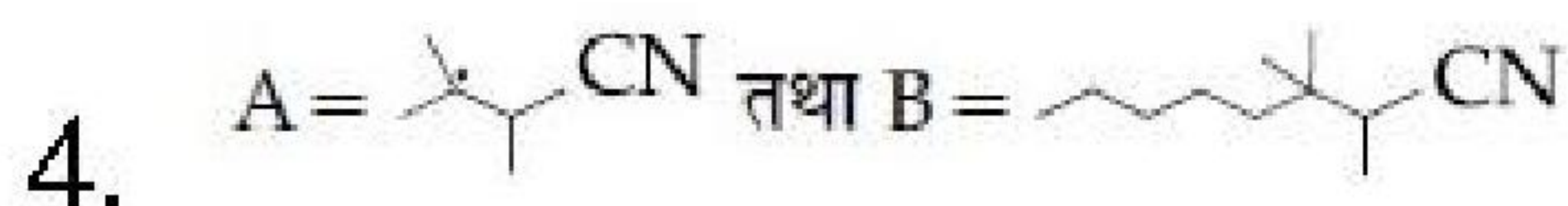
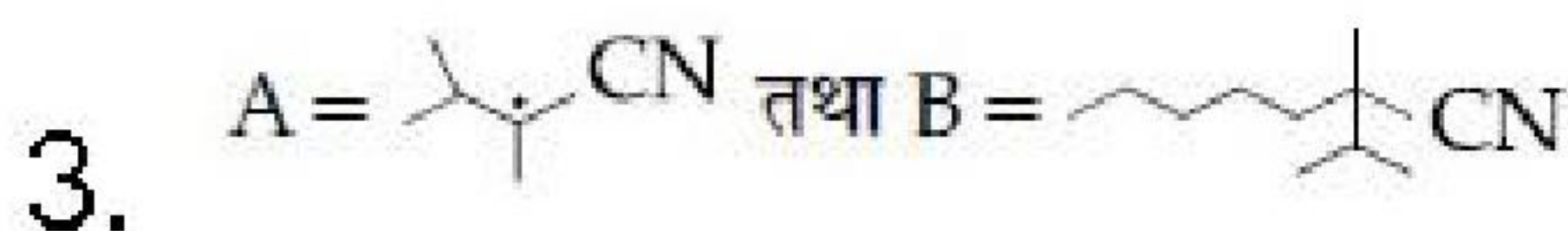
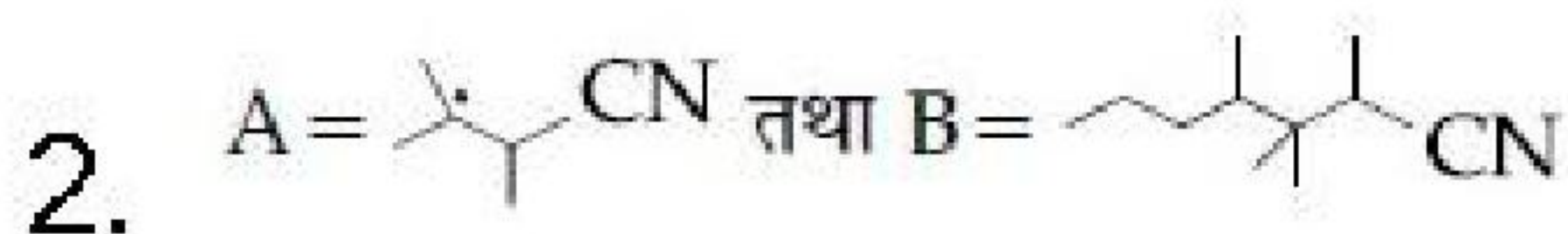
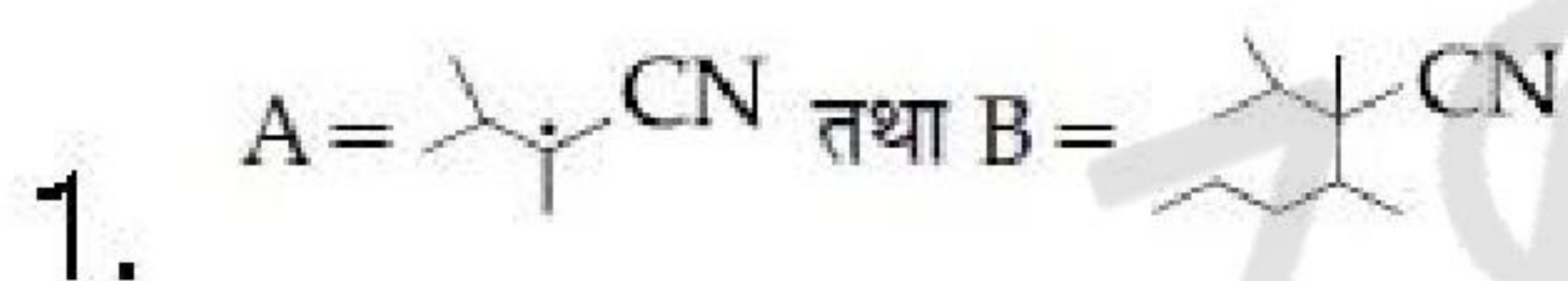
Question Number : 43 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

નિમ્ન અભિક્રિયાઓં મેં મુખ્ય ઉત્પાદ A તથા B હેં :



Options :

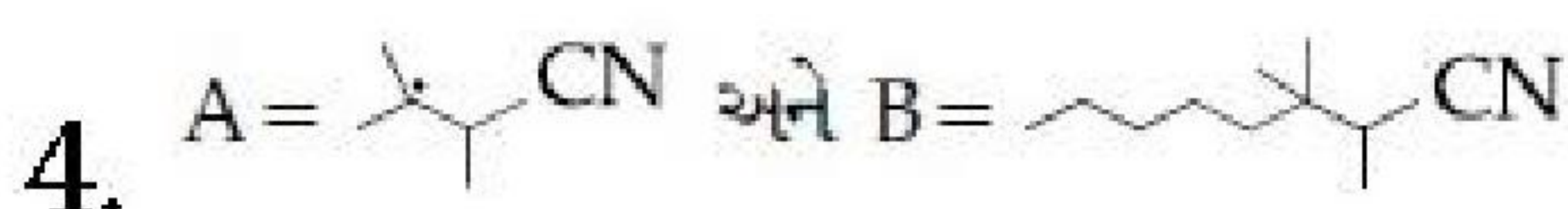
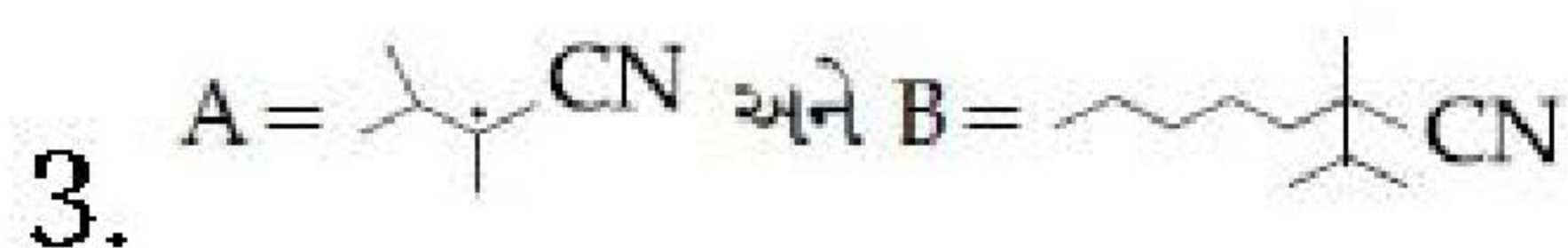
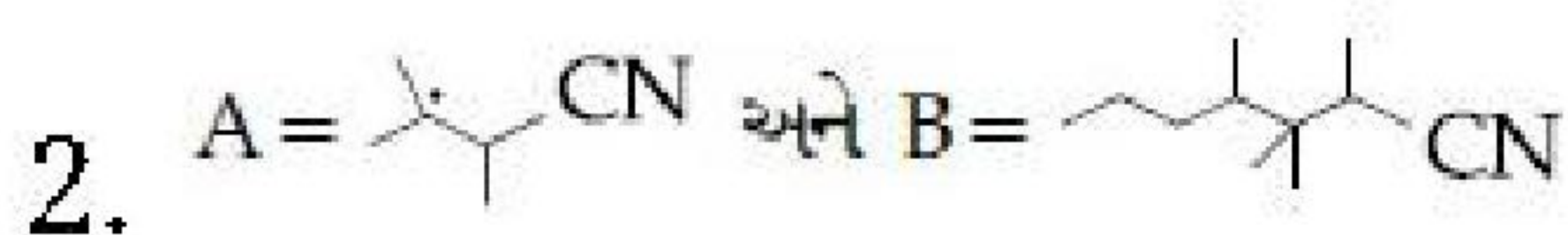
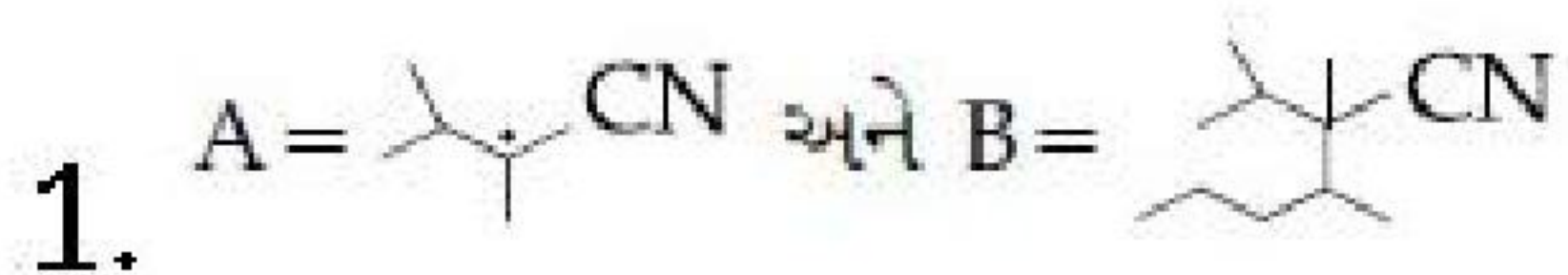


Question Number : 43 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

નીચે આપેલી પ્રક્રિયામાં મુખ્ય નીપજો A અને B શોધો :

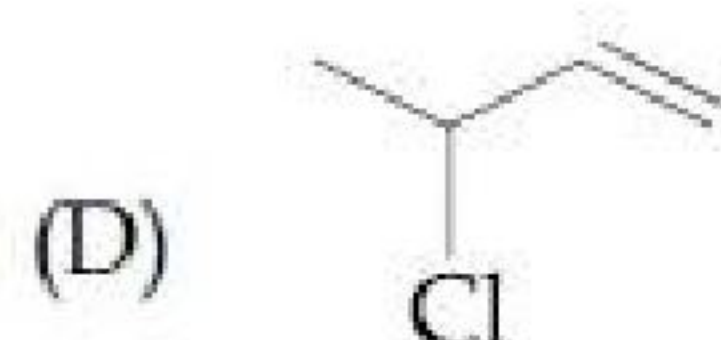
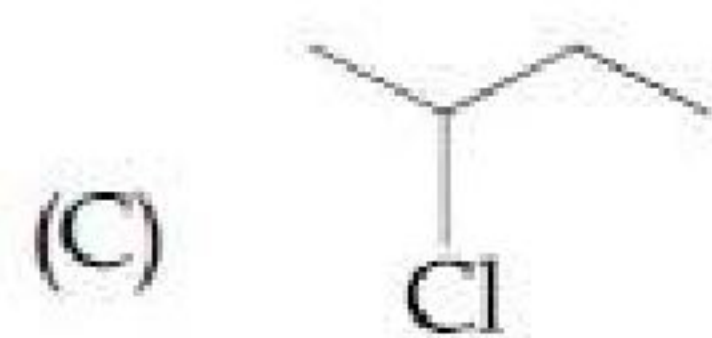
Options :



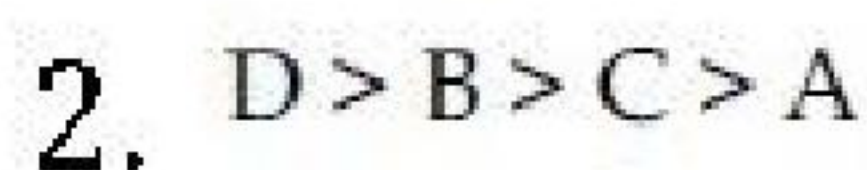
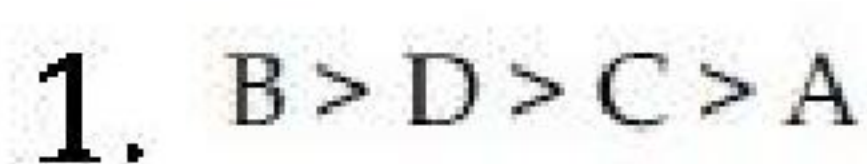
Question Number : 44 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

The decreasing order of reactivity towards dehydrohalogenation (E_1) reaction of the following compounds is :



Options :

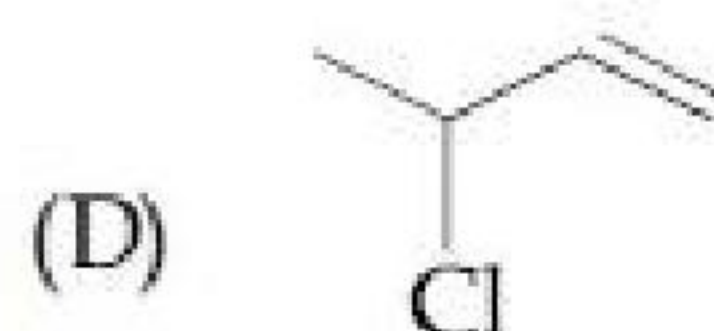
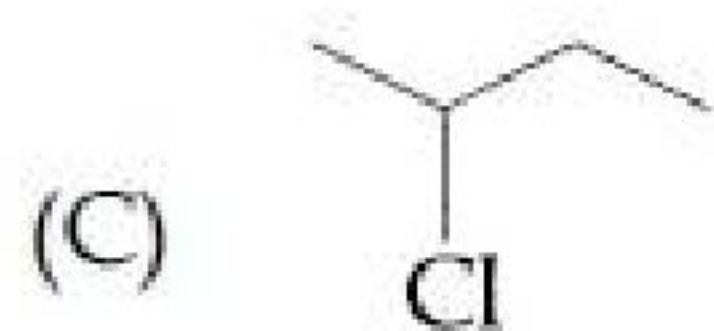
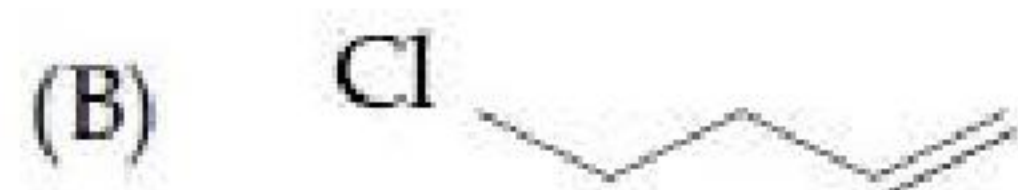


4. $B > D > A > C$

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

Correct Marks : 4 Wrong Marks : 1

निम्न यौगिकों के डिहाइड्रोहैलोजेनेशन (E_1) अभिक्रिया के प्रति अभिक्रियाशीलता का घटता क्रम है :



Options :

1. $B > D > C > A$

2. $D > B > C > A$

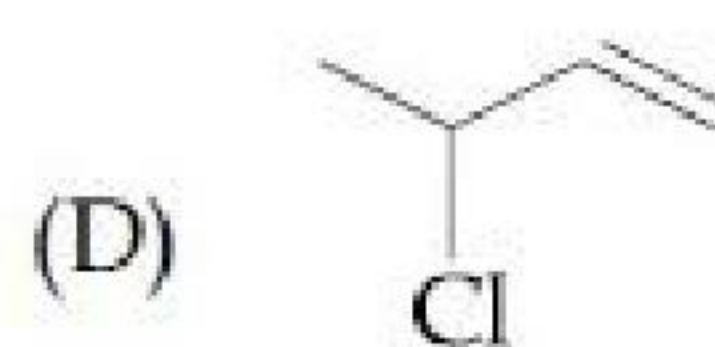
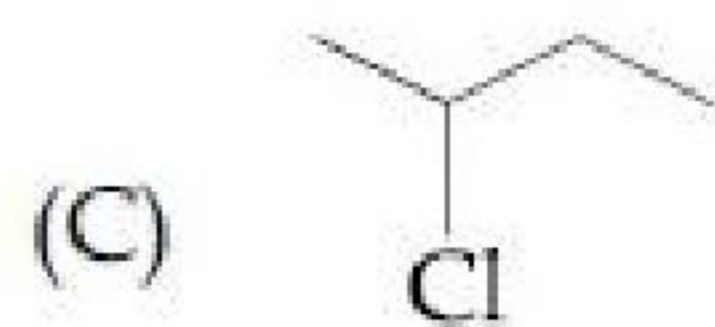
3. $B > A > D > C$

4. $B > D > A > C$

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

Correct Marks : 4 Wrong Marks : 1

નીચે આપેલા સંયોજનોને ડીહાઈડ્રોહેલોજેનેશન (E_1) પ્રક્રિયા માટેની સક્રિયતાના ઘટતા ક્રમમાં ગોઠવો :



Options :

1. $B > D > C > A$

2. $D > B > C > A$

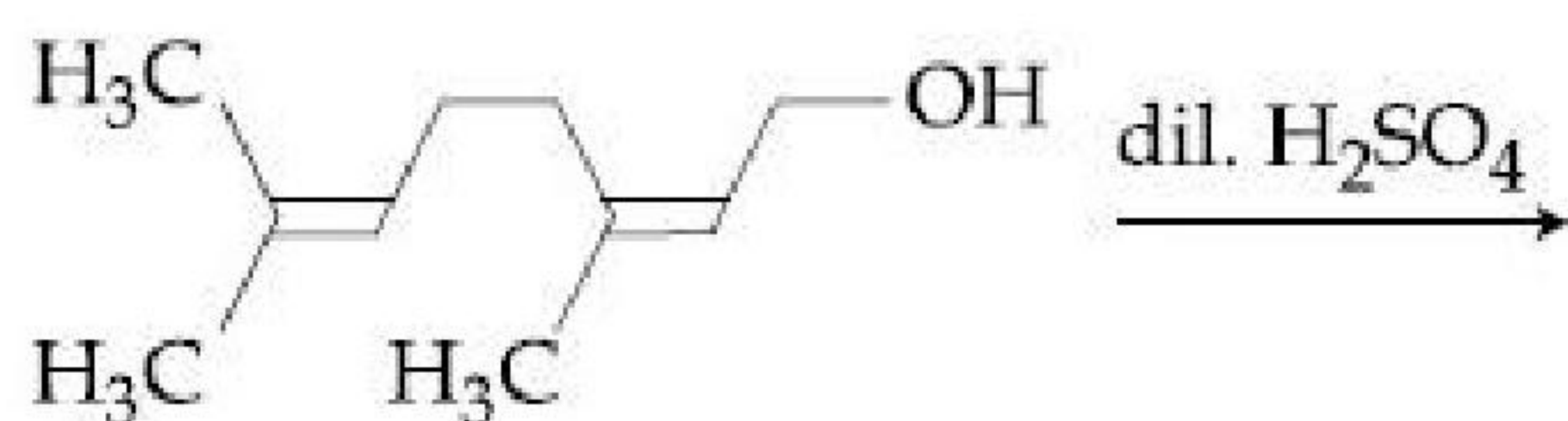
3. $B > A > D > C$

4. $B > D > A > C$

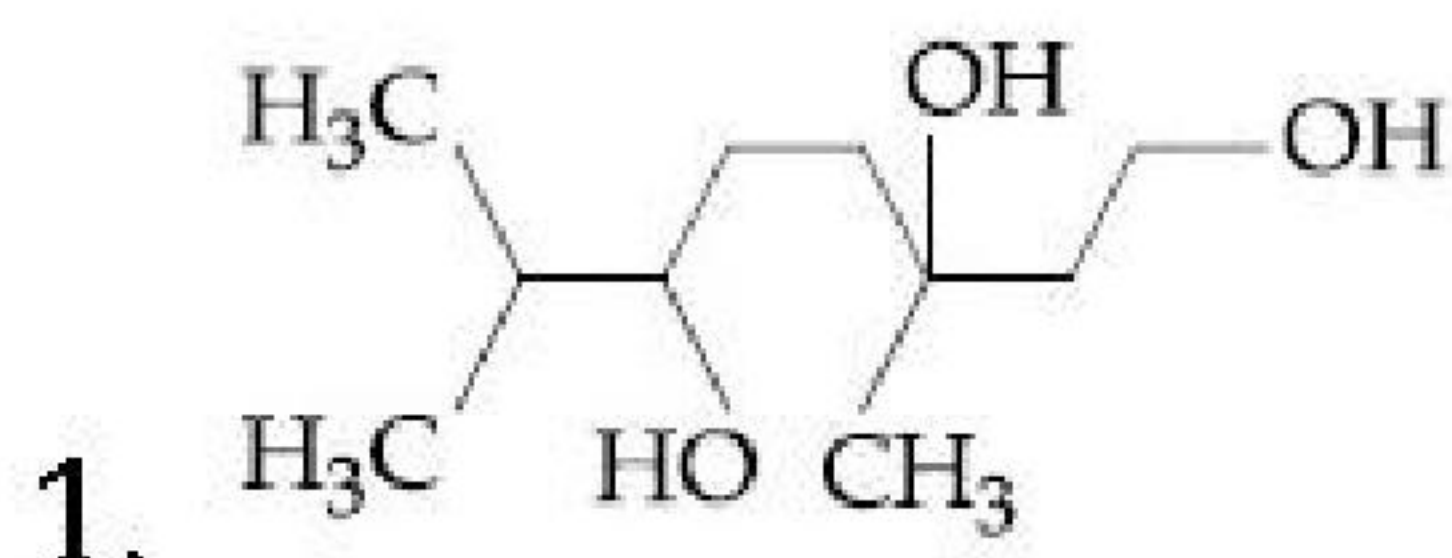
Question Number : 45 Question Type : MCQ Option Shuffling : Yes

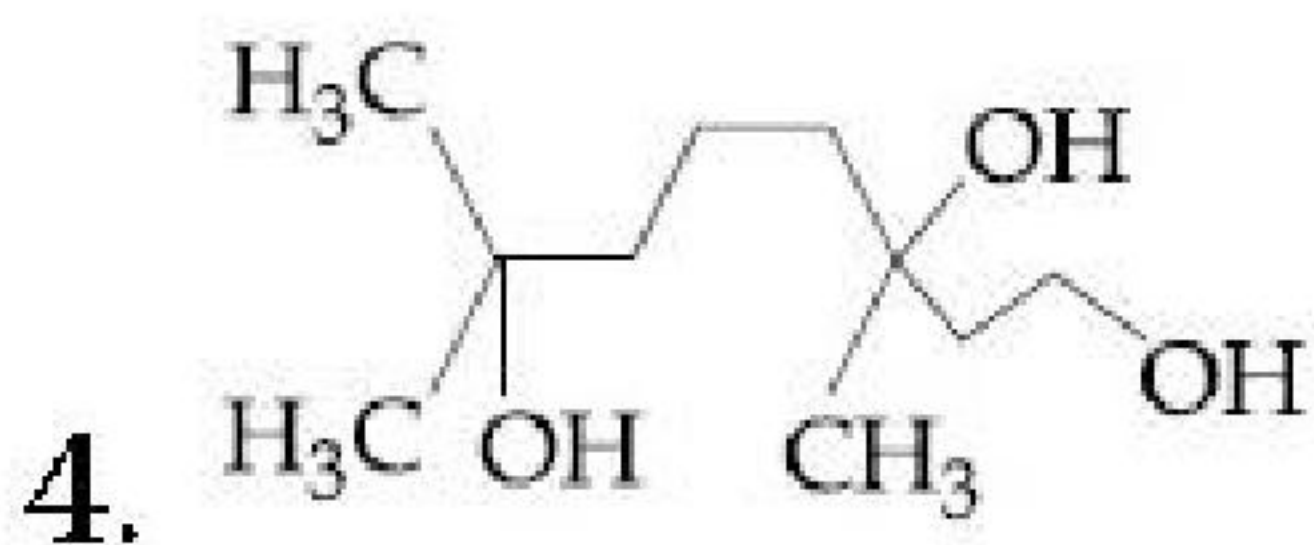
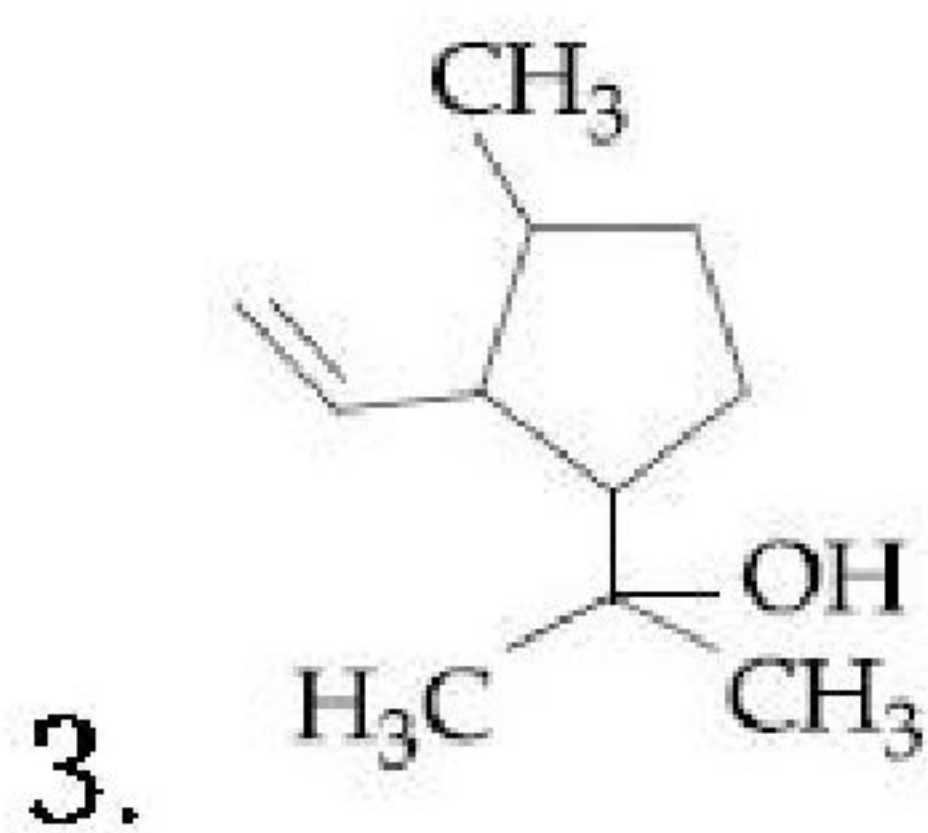
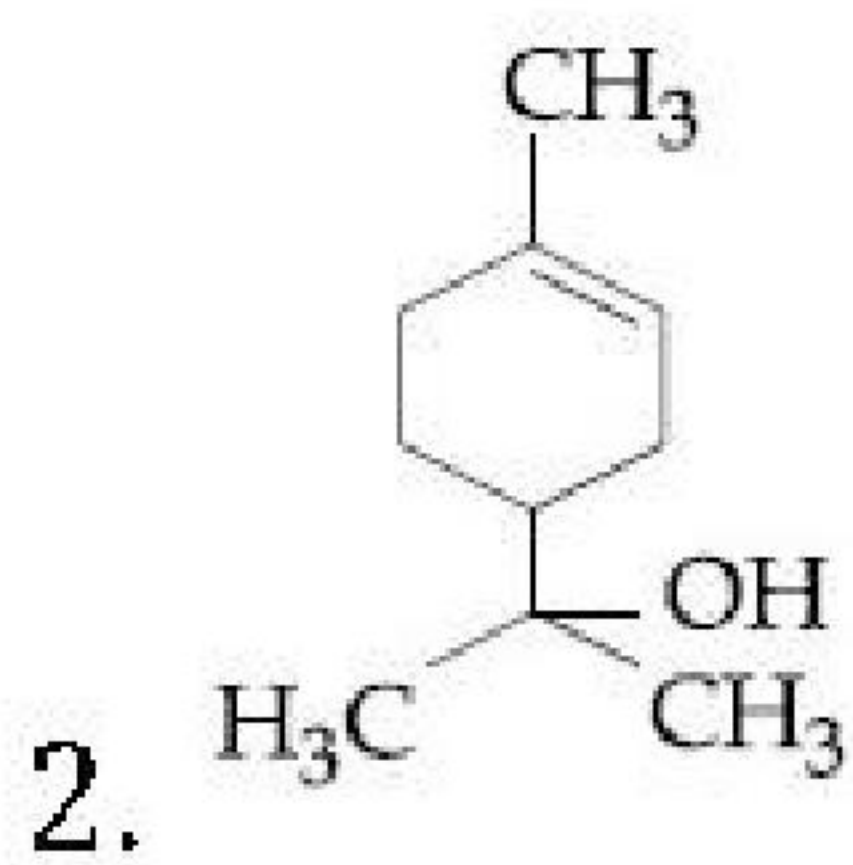
Correct Marks : 4 Wrong Marks : 1

The major product of the following reaction is :



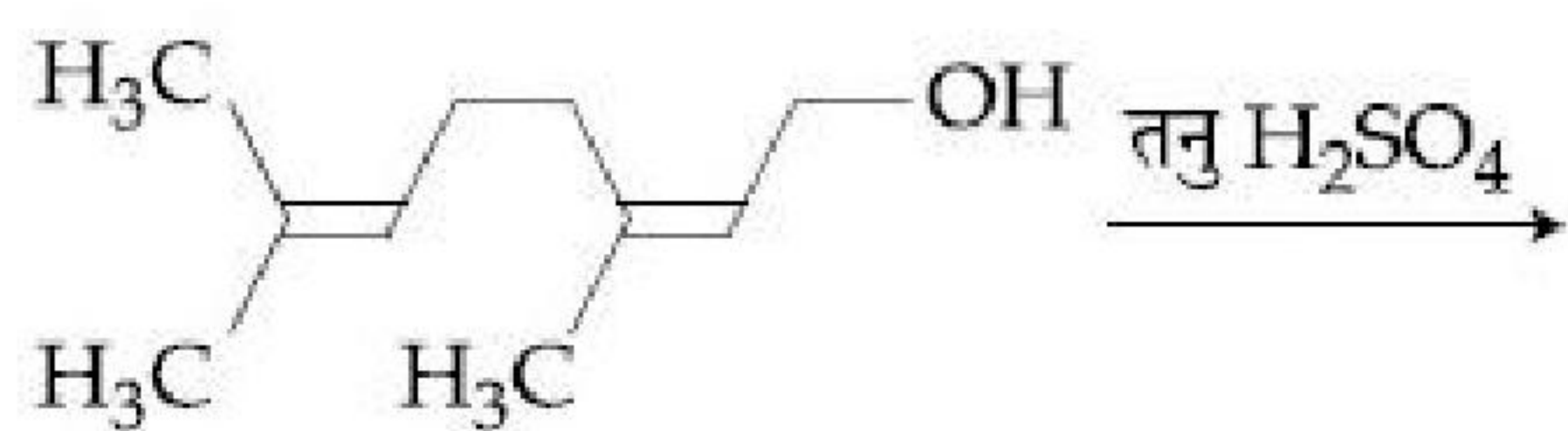
Options :



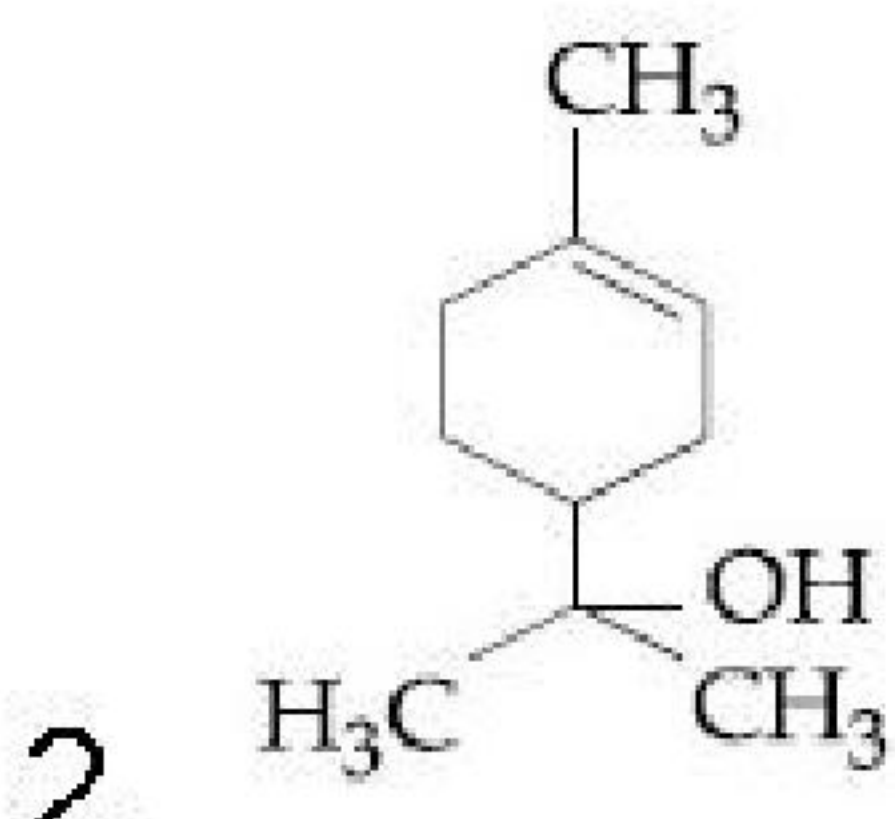
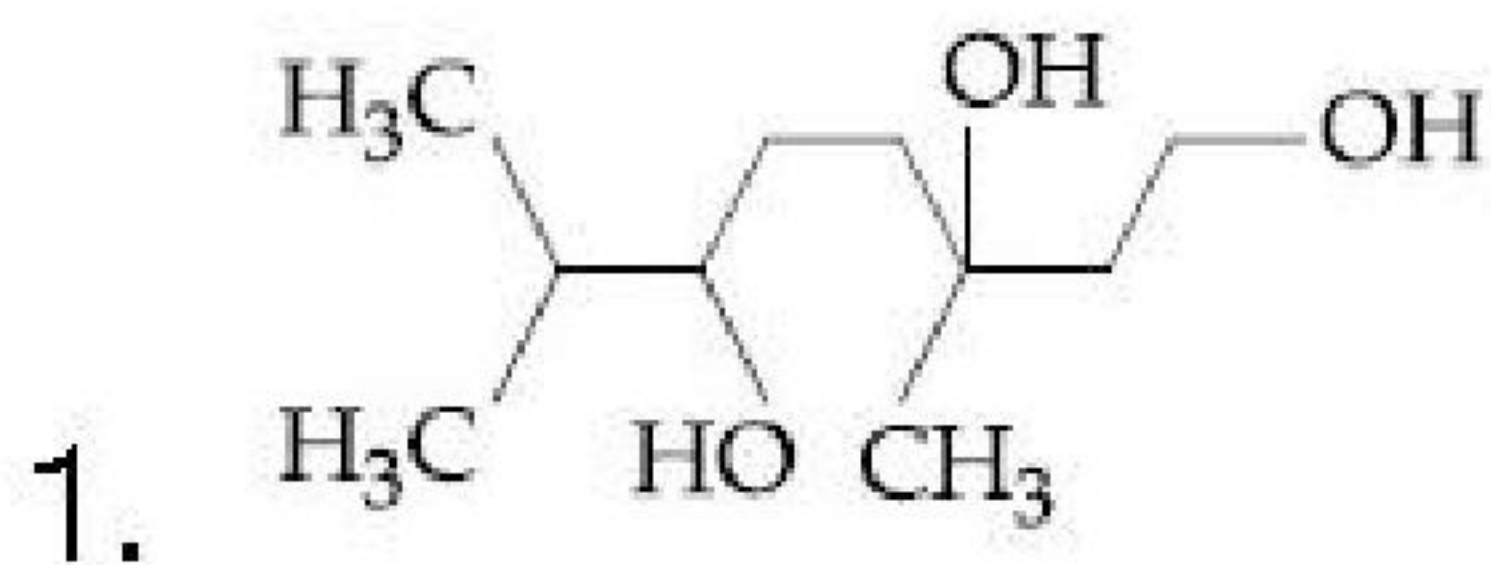


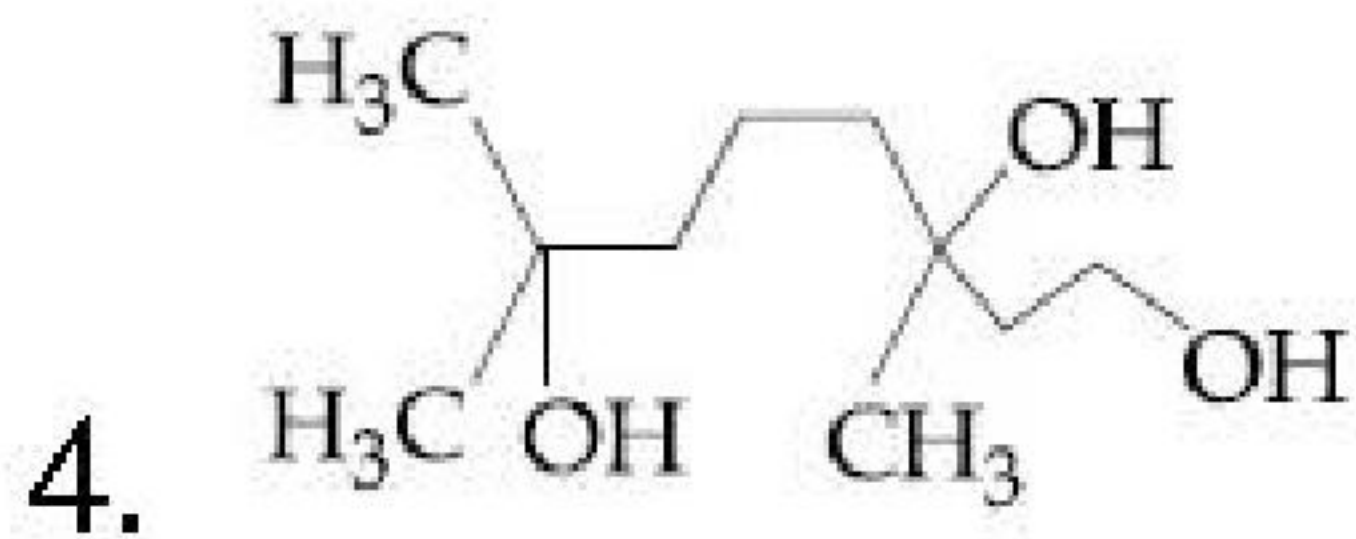
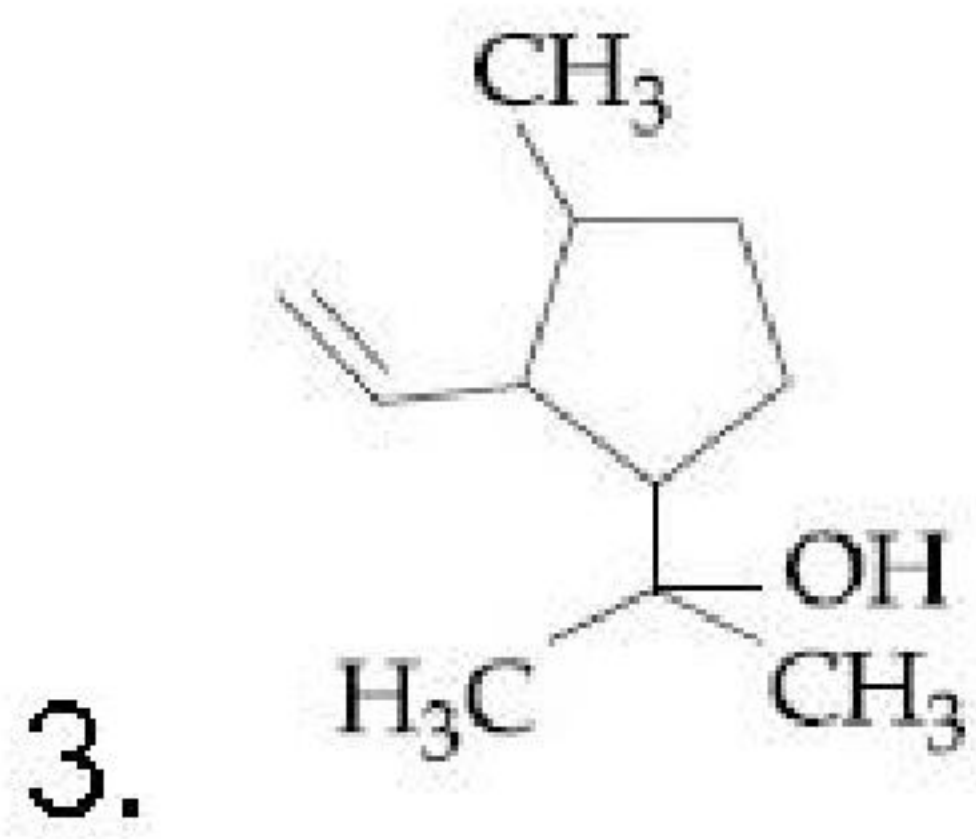
Question Number : 45 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

निम्नलिखित अभिक्रिया का मुख्य उत्पाद है :



Options :

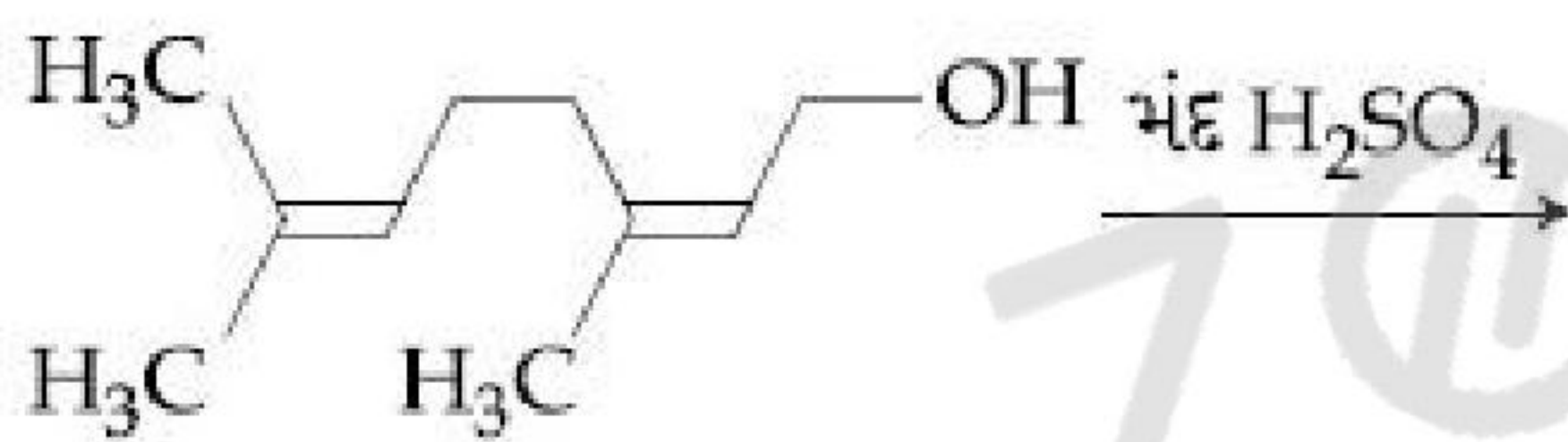




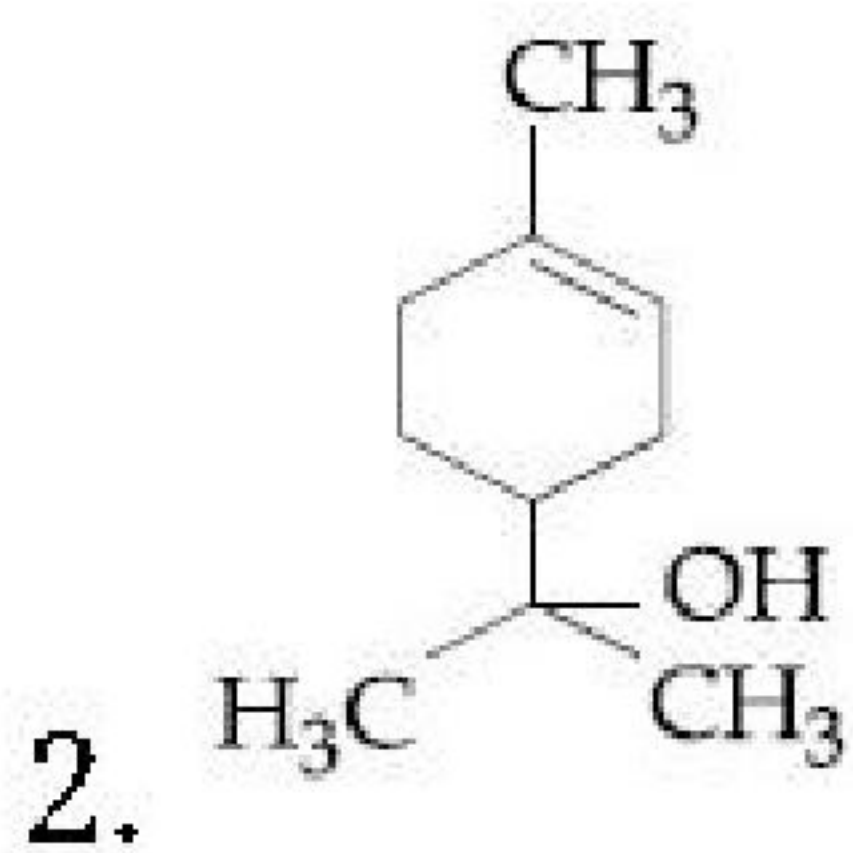
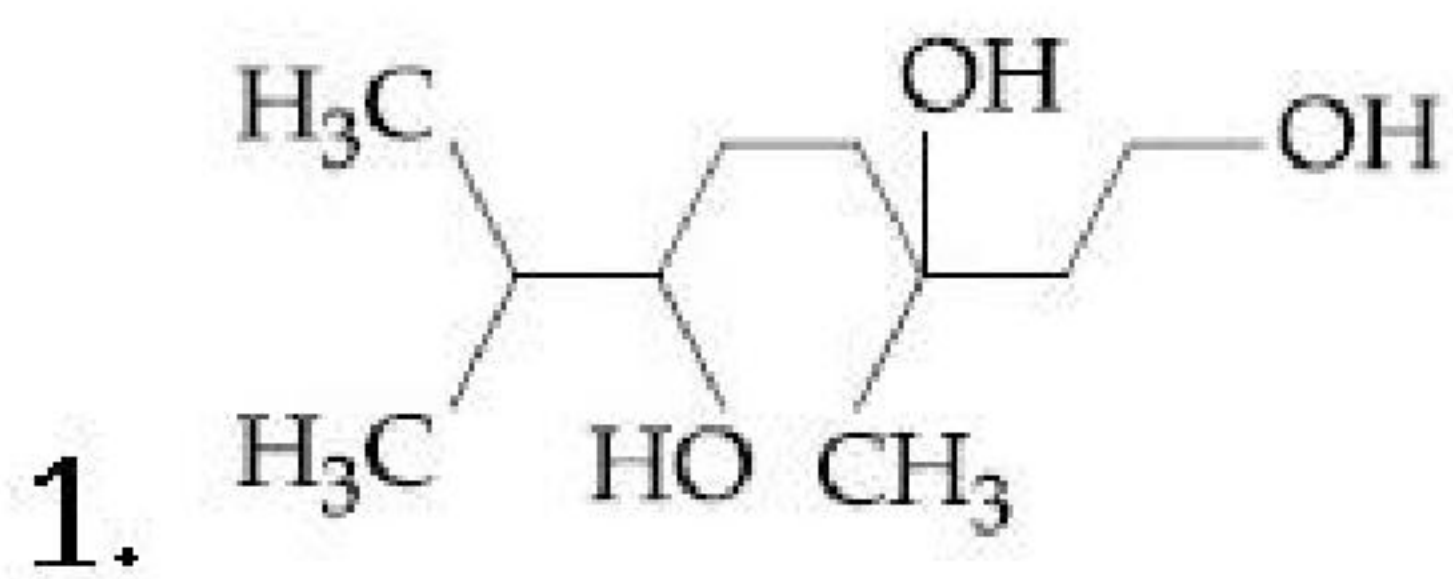
Question Number : 45 Question Type : MCQ Option Shuffling : Yes

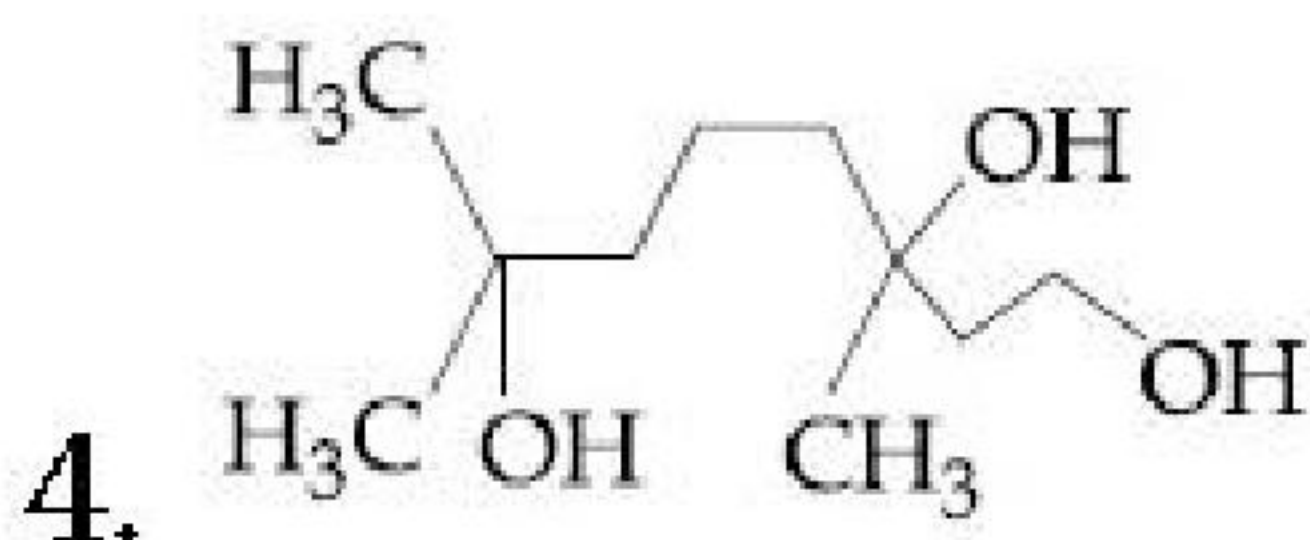
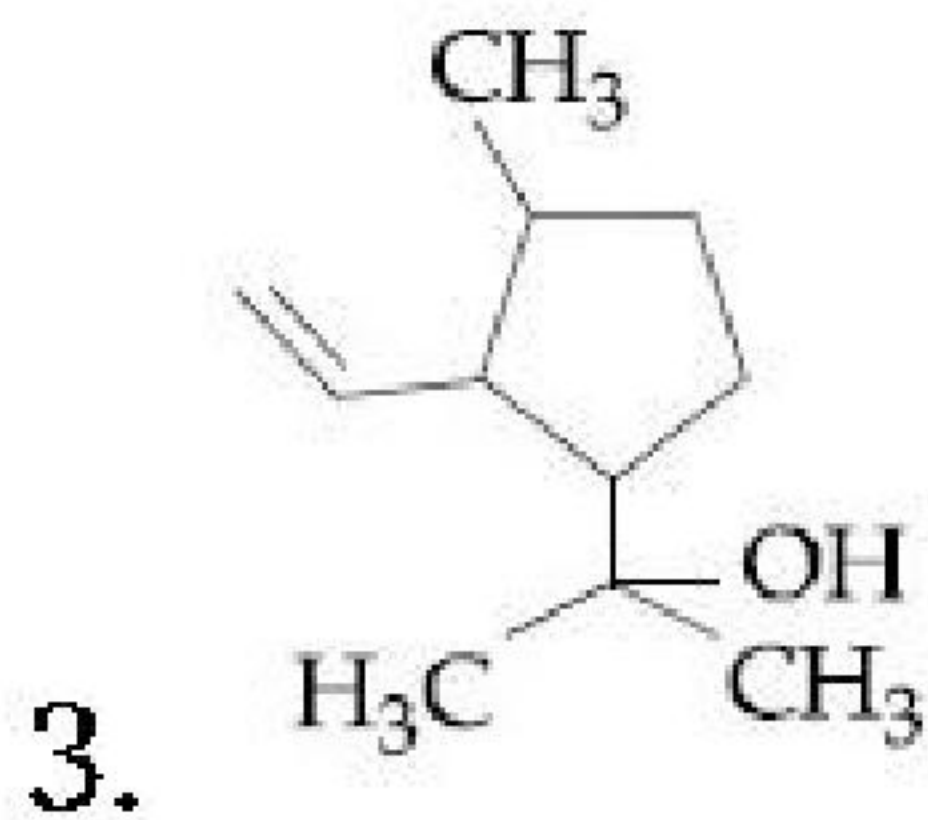
Correct Marks : 4 Wrong Marks : 1

આપેલી પ્રક્રિયાની મુખ્ય નીપજ શોધો :



Options :





Sub-Section Number:

2

Sub-Section Id:

40503689

Question Shuffling Allowed :

Yes

Question Number : 46 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ફેરસ સલ્ફેટ હેપ્ટાહાઈડ્રેટ નો ઉપયોગ ખોરાકમાં આયર્ન સાથે ઉમેરી શક્તિશાળી બનાવવામાં આવે છે. 100 kg ઘઉંમાં 10 ppm આયર્ન મેળવવા માટે આ ક્ષારનો જથ્થો (ગ્રામમાં) શોધો _____.

આણ્વીક દળ : Fe = 55.85; S = 32.00; O = 16.00

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

4.95 to 4.99

Question Number : 46 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Ferrous sulphate heptahydrate is used to fortify foods with iron. The amount (in grams) of the salt required to achieve 10 ppm of iron in 100 kg of wheat is _____.

Atomic weight : Fe = 55.85; S = 32.00;

Show Word Count: Yes

Answers Type: Range

Possible Answers :

4.95 to 4.99

Question Number : 46 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

फेरस सल्फेट हेप्टाहाइड्रेट को आहार के पुष्टीकरण में आयरन के लिये प्रयोग किया जाता है। गेहूँ के 100 kg में आयरन का 10 ppm प्राप्त करने के लिए लवण की मात्रा (ग्राम में) होगी _____।

परमाणु द्रव्यमान : Fe = 55.85; S = 32.00;
O = 16.00

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

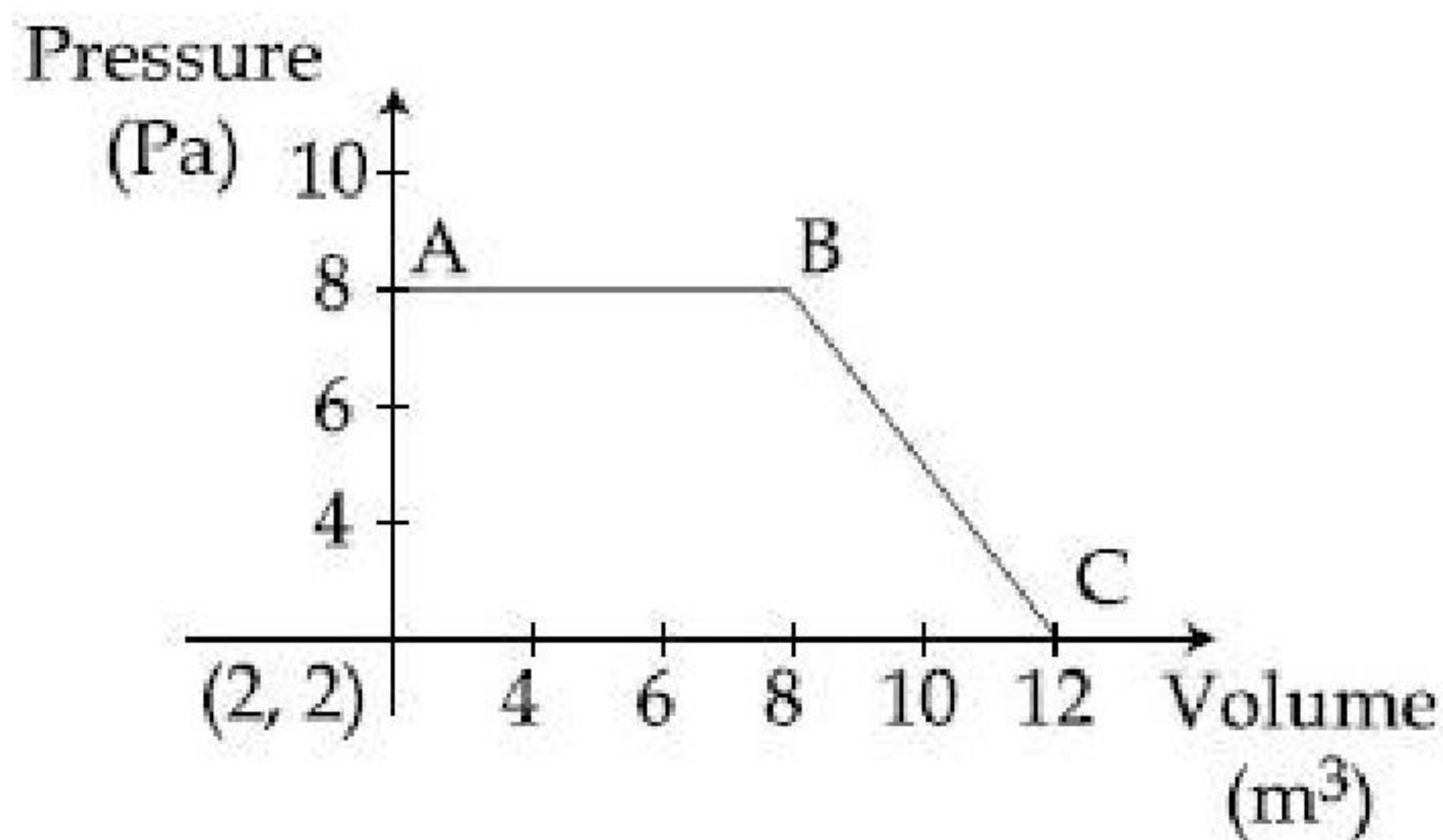
Possible Answers :

4.95 to 4.99

Question Number : 47 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The magnitude of work done by a gas that undergoes a reversible expansion along the path ABC shown in the figure is _____.



Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

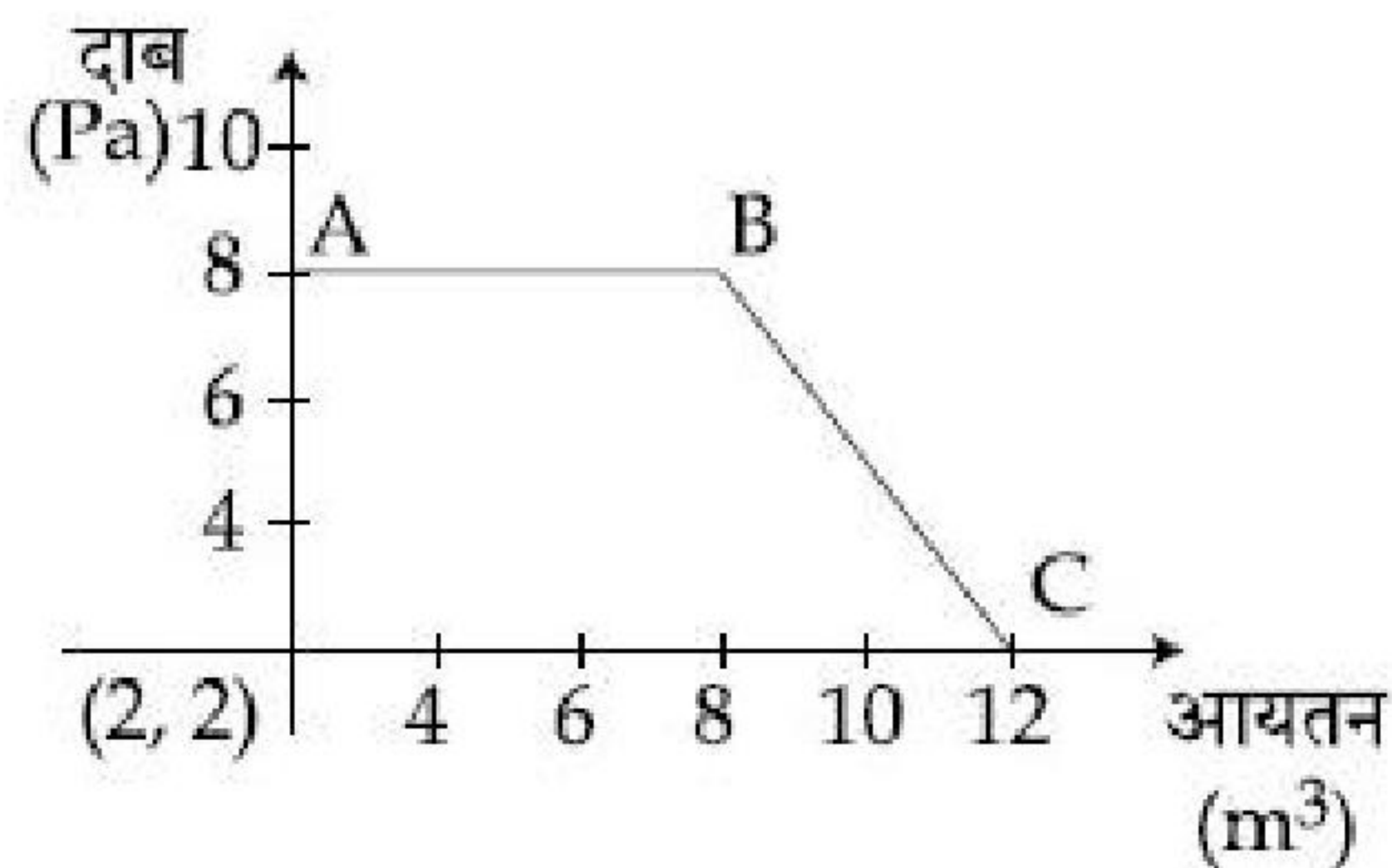
Possible Answers :

48 to 48

Question Number : 47 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

उस गैस के द्वारा, जो चित्र में दिखाये गये ABC पथ के अनुसार उत्क्रमणीय प्रसारण करती है, किये गये कार्य का परिमाण होगा _____.



Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

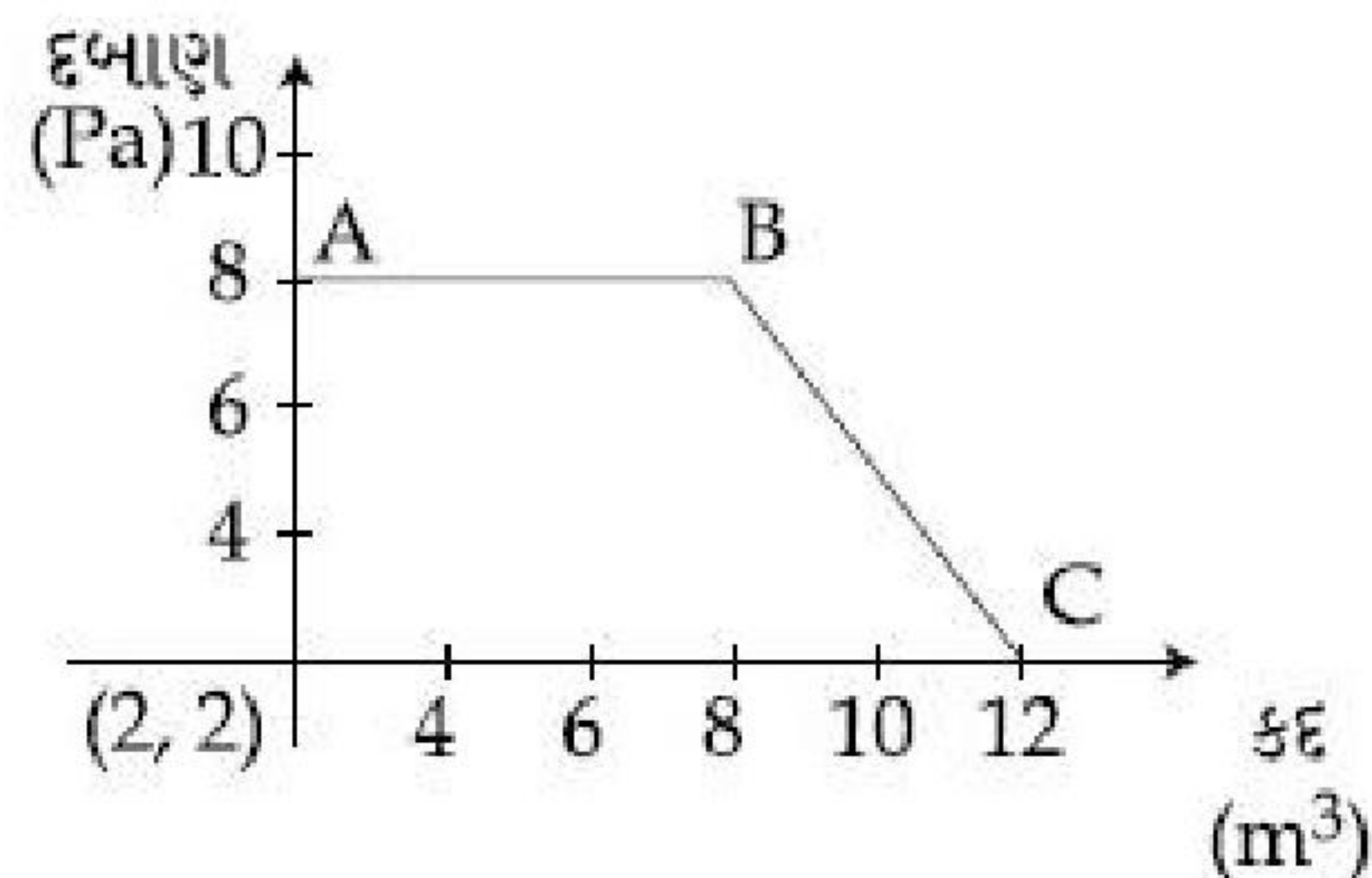
Possible Answers :

48 to 48

Question Number : 47 **Question Type :** SA

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

આકૃતિમાં દર્શાવેલ પથ ABC મુજબ એક વાયુનું પ્રતિવર્તી વિસ્તરણ થાય છે તો વાયુ દ્વારા થતું કાર્ય શું _____.



Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

48 to 48

Question Number : 48 **Question Type :** SA

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

What would be the electrode potential for the given half cell reaction at pH=5 ?

_____.



($R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$; Temp = 298 K;

oxygen under std. atm. pressure of 1 bar)

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

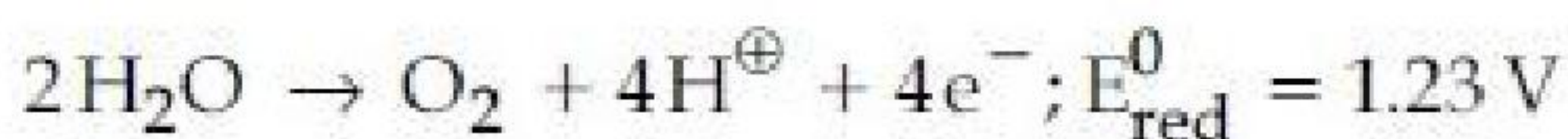
Possible Answers :

-0.93 to -0.94

Question Number : 48 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

pH=5 पर, दी गई अर्द्ध सेल अभिक्रिया के लिए इलेक्ट्रोड विभव क्या होगा ?



($R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$; Temp = 298 K;

ऑक्सीजन मानक वायुमंडलीय दाब 1 bar पर)

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

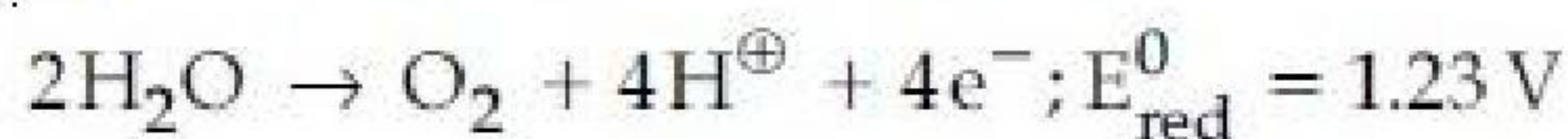
Possible Answers :

-0.93 to -0.94

Question Number : 48 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

pH=5 पर, आपेक्ष अर्ध कोष प्रक्रिया,



भाटे इलेक्ट्रोड पोटेन्शियल शोधो .

$R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$; तापमान = 298 K;

ऑक्सीजन प्रमाणित वातावरण दबाव 1 बार पर

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

-0.93 to -0.94

Question Number : 49 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The volume (in mL) of 0.125 M AgNO_3 required to quantitatively precipitate chloride ions in 0.3 g of $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ is _____.

$$M_{[\text{Co}(\text{NH}_3)_6]\text{Cl}_3} = 267.46 \text{ g/mol}$$

$$M_{\text{AgNO}_3} = 169.87 \text{ g/mol}$$

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

26.60 to 27.0

Question Number : 49 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ के 0.3 g में क्लोराइड आयन को मात्रात्मक रूप से अवक्षेपित करने के लिए 0.125 M AgNO_3 का कितना आयतन (mL में) आवश्यक होगा _____.

$$M_{[\text{Co}(\text{NH}_3)_6]\text{Cl}_3} = 267.46 \text{ g/mol}$$

$$M_{\text{AgNO}_3} = 169.87 \text{ g/mol}$$

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

26.60 to 27.0

Question Number : 49 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ ના 0.3 g માં જથ્થાત્મક રીતે ક્લોરાઈડ આયનને અવક્ષેપીત કરવામાટે જરૂરી 0.125 M AgNO_3 નું કદ (mL માં) છે _____.

$$M_{[\text{Co}(\text{NH}_3)_6]\text{Cl}_3} = 267.46 \text{ g/mol}$$

$$M_{\text{AgNO}_3} = 169.87 \text{ g/mol}$$

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

26.60 to 27.0

Question Number : 50 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

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

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

पेनिसिलीन में काइरल केन्द्रों की संख्या है _____.

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

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

पेनिसिलीनमा रहेला किराल कार्बननी संख्या शोधो _____.

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

Mathematics

Section Id :	40503659
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:	40503690
Question Shuffling Allowed :	Yes

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

$f(x)=\frac{8^{2x}-8^{-2x}}{2^x-2^{-x}}, x\in (-1,1)$ का व्युत्क्रम

1. $\frac{1}{4} \log_e \left(\frac{1+x}{1-x} \right)$

2. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1-x}{1+x} \right)$

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

4. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1+x}{1-x} \right)$

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

Correct Marks : 4 Wrong Marks : 1

$f(x) = \frac{8^{2x} - 8^{-2x}}{8^{2x} + 8^{-2x}}, x \in (-1, 1)$ નું વ્યસ્ત

વિધેય _____ છે.

Options :

1. $\frac{1}{4} \log_e \left(\frac{1+x}{1-x} \right)$

2. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1-x}{1+x} \right)$

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

4. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1+x}{1-x} \right)$

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

The inverse function of

$$f(x) = \frac{8^{2x} - 8^{-2x}}{8^{2x} + 8^{-2x}}, x \in (-1, 1), \text{ is}$$

_____.

Options :

1. $\frac{1}{4} \log_e \left(\frac{1+x}{1-x} \right)$

2. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1-x}{1+x} \right)$

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

4. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1+x}{1-x} \right)$

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

If the equation, $x^2 + bx + 45 = 0$ ($b \in \mathbb{R}$) has
conjugate complex roots and they satisfy

$$|z + 1| = 2\sqrt{10}, \text{ then :}$$

Options :

1. $b^2 + b = 12$

2. $b^2 - b = 42$

3. $b^2 - b = 30$

4. $b^2 + b = 72$

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

यदि समीकरण $x^2 + bx + 45 = 0$, ($b \in \mathbb{R}$) के संयुग्मी
सम्मिश्र मूल हैं, जो $|z + 1| = 2\sqrt{10}$ को संतुष्ट करते
हैं, तो :

Options :

1. $b^2 + b = 12$

2. $b^2 - b = 42$

3. $b^2 - b = 30$

4. $b^2 + b = 72$

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

જો સમીકરણ $x^2 + bx + 45 = 0$ ($b \in \mathbb{R}$) નાં બીજ,
અનુબદ્ધ સંકર સંખ્યાઓ હોય અને તે $|z + 1| = 2\sqrt{10}$
નું સમાધાન કરે તો :

Options :

1. $b^2 + b = 12$

2. $b^2 - b = 42$

3. $b^2 - b = 30$

4. $b^2 + b = 72$

Question Number : 53 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

For which of the following ordered pairs

(μ, δ) , the system of linear equations

$$x + 2y + 3z = 1$$

$$3x + 4y + 5z = \mu$$

$$4x + 4y + 4z = \delta$$

is inconsistent ?

Options :

1. $(1, 0)$

2. $(3, 4)$

3. $(4, 3)$

4. $(4, 6)$

Question Number : 53 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

निम्न में से किस क्रमित युग्म (μ, δ) के लिए रेखिक
समीकरण निकाय

$$x + 2y + 3z = 1$$

$$3x + 4y + 5z = \mu$$

$$4x + 4y + 4z = \delta$$

असंगत (inconsistent) है ?

Options :

1. (1, 0)

2. (3, 4)

3. (4, 3)

4. (4, 6)

Question Number : 53 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

નીચેના માંથી કઈ ક્રમયુક્ત જોડ (μ, δ) માટે સુરેખ
સમીકરણ સંહિતિ

$$x + 2y + 3z = 1$$

$$3x + 4y + 5z = \mu$$

$$4x + 4y + 4z = \delta$$

સુસંગત નથી ?

Options :

1. (1, 0)

2. (3, 4)

3. (4, 3)

4. (4, 6)

Let two points be $A(1, -1)$ and $B(0, 2)$. If a point $P(x', y')$ be such that the area of $\Delta PAB = 5$ sq. units and it lies on the line, $3x + y - 4\lambda = 0$, then a value of λ is :

Options :

1. 1

2. 4

3. -3

4. 3

Question Number : 54 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

माना $A(1, -1)$ तथा $B(0, 2)$ दो बिन्दु हैं। यदि एक बिंदु $P(x', y')$ इस प्रकार है कि ΔPAB का क्षेत्रफल = 5 वर्ग इकाई है तथा यह रेखा $3x + y - 4\lambda = 0$ पर स्थित है, तो λ का एक मान है :

Options :

1. 1

2. 4

3. -3

4. 3

ધારો કે બે બિંદુઓ $A(1, -1)$ અને $B(0, 2)$ છે. જો $P(x', y')$ એવું બિંદુ હોય કે જે રેખા $3x + y - 4\lambda = 0$ પર આવેલું હોય અને ΔPAB નું ક્ષેત્રફળ $= 5$ થો. એકમ હોય, તો λ ની કિંમત _____ છે.

Options :

1. 1

2. 4

3. -3

4. 3

Question Number : 55 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

If a , b and c are the greatest values of

${}^{19}C_p$, ${}^{20}C_q$ and ${}^{21}C_r$ respectively, then :

Options :

1. $\frac{a}{11} = \frac{b}{22} = \frac{c}{21}$

2. $\frac{a}{10} = \frac{b}{11} = \frac{c}{42}$

3. $\frac{a}{10} = \frac{b}{11} = \frac{c}{21}$

4. $\frac{a}{11} = \frac{b}{22} = \frac{c}{42}$

Correct Marks : 4 Wrong Marks : 1

यदि a, b तथा c क्रमशः $^{19}C_p$, $^{20}C_q$ तथा $^{21}C_r$ के अधिकतम मान हैं, तो :

Options :

1. $\frac{a}{11} = \frac{b}{22} = \frac{c}{21}$

2. $\frac{a}{10} = \frac{b}{11} = \frac{c}{42}$

3. $\frac{a}{10} = \frac{b}{11} = \frac{c}{21}$

4. $\frac{a}{11} = \frac{b}{22} = \frac{c}{42}$

Question Number : 55 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

જો a, b અને c એ અનુક્રમે $^{19}C_p$, $^{20}C_q$ અને $^{21}C_r$ ની મહત્તમ કિંમતો હોય, તો :

Options :

1. $\frac{a}{11} = \frac{b}{22} = \frac{c}{21}$

2. $\frac{a}{10} = \frac{b}{11} = \frac{c}{42}$

3. $\frac{a}{10} = \frac{b}{11} = \frac{c}{21}$

4. $\frac{a}{11} = \frac{b}{22} = \frac{c}{42}$

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

Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be such that for all $x \in \mathbb{R}$
 $(2^{1+x} + 2^{1-x}), f(x)$ and $(3^x + 3^{-x})$ are in A.P.,
then the minimum value of $f(x)$ is :

Options :

1. 0

2. 2

3. 3

4. 4

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

माना $f : \mathbb{R} \rightarrow \mathbb{R}$ इस प्रकार है कि सभी $x \in \mathbb{R}$ के
लिए $(2^{1+x} + 2^{1-x}), f(x)$ तथा $(3^x + 3^{-x})$ एक
समांतर श्रेणी में हैं, तो $f(x)$ का न्यूनतम मान है :

Options :

1. 0

2. 2

3. 3

4. 4

Question Number : 56 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

ધારો કે $f : \mathbb{R} \rightarrow \mathbb{R}$ એવું છે કે જેથી પ્રત્યેક $x \in \mathbb{R}$ માટે $(2^{1+x} + 2^{1-x}), f(x)$ અને $(3^x + 3^{-x})$ સમાંતર શ્રેણી (A.P.) માં હોય, તો $f(x)$ ની ન્યૂનતમ કિંમત _____ છે.

Options :

1. 0

2. 2

3. 3

4. 4

Question Number : 57 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

$\lim_{x \rightarrow 0} \left(\frac{3x^2 + 2}{7x^2 + 2} \right)^{1/x^2}$ is equal to :

Options :

1. e

2. e^2

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

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

Question Number : 57 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

$\lim_{x \rightarrow 0} \left(\frac{3x^2 + 2}{7x^2 + 2} \right)^{1/x^2}$ बराबर है :

Options :

1. e

2. e^2

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

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

Question Number : 57 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

$\lim_{x \rightarrow 0} \left(\frac{3x^2 + 2}{7x^2 + 2} \right)^{1/x^2} = \underline{\hspace{2cm}} .$

Options :

1. e

2. e^2

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

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

Question Number : 58 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Let $f(x) = x \cos^{-1}(-\sin|x|)$, $x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$,

then which of the following is true ?

Options :

1. f is not differentiable at $x = 0$

2. $f'(0) = -\frac{\pi}{2}$

f' is decreasing in $\left(-\frac{\pi}{2}, 0\right)$ and

3. increasing in $\left(0, \frac{\pi}{2}\right)$

f' is increasing in $\left(-\frac{\pi}{2}, 0\right)$ and

4. decreasing in $\left(0, \frac{\pi}{2}\right)$

Question Number : 58 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

माना $f(x) = x \cos^{-1}(-\sin|x|)$, $x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

है. तो निम्न में से कौन सा सत्य है?

1. $f, x=0$ પર અવકલનીય નહીં છે.

2. $f'(0) = -\frac{\pi}{2}$

3. $f', \left(-\frac{\pi}{2}, 0\right)$ મેં હ્રાસમાન છે તથા $\left(0, \frac{\pi}{2}\right)$ મેં વર્ધમાન છે.

4. $f', \left(-\frac{\pi}{2}, 0\right)$ મેં વર્ધમાન છે તથા $\left(0, \frac{\pi}{2}\right)$ મેં હ્રાસમાન છે.

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

જો $f(x) = x \cos^{-1}(-\sin|x|), x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right],$

તો નીચેનામાંથી કયું સાચું છે?

Options :

1. $f, x=0$ આગળ વિકલનીય નથી.

2. $f'(0) = -\frac{\pi}{2}$

3. f' એ $\left(-\frac{\pi}{2}, 0\right)$ માં ઘટતું અને $\left(0, \frac{\pi}{2}\right)$ માં વધતું છે.

f' એ $\left(-\frac{\pi}{2}, 0\right)$ માં વધતું અને $\left(0, \frac{\pi}{2}\right)$

4. માં ઘટતું છે.

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

If c is a point at which Rolle's theorem holds for the function,

$$f(x) = \log_e \left(\frac{x^2 + \alpha}{7x} \right) \text{ in the interval}$$

$[3, 4]$, where $\alpha \in \mathbb{R}$, then $f''(c)$ is equal to :

Options :

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

2. $\frac{1}{12}$

3. $-\frac{1}{24}$

4. $-\frac{1}{12}$

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

यदि c एक बिंदु है जिस पर, अंतराल $[3, 4]$ में,

फलन $f(x) = \log_e \left(\frac{x^2 + \alpha}{7x} \right)$ पर रोले प्रमेय

लागू होता है, जहाँ $\alpha \in \mathbb{R}$ है, तो $f''(c)$ बराबर है :

Options :

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

2. $\frac{1}{12}$

3. $-\frac{1}{24}$

4. $-\frac{1}{12}$

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

Correct Marks : 4 Wrong Marks : 1

જો c એ એવું બિંદુ હોય કે જે વિધેય

$$f(x) = \log_e \left(\frac{x^2 + \alpha}{7x} \right) \text{ માટે અંતરાલ } [3, 4] \text{ માં}$$

રોલના પ્રમેયનું પાલન કરે, જ્યાં $\alpha \in \mathbb{R}$ તો

$$f''(c) = \underline{\hspace{2cm}}.$$

Options :

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

2. $\frac{1}{12}$

3. $-\frac{1}{24}$

4. $-\frac{1}{12}$

If

$$\int \frac{\cos x \, dx}{\sin^3 x (1 + \sin^6 x)^{2/3}} = f(x) (1 + \sin^6 x)^{1/\lambda} + c$$

where c is a constant of integration, then

$\lambda f\left(\frac{\pi}{3}\right)$ is equal to :

Options :

1. $\frac{9}{8}$

2. $-\frac{9}{8}$

3. 2

4. -2

Question Number : 60 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

यदि

$$\int \frac{\cos x \, dx}{\sin^3 x (1 + \sin^6 x)^{2/3}} = f(x) (1 + \sin^6 x)^{1/\lambda} + c$$

है, जहाँ c एक समाकलन अचर है, तो $\lambda f\left(\frac{\pi}{3}\right)$ का

मान है :

Options :

1. $\frac{9}{8}$

2. $-\frac{9}{8}$

3. 2

4. -2

Question Number : 60 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

જો

$$\int \frac{\cos x \, dx}{\sin^3 x (1 + \sin^6 x)^{2/3}} = f(x) (1 + \sin^6 x)^{1/\lambda} + c,$$

જ્યાં c એ સંકલનનો અચળાંક હોય, તો

$$\lambda f\left(\frac{\pi}{3}\right) = \text{_____}.$$

Options :

1. $\frac{9}{8}$

2. $-\frac{9}{8}$

3. 2

4. -2

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

Correct Marks : 4 Wrong Marks : 1

For $a > 0$, let the curves $C_1 : y^2 = ax$ and $C_2 : x^2 = ay$ intersect at origin O and a point P . Let the line $x = b$ ($0 < b < a$) intersect the chord OP and the x -axis at points Q and R , respectively. If the line $x = b$ bisects the area bounded by the curves, C_1 and C_2 , and the area of $\Delta OQR = \frac{1}{2}$, then 'a' satisfies the equation :

Options :

1. $x^6 + 6x^3 - 4 = 0$

2. $x^6 - 12x^3 + 4 = 0$

3. $x^6 - 12x^3 - 4 = 0$

4. $x^6 - 6x^3 + 4 = 0$

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

Correct Marks : 4 Wrong Marks : 1

$a > 0$ के लिए, माना वक्र $C_1 : y^2 = ax$ तथा $C_2 : x^2 = ay$, मूलबिंदु O तथा एक बिंदु P पर काटते हैं। माना रेखा $x = b$, ($0 < b < a$), जीवा OP तथा x - अक्ष को क्रमशः बिंदुओं Q तथा R पर काटती है। यदि रेखा $x = b$, वक्रों C_1 तथा C_2 द्वारा परिबद्ध क्षेत्र को समद्विभाजित करती है तथा ΔOQR का क्षेत्रफल $= \frac{1}{2}$ है, तो 'a' जिस समीकरण को संतुष्ट करता है, वह है :

Options :

1. $x^6 + 6x^3 - 4 = 0$

2. $x^6 - 12x^3 + 4 = 0$

3. $x^6 - 12x^3 - 4 = 0$

4. $x^6 - 6x^3 + 4 = 0$

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

Correct Marks : 4 Wrong Marks : 1

ધારો કે $a > 0$ માટે વક્રો $C_1 : y^2 = ax$ અને $C_2 : x^2 = ay$ પરસ્પર ઉગમબિંદુ O અને બિંદુ P આગળ છેદે છે. ધારોકે રેખા $x = b$ ($0 < b < a$) એ, જીવા OP અને x- અક્ષને અનુક્રમે બિંદુઓ Q અને R માં છેદે છે. જો રેખા $x = b$ એ વક્રો C_1 અને C_2 દ્વારા આવૃત્ત પ્રદેશના ક્ષેત્રફળને દુભાગે અને ΔOQR નું

ક્ષેત્રફળ $= \frac{1}{2}$ હોય, તો 'a' એ _____

સમીકરણનું સમાધાન કરે.

Options :

1. $x^6 + 6x^3 - 4 = 0$

2. $x^6 - 12x^3 + 4 = 0$

3. $x^6 - 12x^3 - 4 = 0$

4. $x^6 - 6x^3 + 4 = 0$

Question Number : 62 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Let $y = y(x)$ be a solution of the differential equation,

$$\sqrt{1-x^2} \frac{dy}{dx} + \sqrt{1-y^2} = 0, |x| < 1.$$

If $y\left(\frac{1}{2}\right) = \frac{\sqrt{3}}{2}$, then $y\left(\frac{-1}{\sqrt{2}}\right)$ is equal to :

Options :

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

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

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

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

Question Number : 62 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

माना $y = y(x)$, अवकल समीकरण

$$\sqrt{1-x^2} \frac{dy}{dx} + \sqrt{1-y^2} = 0, |x| < 1 \text{ का एक}$$

हल है। यदि $y\left(\frac{1}{2}\right) = \frac{\sqrt{3}}{2}$ है, तो $y\left(\frac{-1}{\sqrt{2}}\right)$ बराबर है :

Options :

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

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

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

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

Question Number : 62 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

ધારો કે $y=y(x)$ એ વિકલ સમીકરણ

$$\sqrt{1-x^2} \frac{dy}{dx} + \sqrt{1-y^2} = 0, |x| < 1 \text{ નો ઉકેલ}$$

છે. જો $y\left(\frac{1}{2}\right) = \frac{\sqrt{3}}{2}$, તો

$y\left(\frac{-1}{\sqrt{2}}\right) = \underline{\hspace{2cm}}$.

Options :

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

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

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

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

Question Number : 63 Question Type : MCO Option Shuffling : Yes

The locus of a point which divides the line segment joining the point $(0, -1)$ and a point on the parabola, $x^2 = 4y$, internally in the ratio $1 : 2$, is :

Options :

1. $4x^2 - 3y = 2$

2. $x^2 - 3y = 2$

3. $9x^2 - 12y = 8$

4. $9x^2 - 3y = 2$

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

Correct Marks : 4 Wrong Marks : 1

बिंदु $(0, -1)$ तथा परवलय $x^2 = 4y$ पर स्थित एक बिंदु को मिलाने वाले रेखाखण्ड का $1 : 2$ के अनुपात में अंतःविभाजन करने वाले बिंदु का बिंदुपथ है :

Options :

1. $4x^2 - 3y = 2$

2. $x^2 - 3y = 2$

3. $9x^2 - 12y = 8$

4. $9x^2 - 3y = 2$

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

બિંદુ $(0, -1)$ અને પરવલય $x^2 = 4y$ પરના બિંદુને જોડતા રેખાખંડનું, $1 : 2$ ગુણોત્તરમાં અંતઃ વિભાજન કરતા બિંદુનો બિંદુપથ _____ છે.

Options :

1. $4x^2 - 3y = 2$

2. $x^2 - 3y = 2$

3. $9x^2 - 12y = 8$

4. $9x^2 - 3y = 2$

Question Number : 64 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Let the line $y = mx$ and the ellipse $2x^2 + y^2 = 1$ intersect at a point P in the first quadrant. If the normal to this ellipse at P

meets the co-ordinate axes at $\left(-\frac{1}{3\sqrt{2}}, 0\right)$

and $(0, \beta)$, then β is equal to :

Options :

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

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

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

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

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

માના રેખા $y = mx$ તથા દીર્ઘવૃત્ત $2x^2 + y^2 = 1$, પ્રથમ ચતુર્થાંશ મેં સ્થિત એક બિંદુ P પર કાટતે હૈં। યદિ ઇસ દીર્ઘવૃત્ત કા P પર અભિલંબ, નિર્દેશાંક અક્ષોં કો ક્રમશઃ

$\left(-\frac{1}{3\sqrt{2}}, 0\right)$ તથા $(0, \beta)$ પર મિલતા હૈ, તો β કા માન હૈ :

Options :

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

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

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

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

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

ધારો કે રેખા $y = mx$ અને ઉપવલય $2x^2 + y^2 = 1$, પ્રથમ ચરણમાં પરસ્પર P બિંદુએ છેદે છે. જો આ ઉપવલયનો બિંદુ P આગળ નો અભિલંબ, યામાક્ષોને

$\left(-\frac{1}{3\sqrt{2}}, 0\right)$ અને $(0, \beta)$ બિંદુઓ એ મળે, તો

$\beta =$ _____.

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

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

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

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

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

Correct Marks : 4 Wrong Marks : 1

The shortest distance between the lines

$$\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1} \text{ and}$$

$$\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4} \text{ is :}$$

Options :

1. $2\sqrt{30}$

2. $3\sqrt{30}$

3. 3

4. $\frac{7}{2}\sqrt{30}$

रेखाओं $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$ तथा

$\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$ के बीच की न्यूनतम

दूरी है :

Options :

1. $2\sqrt{30}$

2. $3\sqrt{30}$

3. 3

4. $\frac{7}{2}\sqrt{30}$

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

Correct Marks : 4 Wrong Marks : 1

रेखाओं $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$ અને

$\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$ વચ્ચેનું લઘુત્તમ અંતર

_____ છે.

Options :

1. $2\sqrt{30}$

2. $3\sqrt{30}$

3. 3

4. $\frac{7}{2}\sqrt{30}$

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

Let the volume of a parallelopiped whose coterminous edges are given by

$$\vec{u} = \hat{i} + \hat{j} + \lambda\hat{k}, \quad \vec{v} = \hat{i} + \hat{j} + 3\hat{k} \text{ and}$$

$$\vec{w} = 2\hat{i} + \hat{j} + \hat{k} \text{ be 1 cu. unit. If } \theta \text{ be the}$$

angle between the edges $\vec{u}$ and $\vec{w}$, then $\cos\theta$ can be :

Options :

1. $\frac{5}{7}$

2. $\frac{7}{6\sqrt{6}}$

3. $\frac{7}{6\sqrt{3}}$

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

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

માના એક સમાન્તર ષટ્ફલક, જિસકે એક હી શીર્ષ સે

હોકર જાને વાલે કિનારે $\vec{u} = \hat{i} + \hat{j} + \lambda\hat{k}$,

$\vec{v} = \hat{i} + \hat{j} + 3\hat{k}$ તથા $\vec{w} = 2\hat{i} + \hat{j} + \hat{k}$

દ્વારા પ્રદત્ત હૈં, કા આયતન 1 ઘન ઇકાઈ હૈં। યદિ કિનારોં

$\vec{u}$ તથા $\vec{w}$ કે બીચ કા કોણ θ હૈં, તો $\cos\theta$ હો સકતા હૈં :

Options :

1. $\frac{5}{7}$

2. $\frac{7}{6\sqrt{6}}$

3. $\frac{7}{6\sqrt{3}}$

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

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

Correct Marks : 4 Wrong Marks : 1

જેની સંલગ્ન બાજુઓ (cotermious edges)

$\vec{u} = \hat{i} + \hat{j} + \lambda\hat{k}$, $\vec{v} = \hat{i} + \hat{j} + 3\hat{k}$ અને

$\vec{w} = 2\hat{i} + \hat{j} + \hat{k}$ હોય તેવા સમાંતર ફલકનું ઘનફળ

1 ઘન એકમ છે. જો θ એ બાજુઓ $\vec{u}$ અને $\vec{w}$ વચ્ચેનો ખૂણો હોય, તો $\cos\theta$ નું મૂલ્ય _____ હોઈ શકે.

Options :

1. $\frac{5}{7}$

2. $\frac{7}{6\sqrt{6}}$

3. $\frac{7}{6\sqrt{3}}$

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

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

The mean and the standard deviation (s.d.) of 10 observations are 20 and 2 respectively. Each of these 10 observations is multiplied by p and then reduced by q , where $p \neq 0$ and $q \neq 0$. If the new mean and new s.d. become half of their original values, then q is equal to :

Options :

1. -5

2. 10

3. -10

4. -20

Correct Marks : 4 Wrong Marks : 1

10 પ્રેક્ષણોં કે માધ્ય તથા માનક વિચલન ક્રમશઃ 20 તથા 2 હૈં. ઇન 10 પ્રેક્ષણોં મૈં સે પ્રત્યેક કો p સે ગુણા કરને કે પશ્ચાત પ્રત્યેક મૈં સે q કમ કિયા ગયા, જહૌં $p \neq 0$ તથા $q \neq 0$ હૈં. યદિ ના માધ્ય તથા માનક વિચલન કે માન અપને મૂલ માનોં કે આધે હૈં, તો q કા માન હૈં :

Options :

1. -5

2. 10

3. -10

4. -20

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

Correct Marks : 4 Wrong Marks : 1

10 અવલોકનો નો મધ્યક અને પ્રમાણિત વિચલન (s.d.) અનુક્રમે 20 અને 2 છે. આ 10 માંના પ્રત્યેક અવલોકનને p વડે ગુણીને q બાદ કરવામાં આવે છે, જ્યાં $p \neq 0$ અને $q \neq 0$. જો નવો મધ્યક અને નવું પ્રમાણિત વિચલન, તેમની મૂળ કિંમતો કરતાં અડધાં થાય, તો $q =$ _____.

Options :

1. -5

2. 10

3. -10

4. -20

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

Let A and B be two independent events

such that $P(A) = \frac{1}{3}$ and $P(B) = \frac{1}{6}$. Then,

which of the following is TRUE ?

Options :

1. $P(A/(A \cup B)) = \frac{1}{4}$

2. $P(A/B) = \frac{2}{3}$

3. $P(A/B') = \frac{1}{3}$

4. $P(A'/B') = \frac{1}{3}$

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

माना A तथा B दो ऐसी स्वतंत्र घटनाएँ हैं कि

$P(A) = \frac{1}{3}$ तथा $P(B) = \frac{1}{6}$ है, तो निम्न में से कौन

सा सत्य है?

Options :

1. $P(A/(A \cup B)) = \frac{1}{4}$

2. $P(A/B) = \frac{2}{3}$

3. $P(A/B') = \frac{1}{3}$

4. $P(A'/B') = \frac{1}{3}$

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

Correct Marks : 4 Wrong Marks : 1

જો A અને B એ, બે એવી નિરપેક્ષ ઘટનાઓ છે કે

જે થી $P(A) = \frac{1}{3}$ અને $P(B) = \frac{1}{6}$ હોય, તો

નીચેનામાંથી કયું સાચું છે?

Options :

1. $P(A/(A \cup B)) = \frac{1}{4}$

2. $P(A/B) = \frac{2}{3}$

3. $P(A/B') = \frac{1}{3}$

4. $P(A'/B') = \frac{1}{3}$

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

Correct Marks : 4 Wrong Marks : 1

Let

$$f(x) = \left(\sin(\tan^{-1}x) + \sin(\cot^{-1}x) \right)^2 - 1 \quad ,$$

$$|x| > 1. \text{ If } \frac{dy}{dx} = \frac{1}{2} \frac{d}{dx} \left(\sin^{-1}(f(x)) \right) \text{ and}$$

$$y(\sqrt{3}) = \frac{\pi}{6}, \text{ then } y(-\sqrt{3}) \text{ is equal to :}$$

Options :

1. $-\frac{\pi}{6}$

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

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

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

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

Correct Marks : 4 Wrong Marks : 1

माना

$$f(x) = \left(\sin(\tan^{-1}x) + \sin(\cot^{-1}x) \right)^2 - 1 \quad ,$$

$$|x| > 1 \text{ है। यदि } \frac{dy}{dx} = \frac{1}{2} \frac{d}{dx} \left(\sin^{-1}(f(x)) \right)$$

$$\text{तथा } y(\sqrt{3}) = \frac{\pi}{6} \text{ हैं, तो } y(-\sqrt{3}) \text{ का मान है :}$$

Options :

1. $-\frac{\pi}{6}$

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

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

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

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

ધારો કે

$$f(x) = (\sin(\tan^{-1}x) + \sin(\cot^{-1}x))^2 - 1, \quad$$

$$|x| > 1. \quad \text{જો } \frac{dy}{dx} = \frac{1}{2} \frac{d}{dx} (\sin^{-1}(f(x))) \quad \text{અતઃ}$$

$$y(\sqrt{3}) = \frac{\pi}{6}, \quad \text{તો } y(-\sqrt{3}) = \underline{\hspace{2cm}}.$$

Options :

1. $-\frac{\pi}{6}$

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

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

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

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

Which one of the following is a tautology ?

Options :

1. $P \wedge (P \vee Q)$

2. $P \vee (P \wedge Q)$

3. $(P \wedge (P \rightarrow Q)) \rightarrow Q$

4. $Q \rightarrow (P \wedge (P \rightarrow Q))$

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

Correct Marks : 4 Wrong Marks : 1

નિમ્ન મેં સે કૌન સા કથન ઁક પુનરુક્તિ હૈ?

Options :

1. $P \wedge (P \vee Q)$

2. $P \vee (P \wedge Q)$

3. $(P \wedge (P \rightarrow Q)) \rightarrow Q$

4. $Q \rightarrow (P \wedge (P \rightarrow Q))$

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

Correct Marks : 4 Wrong Marks : 1

નીચેનામાંથી કયું નિત્યસત્ય છે?

Options :

1. $P \wedge (P \vee Q)$

2. $P \vee (P \wedge Q)$

3. $(P \wedge (P \rightarrow Q)) \rightarrow Q$

4. $Q \rightarrow (P \wedge (P \rightarrow Q))$

Sub-Section Number: 2
Sub-Section Id: 40503691
Question Shuffling Allowed : Yes

Question Number : 71 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The least positive value of 'a' for which the equation, $2x^2 + (a - 10)x + \frac{33}{2} = 2a$ has real roots is _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

8 to 8

Question Number : 71 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

'a' का वह न्यूनतम धनात्मक मान, जिसके लिए समीकरण $2x^2 + (a - 10)x + \frac{33}{2} = 2a$ के वास्तविक मूल हैं, है _____।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

8 to 8

Question Number : 71 Question Type : SA

સમીકરણ $2x^2 + (a - 10)x + \frac{33}{2} = 2a$ ને
વાસ્તવિક બીજો હોય તેવી 'a' ની લઘુત્તમ ધન કિંમત
_____ છે.

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

The number of all 3×3 matrices A, with
enteries from the set $\{-1, 0, 1\}$ such that
the sum of the diagonal elements of AA^T is
3, is _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

672 to 672

Question Number : 72 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ऐसे सभी 3×3 आव्यूहों A की संख्या, जिनके अवयव
समुच्चय $\{-1, 0, 1\}$ से हैं तथा AA^T के विकर्ण के
अवयवों का योगफल 3 है, है _____ ।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

672 to 672

Question Number : 72 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

જેના ઘટકો ગણ $\{-1, 0, 1\}$ માંથી હોય અને AA^T
ના વિકર્ણના ઘટકોનો સરવાળો 3 હોય તેવા તમામ 3×3
શ્રેણિકો A ની સંખ્યા _____ છે.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

Correct Marks : 4 Wrong Marks : 0

The sum $\sum_{k=1}^{20} (1 + 2 + 3 + \dots + k)$ is

_____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

1540 to 1540

Question Number : 73 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

योगफल $\sum_{k=1}^{20} (1 + 2 + 3 + \dots + k)$ है

_____।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

1540 to 1540

Question Number : 73 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

सर्वान्तर $\sum_{k=1}^{20} (1 + 2 + 3 + \dots + k)$

= _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

1540 to 1540

Question Number : 74 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let the normal at a point P on the curve $y^2 - 3x^2 + y + 10 = 0$ intersect the y-axis at

$\left(0, \frac{3}{2}\right)$. If m is the slope of the tangent at

P to the curve, then |m| is equal to

_____.

Answers Type: Range

Possible Answers :

4 to 4

Question Number : 74 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

माना वक्र $y^2 - 3x^2 + y + 10 = 0$ के बिंदु P पर खींचा गया अभिलंब, y - अक्ष को $\left(0, \frac{3}{2}\right)$ पर काटता है। यदि P पर वक्र की स्पर्श रेखा का ढाल m है, तो $|m|$ बराबर है _____।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

4 to 4

Question Number : 74 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ધારો કે વક્ર $y^2 - 3x^2 + y + 10 = 0$ ના બિંદુ P આગળનો અભિલંબ, y -અક્ષને $\left(0, \frac{3}{2}\right)$ આગળ છેદે છે. જો P આગળ વક્રના સ્પર્શકનો ઢાળ m હોય, તો $|m| =$ _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

4 to 4

Question Number : 75 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

An urn contains 5 red marbles, 4 black marbles and 3 white marbles. Then the number of ways in which 4 marbles can be drawn so that at the most three of them are red is _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

490 to 490

एक कलश में 5 लाल मार्बल, 4 काले मार्बल तथा 3 सफेद मार्बल हैं, तो इसमें से 4 मार्बल इस प्रकार निकालने ताकि उनमें से अधिक से अधिक तीन लाल रंग के हों, के तरीकों की संख्या है _____ ।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

490 to 490

Question Number : 75 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

એક ઘડા માં 5 લાલ લખોટીઓ, 4 કાળી લખોટીઓ અને 3 સફેદ લખોટીઓ છે. જેમાં વધુમાં વધુ ત્રણ લખોટીઓ લાલ હોય તે રીતે 4 લખોટીઓ પસંદ કરવાની રીતોની સંખ્યા _____ છે.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

490 to 490