National Testing Agency

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Subject Name :	Chemical Sciences
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Total Marks :	200
Display Marks:	Yes

CHEMICAL SCIENCES

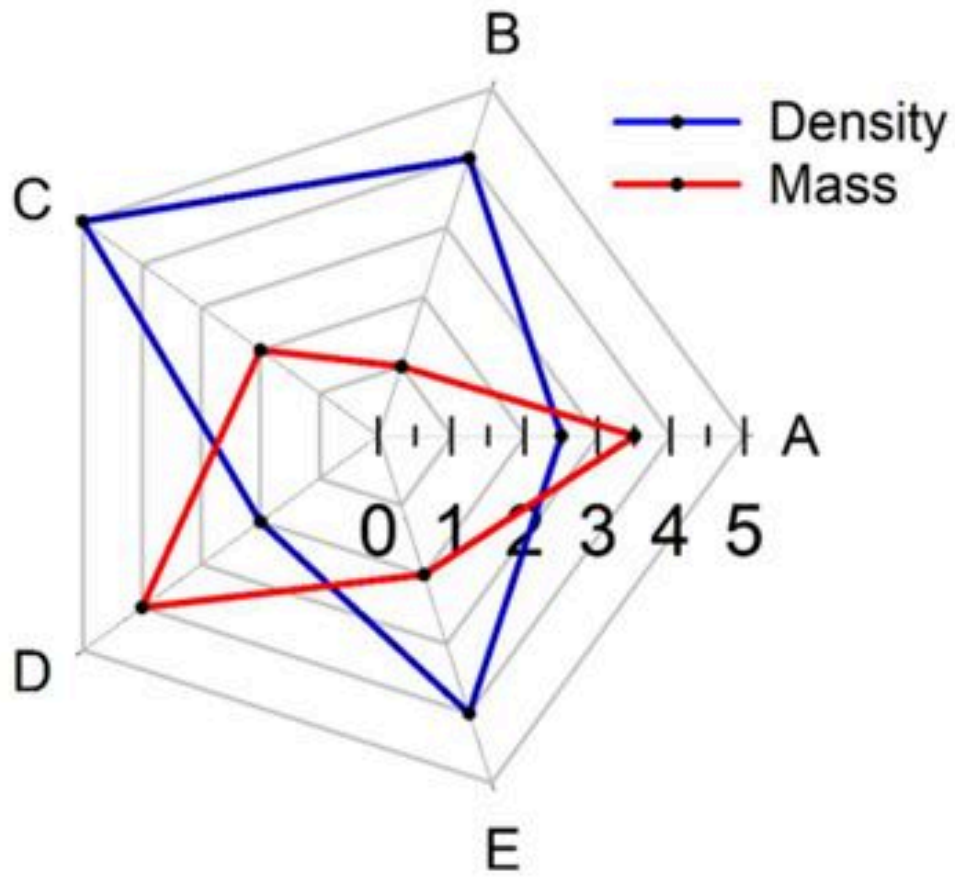
Group Number :	1
Group Id :	9167106
Group Maximum Duration :	0
Group Minimum Duration :	180
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	200

PART-A

Section Id :	91671016
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	15
Section Marks :	30
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	91671016
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 916710556 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The following figure shows densities and masses of five objects (A to E).



The object with the largest volume is ____.

1. A
2. B
3. D
4. E

Options :

9167102221. 1

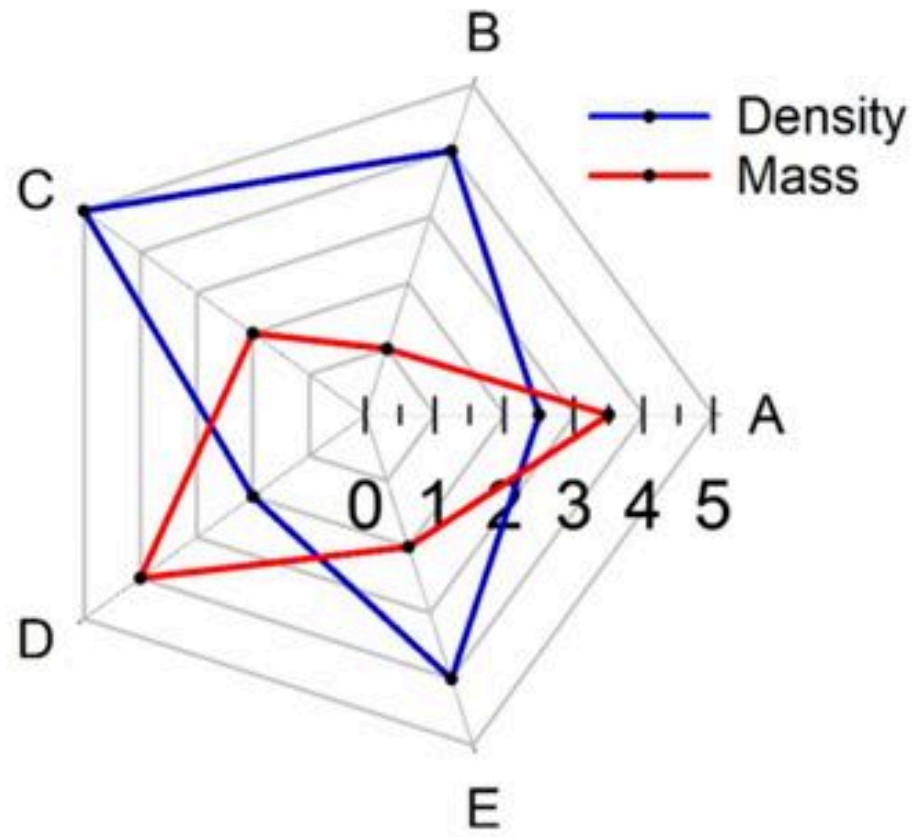
9167102222. 2

9167102223. 3

9167102224. 4

Question Number : 1 Question Id : 916710556 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्न चित्र में पाँच वस्तुओं (A से E) के घनत्व (density) और द्रव्यमान (mass) को दर्शाया गया है।



सबसे अधिक आयतन वाली वस्तु _____ है।

1. A
2. B
3. D
4. E

Options :

9167102221. 1

9167102222. 2

9167102223. 3

9167102224. 4

Question Number : 2 Question Id : 916710557 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In a class, 40% and 20% students passed in Mathematics and Physics, respectively, and 10% students passed in both subjects. What is the probability of a randomly selected student to have passed in Physics if the student already passed in Mathematics?

1. 1/2
2. 1/20
3. 1/4
4. 2/25

Options :

9167102225. 1

9167102226. 2

9167102227. 3

9167102228. 4

Question Number : 2 Question Id : 916710557 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

एक कक्षा में 40% और 20% विद्यार्थियों ने क्रमश: गणित और भौतिक विज्ञान में परीक्षा उत्तीर्ण की और 10 प्रतिशत विद्यार्थी दोनों विषयों में उत्तीर्ण हुए। यादृच्छिक रूप से चयनित विद्यार्थी की भौतिक विज्ञान में पास होने की प्रायिकता क्या होगी यदि उसने गणित की परीक्षा पहले ही उत्तीर्ण कर ली हो?

1. 1/2
2. 1/20
3. 1/4
4. 2/25

Options :

9167102225. 1

9167102226. 2

9167102227. 3

9167102228. 4

Question Number : 3 Question Id : 916710558 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

What is the minimum number of pourings required to transfer exactly 6L of water from a 12L fully filled container to an 8L empty container when a 5L empty container is also available to use?

1. 4
2. 5
3. 6
4. 7

Options :

9167102229. 1

9167102230. 2

9167102231. 3

9167102232. 4

Question Number : 3 Question Id : 916710558 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

12 लीटर क्षमता के एक पूर्ण भरे हुए पात्र से एक 8 लीटर क्षमता वाले खाली पात्र में 6 लीटर पानी को लाने के लिए न्यूनतम कितनी बार पानी उड़ेलना होगा जबकि एक 5 लीटर का खाली पात्र भी उपयोग के लिए उपलब्ध हो?

1. 4
2. 5
3. 6
4. 7

Options :

9167102229. 1

9167102230. 2

9167102231. 3

9167102232. 4

Question Number : 4 Question Id : 916710559 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Suppose $a_1, a_2, \ldots, a_{300}$ are integers such that $a_{i-1} + a_i + a_{i+1} = 2025$ for all $i = 2,3, \ldots, 299$.

If $a_7 = -5$, $a_9 = 37$, then the value of a_{106} is

1. 1993
2. 37
3. – 5
4. 2030

Options :

9167102233. 1

9167102234. 2

9167102235. 3

9167102236. 4

Question Number : 4 Question Id : 916710559 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

माना कि सभी $i = 2,3, \ldots, 299$ के लिए $a_1, a_2, \ldots, a_{300}$ इस तरह के पूर्णांक है कि $a_{i-1} + a_i + a_{i+1} = 2025$

यदि $a_7 = -5$, $a_9 = 37$, तो a_{106} का मान है

1. 1993
2. 37
3. – 5
4. 2030

Options :

9167102233. 1

9167102234. 2

9167102235. 3

9167102236. 4

Question Number : 5 Question Id : 916710560 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A recent survey suggests that the total fertility rate in a country has fallen below 2.1, the population replacement ratio. This necessarily implies that the

1. infant mortality rate has increased reducing the net fertility ratio.
2. total population will decline.
3. population of young people is going to increase with a faster rate in the long run if the same status continues.
4. proportion of elderly people is going to decrease in the long run if the same status continues.

Options :

9167102237. 1

9167102238. 2

9167102239. 3

9167102240. 4

Question Number : 5 Question Id : 916710560 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

एक हालिया सर्वेक्षण में यह बताया गया है कि एक देश में कुल प्रजनन दर, जनसंख्या प्रतिस्थापन अनुपात 2.1, से नीचे आ गई है। इससे निश्चितया यह आशय निकलता है कि

1. नवजात मृत्युदर में वृद्धि हुई है जिससे शुद्ध प्रजनन अनुपात में कमी आई है।
2. कुल जनसंख्या में कमी होगी
3. यदि यह स्थिति जारी रहती है तो दीर्घकाल में युवा लोगों की जनसंख्या में तेज गति से वृद्धि होगी
4. यदि यह स्थिति जारी रहती है तो दीर्घकाल में वृद्ध लोगों की संख्या के अनुपात में कमी होगी

Options :

9167102237. 1

9167102238. 2

9167102239. 3

9167102240. 4

Question Number : 6 Question Id : 916710561 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In an exam, questions of three difficulty levels hard, medium, and easy fetch respectively 7, 3, and 2 marks if correct and 0 if incorrect. Three students got 30 marks each but in three different ways, though the total number of questions correctly answered by each student was the same. Then what could be the total number of questions correctly answered by each of these students?

1. 12
2. 10
3. 9
4. 6

Options :

9167102241. 1

9167102242. 2

9167102243. 3

9167102244. 4

Question Number : 6 Question Id : 916710561 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

एक परीक्षा में तीन प्रकार के कठिनाई स्तर, कठिन, मध्यम और सरल वाले प्रश्नों के सही उत्तरों से क्रमश: 7, 3, और 2 अंक प्राप्त होते हैं, और यदि उत्तर गलत है तो शून्य अंक मिलते हैं। तीन विद्यार्थियों में से प्रत्येक ने 30 अंक प्राप्त किए किंतु तीन विभिन्न तरह से, हालांकि, प्रत्येक विद्यार्थी द्वारा दिए गए सही उत्तर वाले प्रश्नों की कुल संख्या समान थी। तो इन विद्यार्थियों में से प्रत्येक द्वारा सही उत्तर वाले प्रश्नों की कुल संख्या क्या हो सकती है?

1. 12
2. 10
3. 9
4. 6

Options :

9167102241. 1

9167102242. 2

9167102243. 3

9167102244. 4

Question Number : 7 Question Id : 916710562 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The value of $1 + (\frac{1}{2^1} + \frac{1}{3}) + (\frac{1}{2^2} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7}) + \ldots + (\frac{1}{2^9} + \cdots + \frac{1}{1023})$ lies between

1. 2 and 10
2. 11 and 20
3. 21 and 30
4. 31 and 40

Options :

9167102245. 1

9167102246. 2

9167102247. 3

9167102248. 4

Question Number : 7 Question Id : 916710562 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

$1 + (\frac{1}{2^1} + \frac{1}{3}) + (\frac{1}{2^2} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7}) + \ldots + (\frac{1}{2^9} + \cdots + \frac{1}{1023})$ का मान किसके बीच स्थित होगा?

1. 2 एवं 10
2. 11 एवं 20
3. 21 एवं 30
4. 31 एवं 40

Options :

9167102245. 1

9167102246. 2

9167102247. 3

9167102248. 4

Question Number : 8 Question Id : 916710563 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The geometric mean of 100 observations is 25. If each observation is multiplied by 4, what will be the new geometric mean?

1. 100
2. 50
3. 25
4. $(25\times4)^{1/2}$

Options :

9167102249. 1

9167102250. 2

9167102251. 3

9167102252. 4

Question Number : 8 Question Id : 916710563 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

लिए गए 100 प्रेक्षणों का ज्यामितीय (गुणोत्तर) माध्य 25 है। यदि प्रत्येक प्रेक्षण को 4 से गुणा किया जाए तो नया ज्यामितीय माध्य क्या होगा?

1. 100
2. 50
3. 25
4. $(25\times4)^{1/2}$

Options :

9167102249. 1

9167102250. 2

9167102251. 3

9167102252. 4

Question Number : 9 Question Id : 916710564 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which among the following cities can be said most appropriately to bear the same relation to *Tamil Nadu* that **Pune** bears to *Maharashtra*; **Surat** to *Gujarat* and **Asansol** to *West Bengal*?

1. **Tirupati**
2. **Mysore**
3. **Chennai**
4. **Coimbatore**

Options :

9167102253. 1

9167102254. 2

9167102255. 3

9167102256. 4

Question Number : 9 Question Id : 916710564 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित शहरों में से किसका संबंध *तमिलनाडु* से ठीक उसी प्रकार का कहा जा सकता है जैसा संबंध **पुणे** का *महाराष्ट्र* से है; **सूरत** का *गुजरात* से है और **आसनसोल** का *पश्चिम बंगाल* से है?

1. **तिरुपति**
2. **मैसूर**
3. **चैन्नई**
4. **कोयम्बटूर**

Options :

9167102253. 1

9167102254. 2

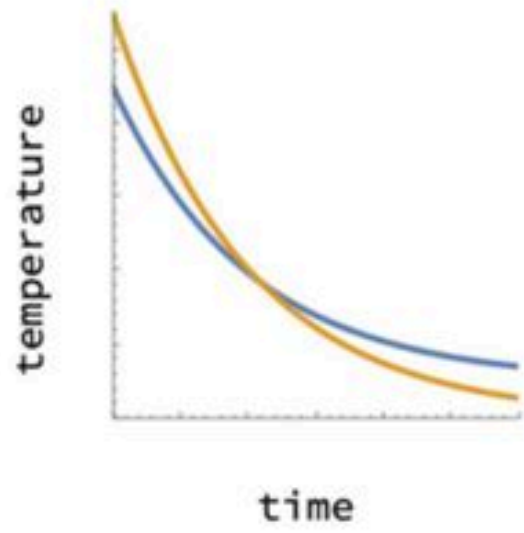
9167102255. 3

9167102256. 4

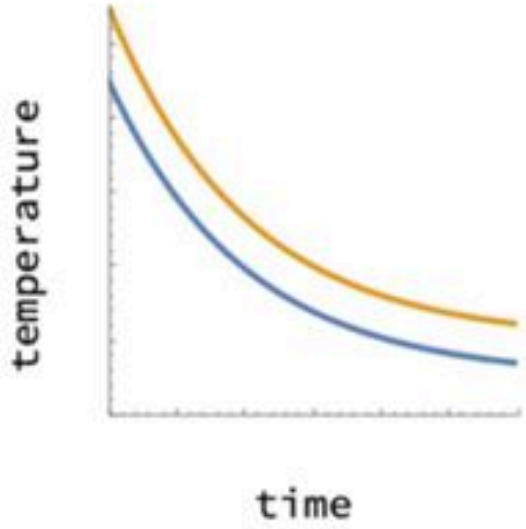
Question Number : 10 Question Id : 916710565 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Two identical metal bars are heated to different temperatures and allowed to cool in the same surroundings. Which one of the following figures correctly shows their cooling curves?

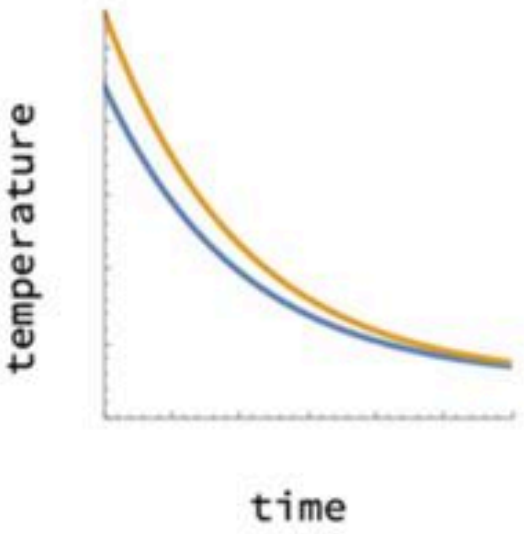
A



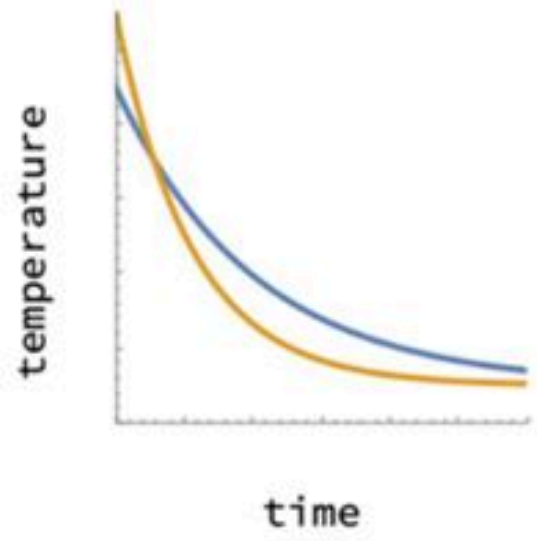
B



C



D



1. A
2. B
3. C
4. D

Options :

9167102257. 1

9167102258. 2

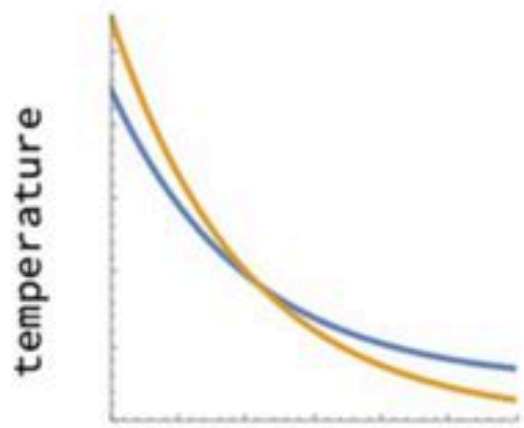
9167102259. 3

9167102260. 4

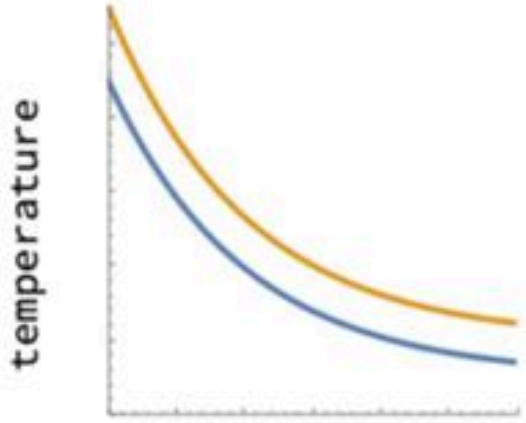
Question Number : 10 Question Id : 916710565 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

धातु की दो समान छड़ों को भिन्न तापमानों पर गर्म किया गया और समान परिवेश में उन्हें ठंडा होने दिया गया। उनके शीतलन आरेख को निम्न में से कौन सा चित्र ठीक प्रकार से प्रदर्शित करता है? (temperature-तापमान; time-समय)

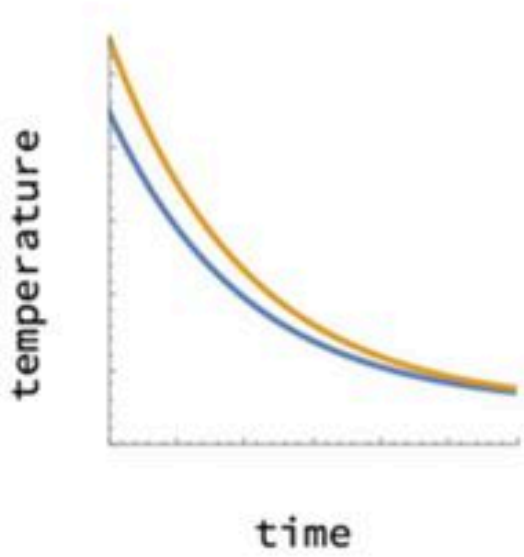
A



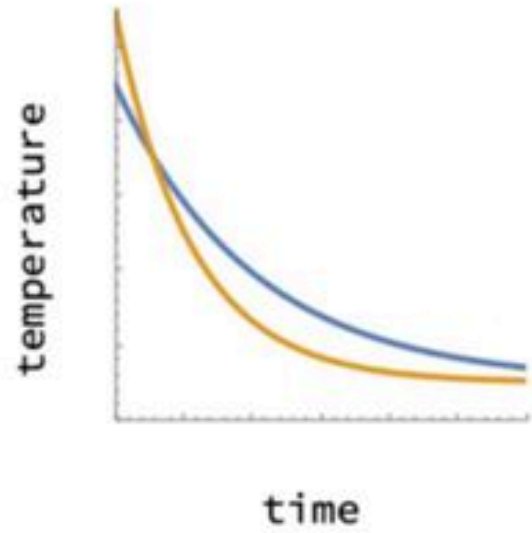
B



C



D



1. A
2. B
3. C
4. D

Options :

9167102257. 1

9167102258. 2

9167102259. 3

9167102260. 4

Question Number : 11 Question Id : 916710566 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A lady bought some apples, each costing Rs. 25, and some bananas each costing Rs 6, for a total of Rs. 378. In how many ways could she have chosen the numbers of apples and bananas?

1. 1
2. 2
3. 3
4. 4

Options :

9167102261. 1

9167102262. 2

9167102263. 3

9167102264. 4

Question Number : 11 Question Id : 916710566 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

एक महिला ने कुल रु. 378 के कुछ सेब और केले खरीदे जिसमें प्रत्येक सेब का मूल्य रु. 25 था, और प्रत्येक केले का मूल्य रु. 6 था। वह कितने प्रकार से सेब और केलों की संख्या का चयन कर सकती थी ?

1. 1
2. 2
3. 3
4. 4

Options :

9167102261. 1

9167102262. 2

9167102263. 3

9167102264. 4

Question Number : 12 Question Id : 916710567 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In a community, some artists are teachers, no teacher is a painter, all painters are artists, and all teachers are professionals. Then it can be definitely asserted that

1. no painter is a professional
2. all artists are professionals
3. no professionals are teachers
4. some artists are professionals

Options :

9167102265. 1

9167102266. 2

9167102267. 3

9167102268. 4

Question Number : 12 Question Id : 916710567 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

एक समुदाय में, कुछ कलाकार शिक्षक हैं, कोई भी शिक्षक पेंटर नहीं है, सभी पेंटर्स कलाकार हैं, तथा सभी शिक्षक पेशेवर (प्रोफेशनल) हैं। तब यह निश्चित तौर पर कहा जा सकता है कि

1. कोई भी पेंटर पेशेवर नहीं है
2. सभी कलाकार पेशेवर हैं
3. कोई भी पेशेवर शिक्षक नहीं है
4. कुछ कलाकार पेशेवर हैं

Options :

9167102265. 1

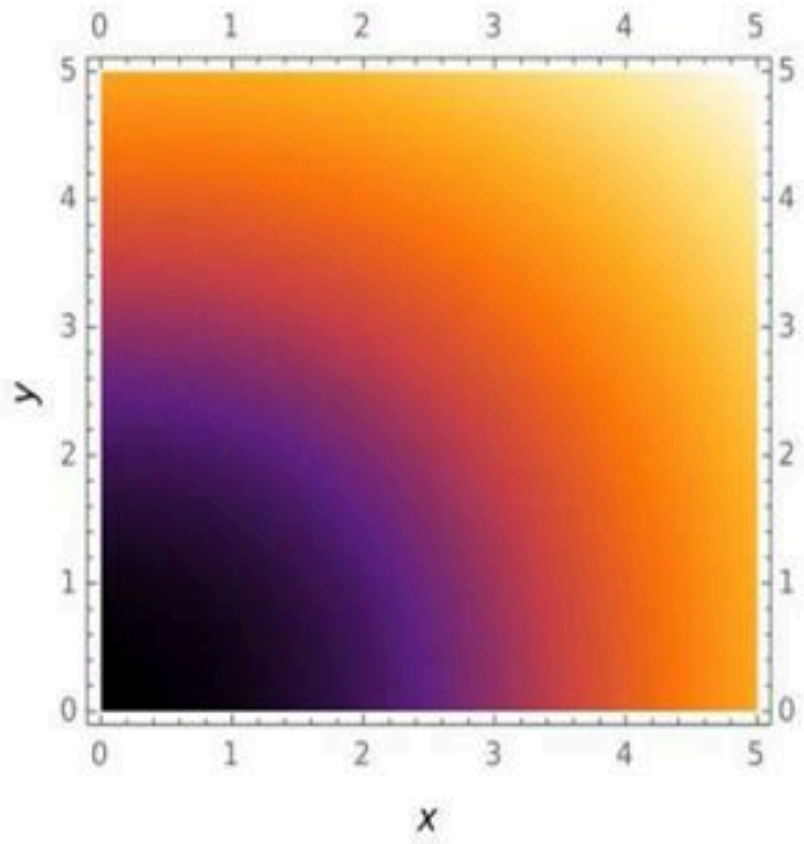
9167102266. 2

9167102267. 3

9167102268. 4

Question Number : 13 Question Id : 916710568 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The following plot shows temperature as a function of *x* and *y*. Along which path is the temperature change minimum?



1. x = constant or y = constant
2. $\frac{y}{x^2}$ = constant
3. $y^2 + x^2$ = constant
4. y x = constant

Options :

9167102269. 1

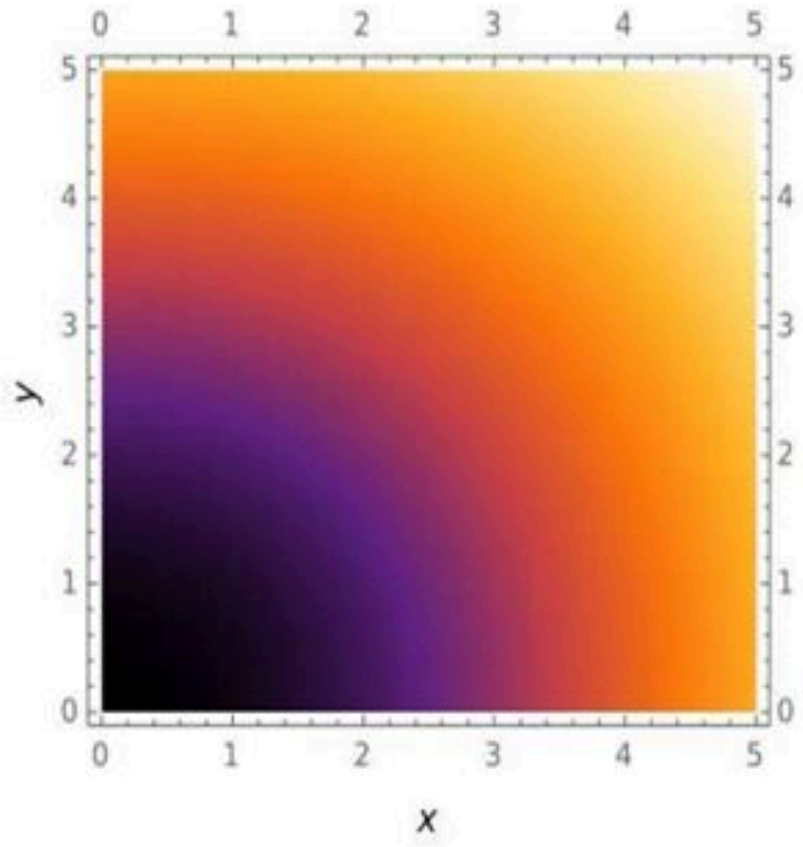
9167102270. 2

9167102271. 3

9167102272. 4

Question Number : 13 Question Id : 916710568 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

नीचे दिए गए प्लॉट में तापमान को x और y फलन के रूप में प्रदर्शित किया गया है। किस पथ पर तापमान में न्यूनतम परिवर्तन होता है?



1. x = स्थिरांक या y = स्थिरांक
2. $\frac{y}{x^2}$ = स्थिरांक
3. $y^2 + x^2$ = स्थिरांक
4. y x = स्थिरांक

Options :

9167102269. 1

9167102270. 2

9167102271. 3

9167102272. 4

Question Number : 14 Question Id : 916710569 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

How many 5-digit numbers can be formed from the digits 0, 2, 3, 4, 6, 7 and 9, using each at most once, which are divisible by 5?

1. 120
2. 240
3. 360
4. 720

Options :

9167102273. 1

9167102274. 2

9167102275. 3

9167102276. 4

Question Number : 14 Question Id : 916710569 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

प्रत्येक अंक का अधिकतम एक बार उपयोग करके 0, 2, 3, 4, 6, 7 और 9 अंकों से 5 अंकों की कितनी संख्याएं बनाईं जा सकती हैं जो 5 से विभाज्य हो?

1. 120
2. 240
3. 360
4. 720

Options :

9167102273. 1

9167102274. 2

9167102275. 3

9167102276. 4

Question Number : 15 Question Id : 916710570 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Alloy A is formed by mixing iron (Fe) and nickel (Ni) in the ratio 3:4, while alloy B is formed by mixing Fe and Ni in the ratio 9:5. If equal quantities of alloys A and B are melted together to form a new alloy C, what will be the ratio of Fe to Ni in the alloy C?

1. 4:3
2. 5:3
3. 15:13
4. 13:9

Options :

9167102277. 1

9167102278. 2

9167102279. 3

9167102280. 4

Question Number : 15 Question Id : 916710570 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

लौह (Fe) और निकिल (Ni) को 3:4 के अनुपात में मिलाकर एक मिश्रधातु A तैयार की गई जबकि Fe और Ni को 9:5 के अनुपात में मिलाकर मिश्रधातु B तैयार की गई। यदि मिश्रधातु A और B को एक नई मिश्रधातु C को तैयार करने के लिए समान मात्रा में एक साथ पिघलाया जाए तो इस मिश्रधातु C में Fe और Ni का अनुपात क्या होगा?

1. 4:3
2. 5:3
3. 15:13
4. 13:9

Options :

9167102277. 1

9167102278. 2

9167102279. 3

9167102280. 4

Question Number : 16 Question Id : 916710571 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The minimum height of a plane vertical mirror that will allow a 6-feet tall person to see himself fully in it

1. depends on the distance between the person and the mirror
2. is 3 feet
3. is 4.5 feet
4. is 6 feet

Options :

9167102281. 1

9167102282. 2

9167102283. 3

9167102284. 4

Question Number : 16 Question Id : 916710571 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

एक समतल ऊर्ध्वाधर दर्पण, जिसमें एक 6 फीट लंबा व्यक्ति अपनी पूरी छवि देख सके, की न्यूनतम ऊँचाई

1. व्यक्ति और दर्पण के बीच की दूरी पर निर्भर होगी
2. 3 फीट है
3. 4.5 फीट है
4. 6 फीट है

Options :

9167102281. 1

9167102282. 2

9167102283. 3

9167102284. 4

Question Number : 17 Question Id : 916710572 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Some, but not all, faces of a six-faced cubical fair die are painted red (R) and the remaining green (G); and the die is thrown until red faces come up on top 4 times. Consider the following sequences of colours listed left to right as they appear on the top.

A: **GRRRR**
B: **GRGRRR**
Which one of the following is true?

1. A is more probable than B
2. B is more probable than A
3. Both have the same probability
4. Whether A or B is more probable depends upon how many faces are painted green

Options :

9167102285. 1

9167102286. 2

9167102287. 3

9167102288. 4

Question Number : 17 Question Id : 916710572 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

एक 6 फलकों वाले निष्पक्ष घनाकार पासे के कुछ फलकों को, पर सभी को नहीं, लाल रंग (R) से रंगा गया और शेष को हरे रंग (G) से रंगा गया; इस पासे को 4 बार लाल फलक के ऊपर आने तक फेंका गया। इन रंगों के शीर्ष पर बांए से दाएं उभरने के निम्नलिखित सूचीबद्ध अनुक्रमों पर विचार करें।

A: **GRRRR**
B: **GRGRRR**

निम्नलिखित में से कौन सा कथन सही है?

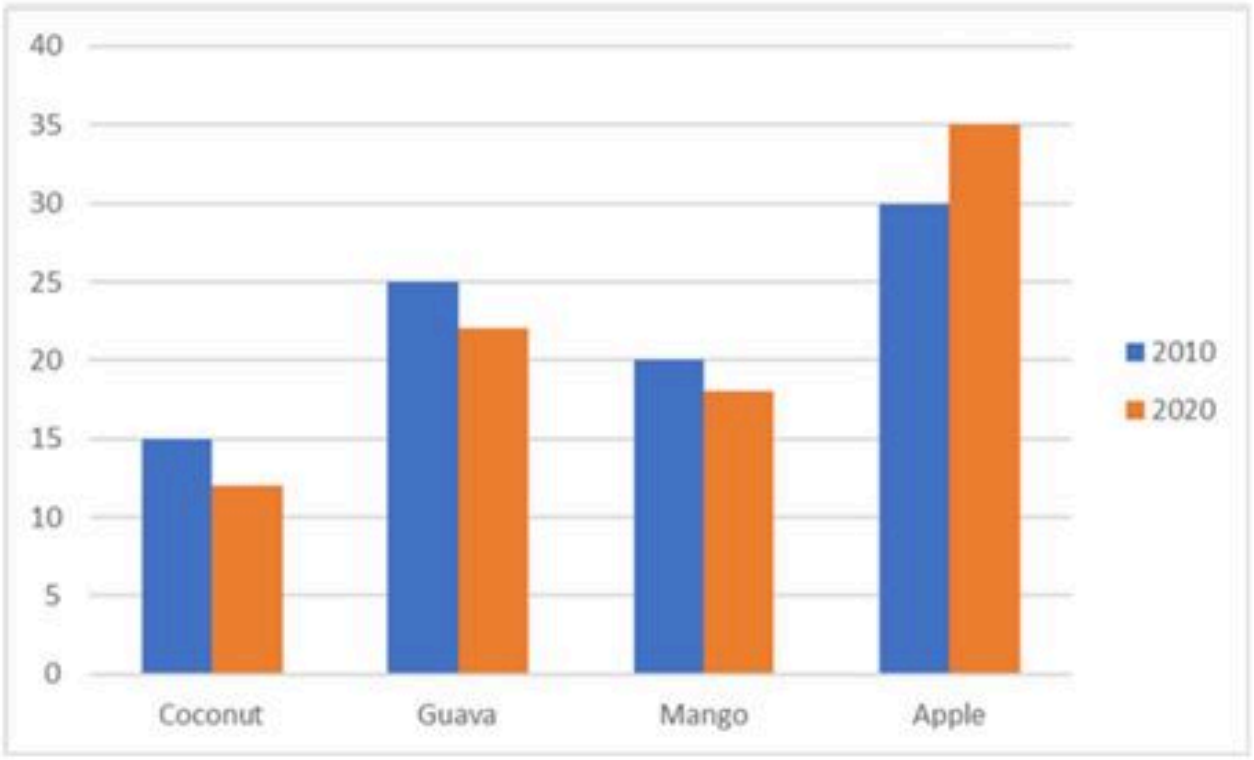
1. A की प्रायिकता B से अधिक है
2. B की प्रायिकता A से अधिक है
3. दोनों की प्रायिकता समान है
4. A या B का अधिक संभाव्य होना इस बात पर निर्भर करता है कि हरे रंग से कितने फलक रंगे गए हैं

Options :

9167102285. 1
9167102286. 2
9167102287. 3
9167102288. 4

Question Number : 18 Question Id : 916710573 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The numbers (in millions) of coconut, guava, mango and apple trees in a region in 2010 and 2020 are shown in the following figure.



The maximum relative change in numbers was for

1. coconut trees
2. guava trees
3. mango trees
4. apple trees

Options :

9167102289. 1

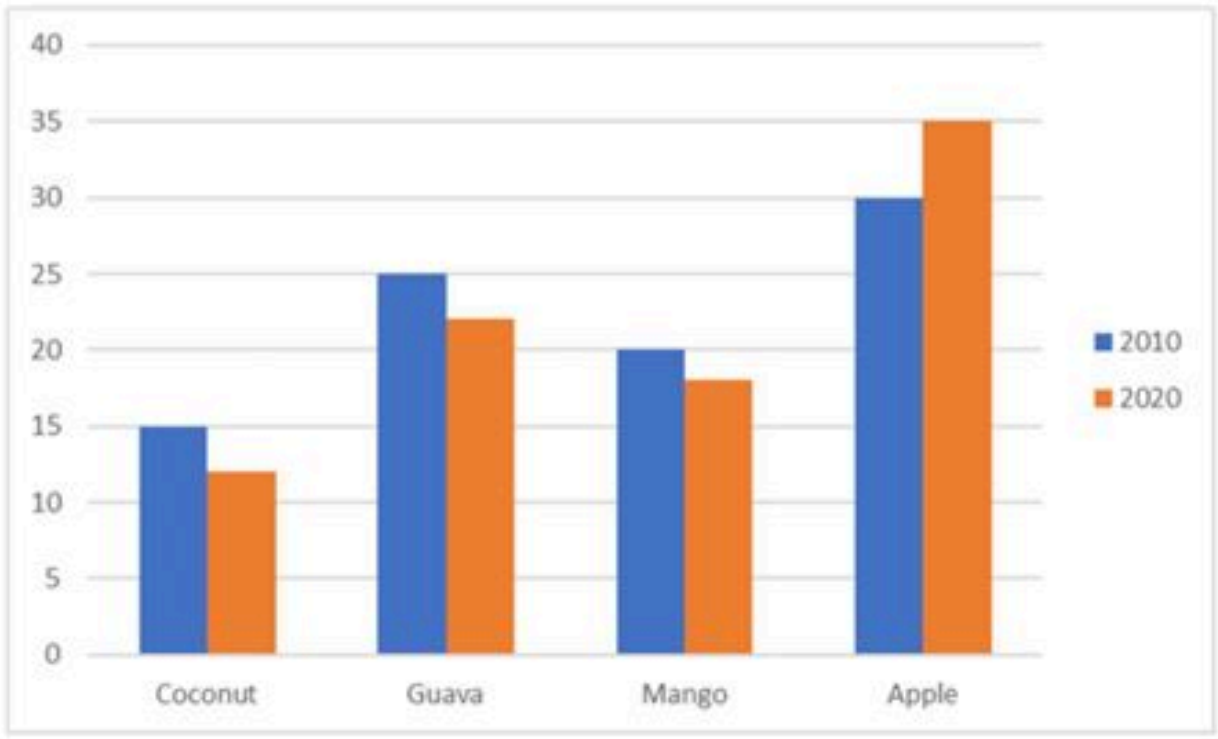
9167102290. 2

9167102291. 3

9167102292. 4

Question Number : 18 Question Id : 916710573 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

नीचे दिए गए चित्र में एक विशेष क्षेत्र में वर्ष 2010 तथा 2020 में नारियल (Coconut), अमरूद (Guava), आम (Mango) और सेब (Apple) के वृक्षों की संख्या (मिलियन में) दिखाई गई है।



किसकी संख्या में सर्वाधिक सापेक्षिक परिवर्तन पाया गया

1. नारियल के वृक्ष
2. अमरूद के वृक्ष
3. आम के वृक्ष
4. सेब के वृक्ष

Options :

9167102289. 1

9167102290. 2

9167102291. 3

9167102292. 4

Question Number : 19 Question Id : 916710574 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Five students graduated from a college, not all in the same year, after each has studied for four years. If batchmates Jiten and Anwar were between Ramesh and Prakash but senior to Sam while Ramesh had left the college before Jiten took admission, then it is certain that

1. Anwar was the most senior
2. Ramesh was the most senior
3. Sam was the most junior
4. Prakash was the most junior

Options :

9167102293. 1

9167102294. 2

9167102295. 3

9167102296. 4

Question Number : 19 Question Id : 916710574 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

किसी कॉलेज से पाँच विद्यार्थियों, प्रत्येक ने चार वर्षों तक अध्ययन करने के पश्चात स्नातक पास किया लेकिन सभी ने एक ही वर्ष में नहीं। सहपाठी जितेन और अनवर यदि रमेश और प्रकाश के बीच थे किंतु सेम से वरिष्ठ थे, जबकि रमेश ने जितेन के प्रवेश लेने के पूर्व ही कॉलेज छोड़ दिया था तो यह स्पष्ट है कि

1. अनवर सबसे वरिष्ठ था
2. रमेश सबसे वरिष्ठ था
3. सेम सबसे कनिष्ठ था
4. प्रकाश सबसे कनिष्ठ था

Options :

9167102293. 1

9167102294. 2

9167102295. 3

9167102296. 4

Question Number : 20 Question Id : 916710575 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Three periodic events repeat every 24 seconds, 54 seconds, and 56 seconds. If they coincide at 10:20:00, when will they next coincide?

1. 10:35:12
2. 10:45:20
3. 10:45:12
4. 10:35:20

Options :

9167102297. 1

9167102298. 2

9167102299. 3

9167102300. 4

Question Number : 20 Question Id : 916710575 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

तीन आवधिक घटनाएं प्रत्येक 24 सैकेंड, 54 सैकेंड तथा 56 सैकेंड में दोहराई जाती हैं। यदि वे 10:20:00 पर एक साथ घटित होती हैं तो उनके अगली बार एक साथ घटित होने का समय क्या होगा?

1. 10:35:12
2. 10:45:20
3. 10:45:12
4. 10:35:20

Options :

9167102297. 1

9167102298. 2

9167102299. 3

9167102300. 4

PART-B

Section Id :	91671017
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	40
Number of Questions to be attempted :	35
Section Marks :	70
Maximum Instruction Time :	0
Sub-Section Number :	1

Sub-Section Id : 91671017

Question Shuffling Allowed : Yes

Question Number : 21 Question Id : 916710576 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Among the following, the INCORRECT statement regarding ionization energy is

1. It decreases as the size of the atom increases
2. It increases with increase in nuclear charge
3. It increases continuously from B to F across the second period
4. The ionization energy is higher for electrons in orbitals with greater penetration

Options :

9167102301. 1

9167102302. 2

9167102303. 3

9167102304. 4

Question Number : 21 Question Id : 916710576 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित में से, आयनन ऊर्जा के संबंध में **गलत** कथन है

1. परमाणु के आमाप के बढ़ने पर यह घटती है
2. नाभिकीय आवेश के बढ़ने पर यह बढ़ती है
3. द्वितीय आवर्त में B से F तक यह निरंतर बढ़ती है
4. अधिक वेधन के कक्षकों वाले इलेक्ट्रॉनों की आयनन ऊर्जा अधिक है

Options :

9167102301. 1

9167102302. 2

9167102303. 3

9167102304. 4

Question Number : 22 Question Id : 916710577 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct sequence of increasing O–O bond length in the following species is

1. $[O_2]^+$, O_2F_2, H_2O_2, $[O_2]^{2-}$
2. O_2F_2, $[O_2]^+$, H_2O_2, $[O_2]^{2-}$
3. O_2F_2, $[O_2]^+$, $[O_2]^{2-}$, H_2O_2
4. $[O_2]^+$, H_2O_2, O_2F_2, $[O_2]^{2-}$

Options :

9167102305. 1

9167102306. 2

9167102307. 3

9167102308. 4

Question Number : 22 Question Id : 916710577 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित स्पीशीज़ में बढ़ते हुए O–O आबन्ध लंबाई का सही क्रम है

1. $[O_2]^+$, O_2F_2, H_2O_2, $[O_2]^{2-}$
2. O_2F_2, $[O_2]^+$, H_2O_2, $[O_2]^{2-}$
3. O_2F_2, $[O_2]^+$, $[O_2]^{2-}$, H_2O_2
4. $[O_2]^+$, H_2O_2, O_2F_2, $[O_2]^{2-}$

Options :

9167102305. 1

9167102306. 2

9167102307. 3

9167102308. 4

Question Number : 23 Question Id : 916710578 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The reaction NOT falling under the category of acid–base reaction is

1. $HClO_4 + CH_3CN \rightarrow [CH_3CNH]^+[ClO_4]^-$
2. $NOF + ClF_3 \rightarrow [NO]^+[ClF_4]^-$
3. $XeO_3 + OH^- \rightarrow [HXeO_4]^-$
4. $Pt + XeF_4 \rightarrow PtF_4 + Xe$

Options :

9167102309. 1

9167102310. 2

9167102311. 3

9167102312. 4

Question Number : 23 Question Id : 916710578 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

अम्ल-क्षार अभिक्रिया वर्ग के अंतर्गत नहीं आने वाली अभिक्रिया है

1. $HClO_4 + CH_3CN \rightarrow [CH_3CNH]^+[ClO_4]^-$
2. $NOF + ClF_3 \rightarrow [NO]^+[ClF_4]^-$
3. $XeO_3 + OH^- \rightarrow [HXeO_4]^-$
4. $Pt + XeF_4 \rightarrow PtF_4 + Xe$

Options :

9167102309. 1

9167102310. 2

9167102311. 3

9167102312. 4

Question Number : 24 Question Id : 916710579 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The P−O stretching frequency of phosphoryl compounds follows the order

1. $F_3PO > Cl_3PO > Me_3PO > Ph_3PO$
2. $F_3PO > Cl_3PO > Ph_3PO > Me_3PO$
3. $Me_3PO > Ph_3PO > Cl_3PO > F_3PO$
4. $Ph_3PO > Me_3PO > F_3PO > Cl_3PO$

Options :

9167102313. 1

9167102314. 2

9167102315. 3

9167102316. 4

Question Number : 24 Question Id : 916710579 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

फॉस्फोरिल यौगिकों की P−O तनन आवृति जिस क्रम का अनुसरण करती है, वह है

1. $F_3PO > Cl_3PO > Me_3PO > Ph_3PO$
2. $F_3PO > Cl_3PO > Ph_3PO > Me_3PO$
3. $Me_3PO > Ph_3PO > Cl_3PO > F_3PO$
4. $Ph_3PO > Me_3PO > F_3PO > Cl_3PO$

Options :

9167102313. 1

9167102314. 2

9167102315. 3

9167102316. 4

Question Number : 25 Question Id : 916710580 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The point groups of $[Re_2Cl_8]^{2-}$ and *trans*−$[Co(en)_2Cl_2]^{+}$, respectively, are

1. D_{4h} and D_2
2. D_{4d} and D_2
3. D_{4h} and D_{2h}
4. D_{4d} and D_{2h}

Options :

9167102317. 1

9167102318. 2

9167102319. 3

9167102320. 4

Question Number : 25 Question Id : 916710580 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

$[Re_2Cl_8]^{2-}$ तथा *trans*−$[Co(en)_2Cl_2]^{+}$ के बिंदु समूह, हैं, क्रमशः

1. D_{4h} तथा D_2
2. D_{4d} तथा D_2
3. D_{4h} तथा D_{2h}
4. D_{4d} तथा D_{2h}

Options :

9167102317. 1

9167102318. 2

9167102319. 3

9167102320. 4

Question Number : 26 Question Id : 916710581 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following statements regarding the extraction and separation of lanthanoids from Monazite

A. Monazite is primarily PO_4^{3-} salt of Ln
B. Monazite contains Th along with Ln
C. Ln^{3+} ions are separated by using ion-exchange columns
D. Ln^{3+} ions are eluted from the column by using an aqueous acidic solution of H_4EDTA

The option with all correct statements is

1. A, B, and D only
2. B, C, and D only
3. A, C, and D only
4. A, B, and C only

Options :

9167102321. 1

9167102322. 2

9167102323. 3

9167102324. 4

Question Number : 26 Question Id : 916710581 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

मोनेजाइट से लैन्थैनाइडो के निष्कर्षण तथा पृथक्करण के संबंध में निम्नलिखित कथनों पर विचार करें

A. मोनेजाइट मुख्यतः Ln का PO_4^{3-} लवण है

B. मोनेजाइट में Ln के साथ Th भी सम्मिलित है

C. आयन-विनिमय कॉलमों का उपयोग करके Ln^{3+} आयनों को पृथक्कृत करते हैं

D. H_4EDTA के जलीय अम्लीय विलयन का उपयोग करके कॉलम से Ln^{3+} आयनों को क्षालित करते हैं

सभी सही कथनों वाला विकल्प है

1. केवल A, B, तथा D
2. केवल B, C, तथा D
3. केवल A, C, तथा D
4. केवल A, B, तथा C

Options :

9167102321. 1

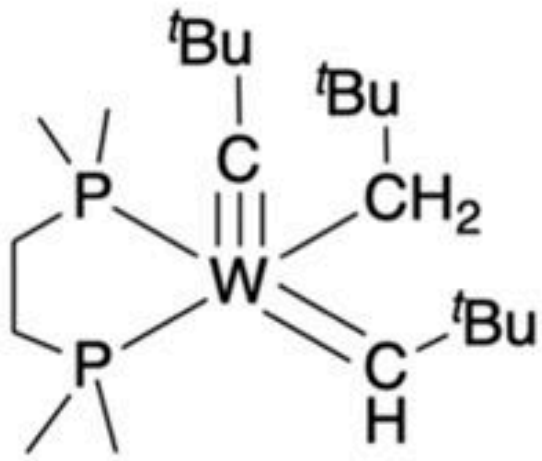
9167102322. 2

9167102323. 3

9167102324. 4

Question Number : 27 Question Id : 916710582 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct option of bond lengths (Å) of the metal-alkylidene and metal-alkylidyne, respectively, and the corresponding ^{13}C NMR chemical shifts (ppm) of the complex below



is

1. 1.78, 1.94 and 296, 256
2. 1.94, 1.78 and 256, 296
3. 1.94, 1.78 and 296, 256
4. 1.78, 1.94 and 256, 296

Options :

9167102325. 1

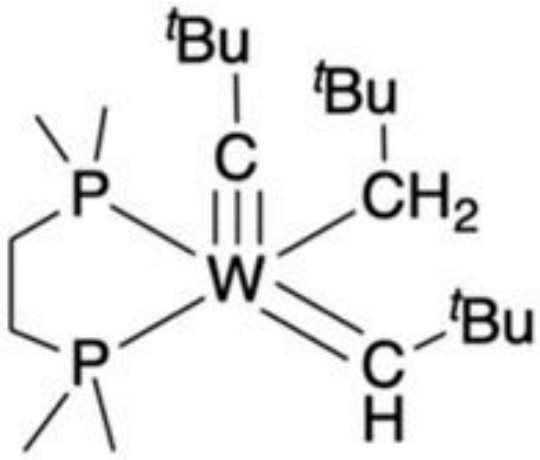
9167102326. 2

9167102327. 3

9167102328. 4

Question Number : 27 Question Id : 916710582 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्न संकुल में, क्रमशः, धातु-एल्किलिडीन तथा धातु-एल्किलिडायन के आबन्ध लंबाइयों (Å), तथा संगत ^{13}C NMR रासायनिक सृतियों (ppm) का सही विकल्प



1. 1.78, 1.94 तथा 296, 256
2. 1.94, 1.78 तथा 256, 296
3. 1.94, 1.78 तथा 296, 256
4. 1.78, 1.94 तथा 256, 296

Options :

9167102325. 1

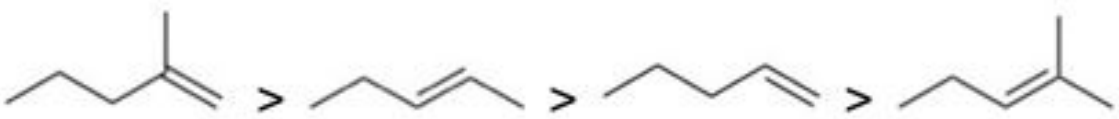
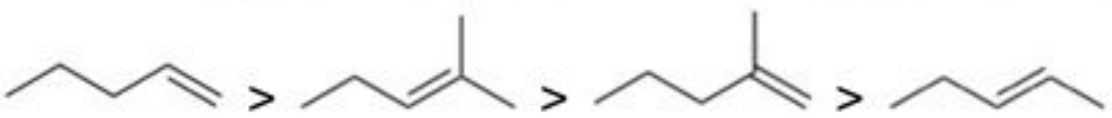
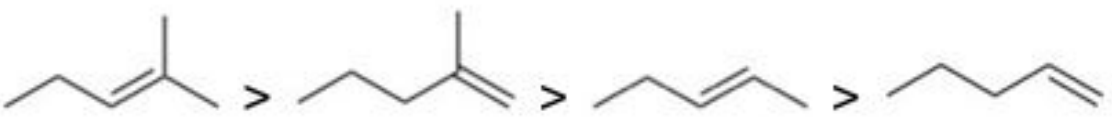
9167102326. 2

9167102327. 3

9167102328. 4

Question Number : 28 Question Id : 916710583 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The relative reactivity of alkenes for the cobalt-catalyzed hydroformylation reaction follows the order

1. 
2. 
3. 
4. 

Options :

9167102329. 1

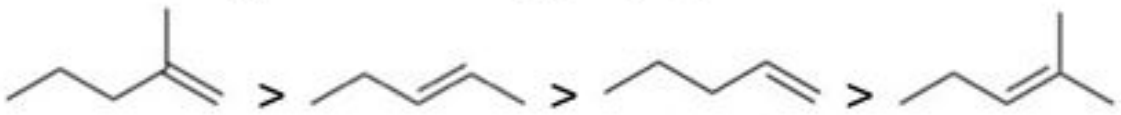
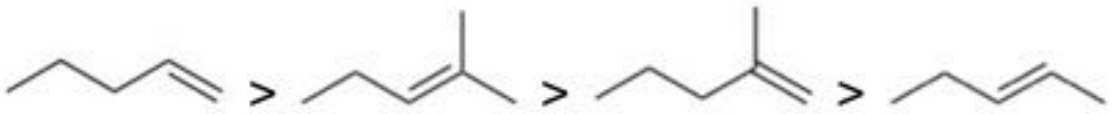
9167102330. 2

9167102331. 3

9167102332. 4

Question Number : 28 Question Id : 916710583 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

कोबाल्ट-उत्प्रेरित हाइड्रोफॉर्मिलन अभिक्रिया के लिए ऐल्कीनों की सापेक्षिक क्रियाशीलता जिस क्रम का अनुसरण करती है, वह है

1. 
2. 
3. 
4. 

Options :

9167102329. 1

9167102330. 2

9167102331. 3

9167102332. 4

Question Number : 29 Question Id : 916710584 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The option with the correct fragments that are isolobal with “S” atom

A. $CpCo(CO)$
B. $CpFe(CO)_2$
C. $Cr(CO)_5$
D. CH_3^+

is

1. A, B, and C only
2. A, C, and D only
3. B, C, and D only
4. A, B, and D only

Options :

9167102333. 1

9167102334. 2

9167102335. 3

9167102336. 4

Question Number : 29 Question Id : 916710584 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

“S” परमाणु के साथ आइसोलोबल खंडों का जो सही विकल्प है, वह

A. $CpCo(CO)$
B. $CpFe(CO)_2$
C. $Cr(CO)_5$
D. CH_3^+

है

1. केवल A, B, तथा C
2. केवल A, C, तथा D
3. केवल B, C, तथा D
4. केवल A, B, तथा D

Options :

9167102333. 1

9167102334. 2

9167102335. 3

9167102336. 4

Question Number : 30 Question Id : 916710585 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following statements about H_2S generation using Kipp's apparatus

A. The reagents used are FeS and dil. H_2SO_4
B. The reagents used are FeS and conc. HNO_3
C. H_2S can be prepared intermittently (on-demand)
D. Kipp's apparatus consists of three chambers

The option with the correct statements is

1. B, C and D only
2. A and D only
3. A, C and D only
4. B and C only

Options :

9167102337. 1

9167102338. 2

9167102339. 3

9167102340. 4

Question Number : 30 Question Id : 916710585 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

कीप उपकरण का उपयोग करके H_2S उत्पादन के बारे में निम्नलिखित कथनों पर विचार करें

A. प्रयुक्त अभिकर्मक FeS तथा तनु H_2SO_4 हैं
B. प्रयुक्त अभिकर्मक FeS तथा सांद्र HNO_3 हैं
C. H_2S को आंतरायिकतः (माँग किए जाने पर) तैयार किया जा सकता है
D. कीप उपकरण तीन चेम्बरों से निर्मित होता है

सही कथनों वाला विकल्प है

1. केवल B, C तथा D
2. केवल A तथा D
3. केवल A, C तथा D
4. केवल B तथा C

Options :

9167102337. 1

9167102338. 2

9167102339. 3

9167102340. 4

Question Number : 31 Question Id : 916710586 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The metals present in the active sites of particulate and soluble methane monooxygenases (abbreviated as pMMO and sMMO respectively) that are produced by methane−metabolizing bacteria, respectively, are

1. Cu and Ni
2. Fe and Ni
3. Mn and Fe
4. Cu and Fe

Options :

9167102341. 1

9167102342. 2

9167102343. 3

9167102344. 4

Question Number : 31 Question Id : 916710586 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

मीथेन-उपापचयी जीवाणु द्वारा उत्पादित कणिकीय तथा विलेय मीथेन मोनोऑक्सीजिनेज (क्रमशः pMMO तथा sMMO के रूप में संक्षिप्त) के सक्रिय स्थलों में उपस्थित धातु, हैं, क्रमशः

1. Cu तथा Ni
2. Fe तथा Ni
3. Mn तथा Fe
4. Cu तथा Fe

Options :

9167102341. 1

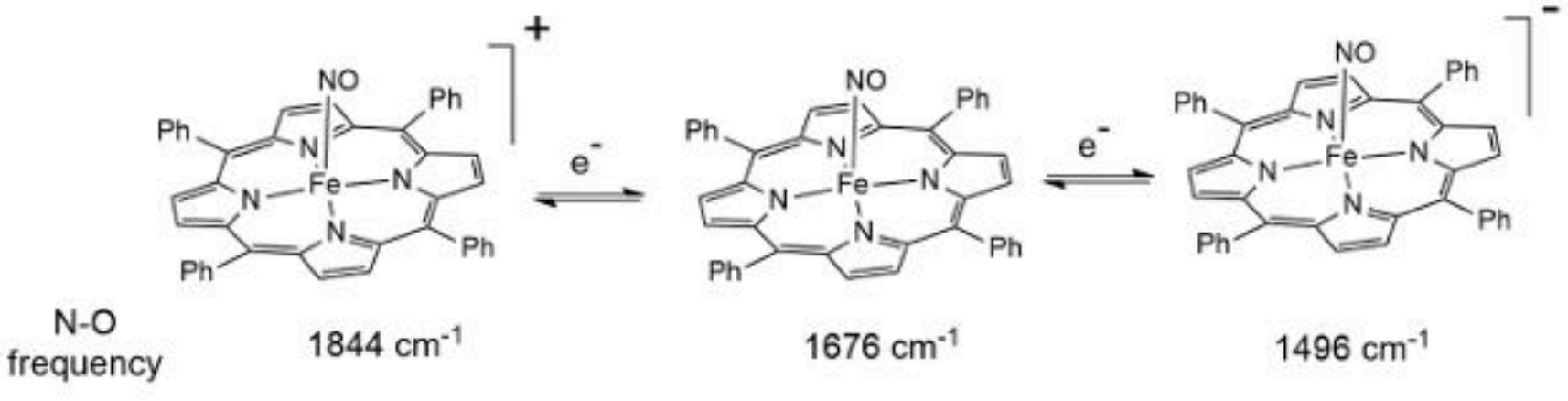
9167102342. 2

9167102343. 3

9167102344. 4

Question Number : 32 Question Id : 916710587 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For the reaction sequence given below, the correct statement for the doubly reduced species (showing N-O frequency of 1496 cm^{-1})



is

1. The Fe-NO bond length remains unaffected upon reduction
2. There is no back-bonding interaction between iron and NO
3. The reduction is predominantly localized on the NO ligand
4. The reduction is fully localized on the metal

Options :

9167102345. 1

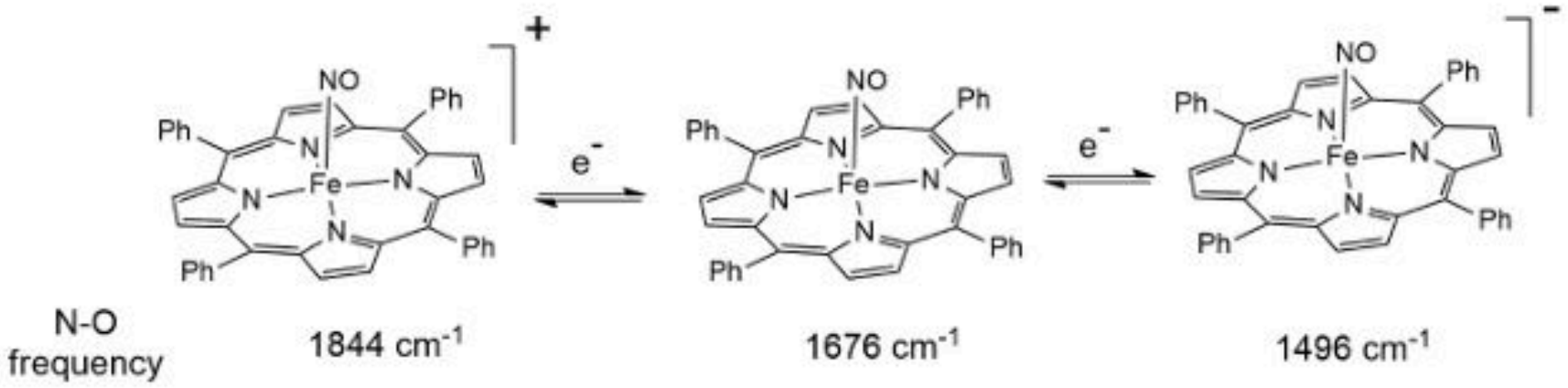
9167102346. 2

9167102347. 3

9167102348. 4

Question Number : 32 Question Id : 916710587 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

नीचे दी गई अभिक्रिया क्रम में, द्विअपचयित स्पीशीज़ (1496 cm^{-1} की N-O आवृति प्रदर्शित कर रहा है) के लिए सही कथन



है

1. अपचयन पर Fe-NO आबन्ध लंबाई अप्रभावित रहती है
2. आयरन तथा NO के मध्य कोई पश्च-आबंधन अन्योन्यक्रिया नहीं है
3. अपचयन मुख्यतः NO लिगन्ड में स्थानीयित होता है
4. अपचयन पूर्ण रूप से धातु में स्थानीयित होता है

Options :

9167102345. 1

9167102346. 2

9167102347. 3

9167102348. 4

Question Number : 33 Question Id : 916710588 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

An element $^{27}_{13}\mathbf{A}$ is bombarded with two α−particles to give **B** with the emission of a neutron. The element **B** is

1. $^{30}_{15}\mathbf{B}$
2. $^{35}_{17}\mathbf{B}$
3. $^{34}_{17}\mathbf{B}$
4. $^{32}_{16}\mathbf{B}$

Options :

9167102349. 1

9167102350. 2

9167102351. 3

9167102352. 4

Question Number : 33 Question Id : 916710588 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

किसी तत्व $^{27}_{13}\mathbf{A}$ पर दो α–कणों की बमबारी की जाती है जिससे न्यूट्रॉन उत्सर्जन के साथ **B** प्राप्त होता है। तत्व **B** है

1. $^{30}_{15}\mathbf{B}$
2. $^{35}_{17}\mathbf{B}$
3. $^{34}_{17}\mathbf{B}$
4. $^{32}_{16}\mathbf{B}$

Options :

9167102349. 1

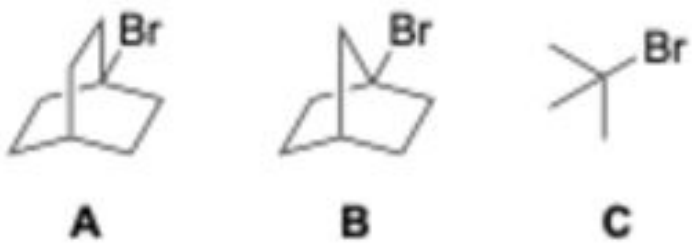
9167102350. 2

9167102351. 3

9167102352. 4

Question Number : 34 Question Id : 916710589 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct order of the relative rates of solvolysis for the following compounds in 80% aqueous ethanol at 25 °C is



1. **A > B > C**
2. **B > C > A**
3. **C > A > B**
4. **C > B > A**

Options :

9167102353. 1

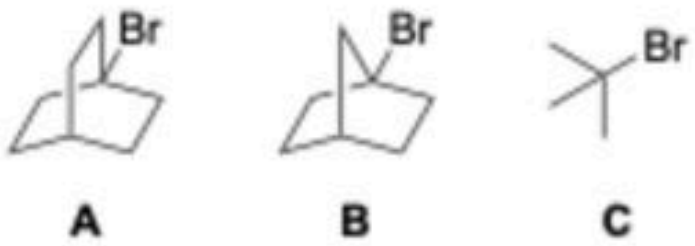
9167102354. 2

9167102355. 3

9167102356. 4

Question Number : 34 Question Id : 916710589 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

25 °C पर 80% जलीय एथेनॉल में निम्नलिखित यौगिकों के विलायक अपघटन के सापेक्षिक दरों का सही क्रम है



1. A > B > C
2. B > C > A
3. C > A > B
4. C > B > A

Options :

9167102353. 1

9167102354. 2

9167102355. 3

9167102356. 4

Question Number : 35 Question Id : 916710590 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct reagent(s) to effect the following transformation is(are)



A. Pd/C, H_2 (1 atm)
B. $NaBH_4$, $ZnCl_2$
C. $LiAlH_4$
D. $BH_3 \cdot Me_2S$

1. Only A
2. Only B and C
3. Only B, C and D
4. Only A, B and D

Options :

9167102357. 1

9167102358. 2

9167102359. 3

9167102360. 4

Question Number : 35 Question Id : 916710590 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित रूपांतरण को प्रभावी करने के लिए सही अभिकर्मक (अभिकर्मक) है (हैं)



A. $Pd/C, H_2$ (1 atm)
B. $NaBH_4, ZnCl_2$
C. $LiAlH_4$
D. $BH_3 \cdot Me_2S$

1. केवल A
2. केवल B तथा C
3. केवल B, C तथा D
4. केवल A, B तथा D

Options :

9167102357. 1

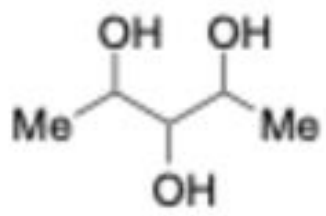
9167102358. 2

9167102359. 3

9167102360. 4

Question Number : 36 Question Id : 916710591 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The number of optically active stereoisomers for the following compound is



1. 2
2. 4
3. 6
4. 8

Options :

9167102361. 1

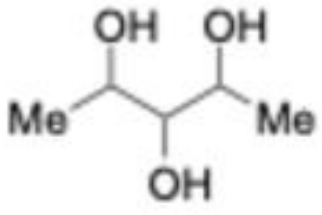
9167102362. 2

9167102363. 3

9167102364. 4

Question Number : 36 Question Id : 916710591 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित यौगिक के लिए ध्रुवण घूर्णक त्रिविम समावयवों की संख्या है



1. 2
2. 4
3. 6
4. 8

Options :

9167102361. 1

9167102362. 2

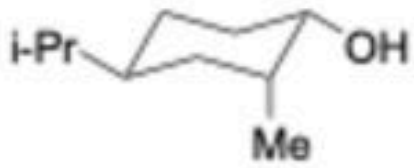
9167102363. 3

9167102364. 4

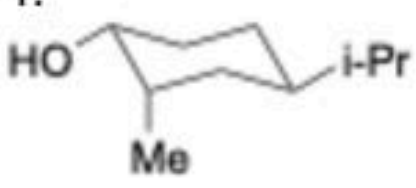
Question Number : 37 Question Id : 916710592 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The structure that corresponds to (1*S*,2*R*,4*S*)-4-isopropyl-2-methylcyclohexanol is

1.


2.


3.


4.


Options :

9167102365. 1

9167102366. 2

9167102367. 3

9167102368. 4

Question Number : 37 Question Id : 916710592 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

जो संरचना (1*S*,2*R*,4*S*)-4-आइसोप्रोपिल-2-मेथिलसाइक्लोहेक्सेनॉल के संगत है, वह है

1.



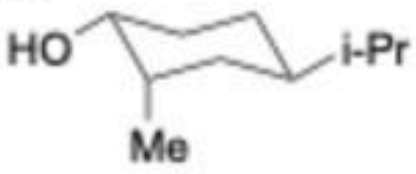
2.



3.



4.



Options :

9167102365. 1

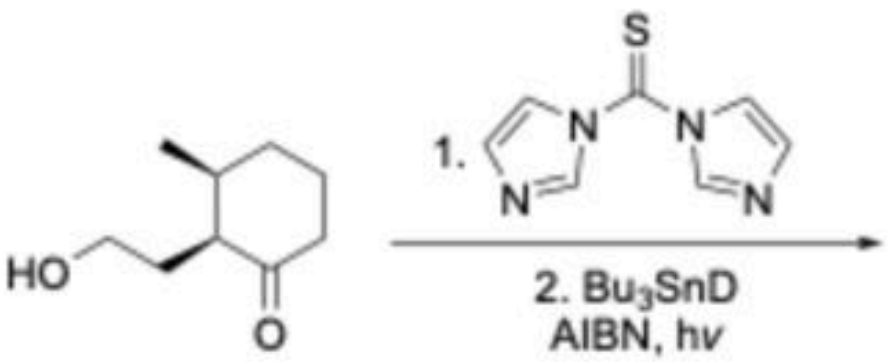
9167102366. 2

9167102367. 3

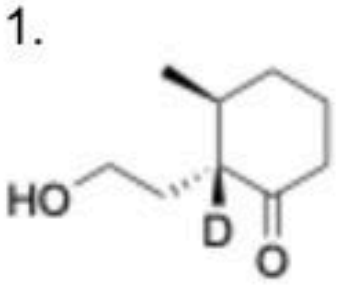
9167102368. 4

Question Number : 38 Question Id : 916710593 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

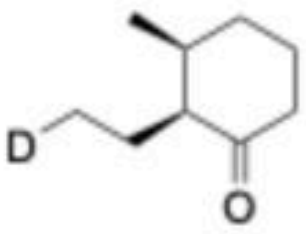
The major product formed in the following reaction is



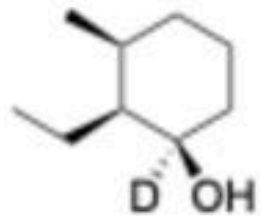
1.



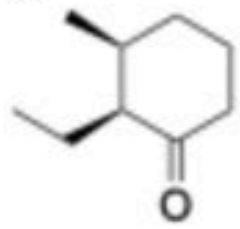
2.



3.



4.



Options :

9167102369. 1

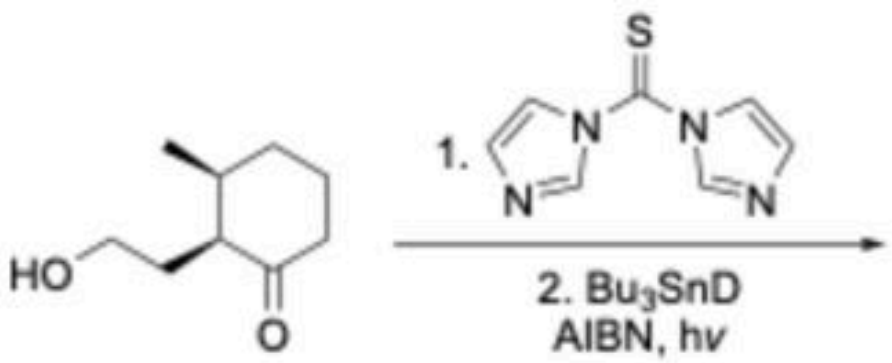
9167102370. 2

9167102371. 3

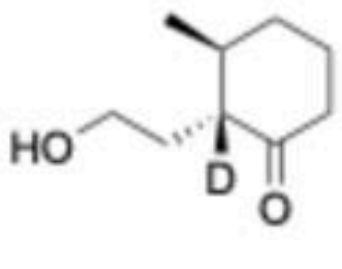
9167102372. 4

Question Number : 38 Question Id : 916710593 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

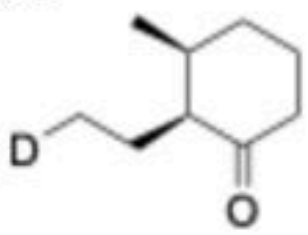
निम्नलिखित अभिक्रिया में विरचित मुख्य उत्पाद है



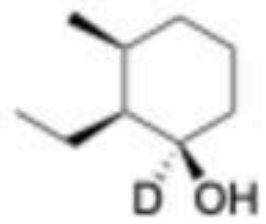
1.



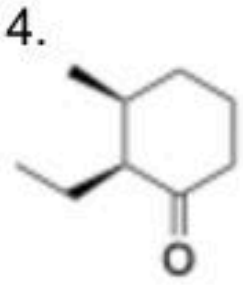
2.



3.



4.



Options :

9167102369. 1

9167102370. 2

9167102371. 3

9167102372. 4

Question Number : 39 Question Id : 916710594 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct statement about the bond angles of $^{\bullet}CF_3$ and $^{\bullet}CH_3$ is

1. $^{\bullet}CF_3 < {}^{\bullet}CH_3$ due to $n \rightarrow \sigma^*$ interaction in $^{\bullet}CF_3$
2. $^{\bullet}CF_3 > {}^{\bullet}CH_3$ due to $n \rightarrow \sigma^*$ interaction in $^{\bullet}CF_3$
3. $^{\bullet}CF_3 < {}^{\bullet}CH_3$ due to bond pair-bond pair repulsion in $^{\bullet}CF_3$
4. $^{\bullet}CF_3 > {}^{\bullet}CH_3$ due to bond pair-bond pair repulsion in $^{\bullet}CF_3$

Options :

9167102373. 1

9167102374. 2

9167102375. 3

9167102376. 4

Question Number : 39 Question Id : 916710594 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

$^{\bullet}CF_3$ तथा $^{\bullet}CH_3$ के आबन्ध कोणों के बारे में सही कथन है

1. $^{\bullet}CF_3$ में $n \rightarrow \sigma^*$ अन्योन्यक्रिया के कारण $^{\bullet}CF_3 < {}^{\bullet}CH_3$
2. $^{\bullet}CF_3$ में $n \rightarrow \sigma^*$ अन्योन्यक्रिया के कारण $^{\bullet}CF_3 > {}^{\bullet}CH_3$
3. $^{\bullet}CF_3$ में आबन्ध युग्म- आबन्ध युग्म प्रतिकर्षण के कारण $^{\bullet}CF_3 < {}^{\bullet}CH_3$
4. $^{\bullet}CF_3$ में आबन्ध युग्म- आबन्ध युग्म प्रतिकर्षण के कारण $^{\bullet}CF_3 > {}^{\bullet}CH_3$

Options :

9167102373. 1

9167102374. 2

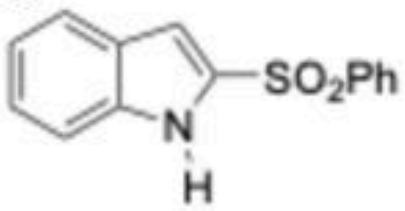
9167102375. 3

9167102376. 4

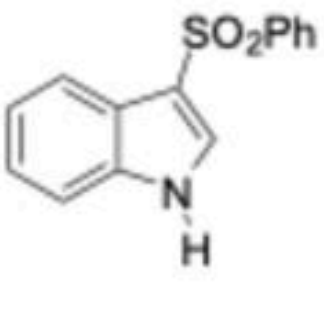
Question Number : 40 Question Id : 916710595 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The major product formed in the reaction of indole with $NaNH_2$ and $PhSO_2Cl$ is

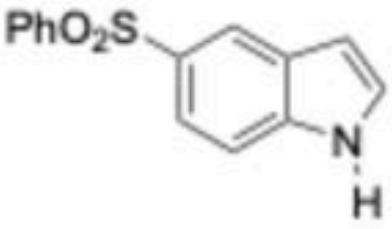
1.



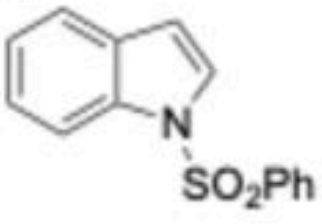
2.



3.



4.



Options :

9167102377. 1

9167102378. 2

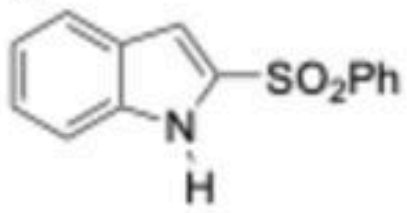
9167102379. 3

9167102380. 4

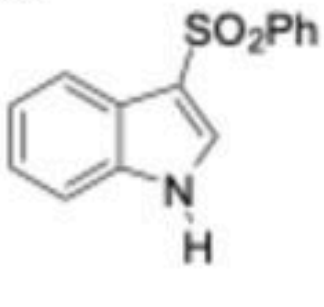
Question Number : 40 Question Id : 916710595 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

इंडोल की $NaNH_2$ तथा $PhSO_2Cl$ के साथ अभिक्रिया में विरचित मुख्य उत्पाद है

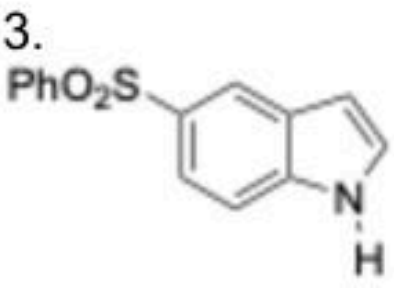
1.



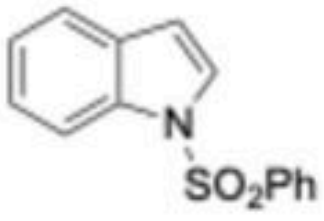
2.



3.



4.



Options :

9167102377. 1

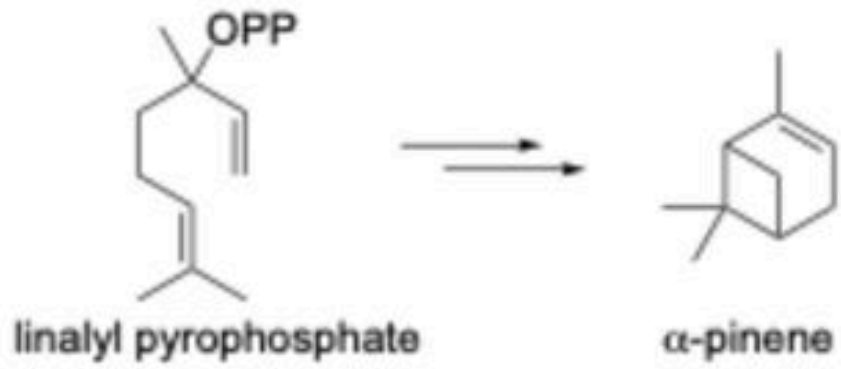
9167102378. 2

9167102379. 3

9167102380. 4

Question Number : 41 Question Id : 916710596 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct sequence of steps involved in the biosynthesis of α-pinene from linalyl pyrophosphate is



A. six-membered ring formation with loss of pyrophosphate (OPP)
B. four-membered ring formation
C. loss of H^+

1. A, B, C
2. A, C, B
3. B, C, A
4. B, A, C

Options :

9167102381. 1

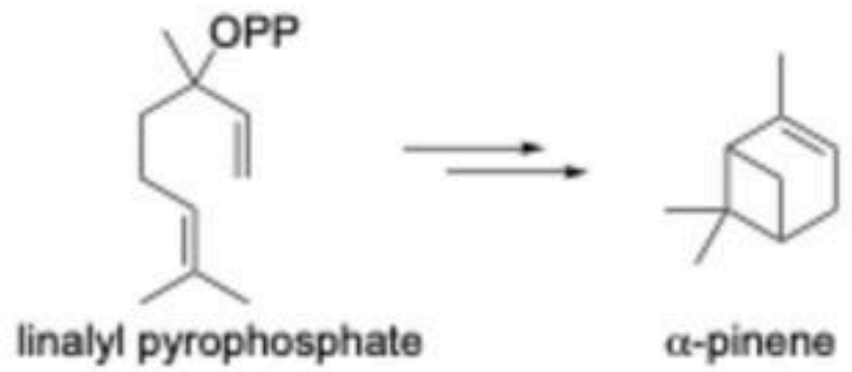
9167102382. 2

9167102383. 3

9167102384. 4

Question Number : 41 Question Id : 916710596 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

लिनालिल (linalyl) पाइरोफास्फेट से α-पाइनीन के जैवसंश्लेषण में सम्मिलित पदों का सही क्रम है



A. पाइरोफास्फेट (OPP) की हानि के साथ छः-सदस्यीय वलय विरचन

B. चार-सदस्यीय वलय विरचन

C. H^+ की हानि

1. A, B, C
2. A, C, B
3. B, C, A
4. B, A, C

Options :

9167102381. 1

9167102382. 2

9167102383. 3

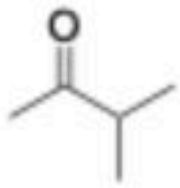
9167102384. 4

Question Number : 42 Question Id : 916710597 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

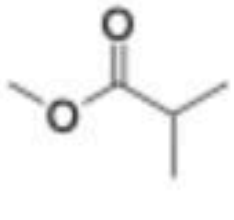
The compound that would give the following data is

^{1}H NMR: δ2.43 (m, 1H), 2.10 (s, 3H), 0.95 (d, J = 7 Hz, 6H) ppm.

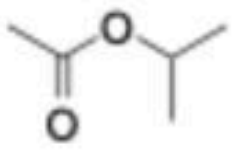
1.



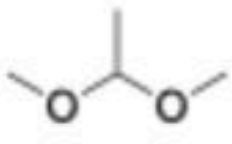
2.



3.



4.



Options :

9167102385. 1

9167102386. 2

9167102387. 3

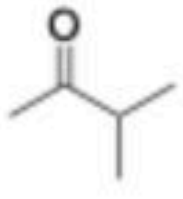
9167102388. 4

Question Number : 42 Question Id : 916710597 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

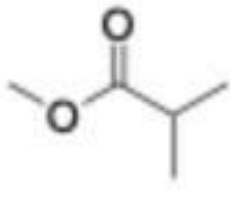
जो यौगिक निम्नलिखित आँकड़े देगा, वह है

^{1}H NMR: δ 2.43 (m, 1H), 2.10 (s, 3H), 0.95 (d, J = 7 Hz, 6H) ppm.

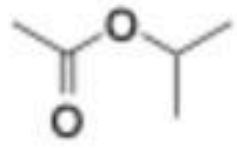
1.



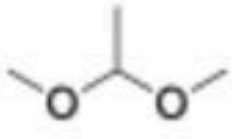
2.



3.



4.



Options :

9167102385. 1

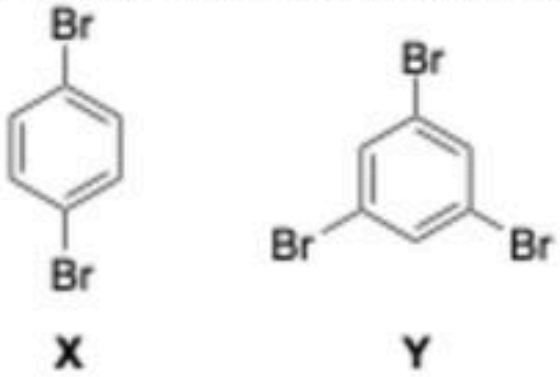
9167102386. 2

9167102387. 3

9167102388. 4

Question Number : 43 Question Id : 916710598 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The relative intensity of molecular ion peaks in the mass spectra of compounds **X** and **Y**, respectively, is



X **Y**

1. 9:6:1 and 1:2:2:1
2. 1:2:1 and 1:2:2:1
3. 9:6:1 and 1:3:3:1
4. 1:2:1 and 1:3:3:1

Options :

9167102389. 1

9167102390. 2

9167102391. 3

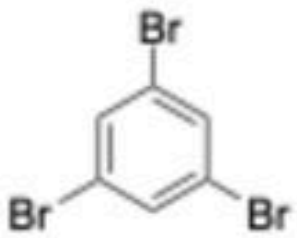
9167102392. 4

Question Number : 43 Question Id : 916710598 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

यौगिक **X** तथा **Y** के द्रव्यमान स्पेक्ट्रा में आण्विक आयन शिखरों की सापेक्षिक तीव्रता, है, क्रमशः



X



Y

1. 9:6:1 तथा 1:2:2:1
2. 1:2:1 तथा 1:2:2:1
3. 9:6:1 तथा 1:3:3:1
4. 1:2:1 तथा 1:3:3:1

Options :

9167102389. 1

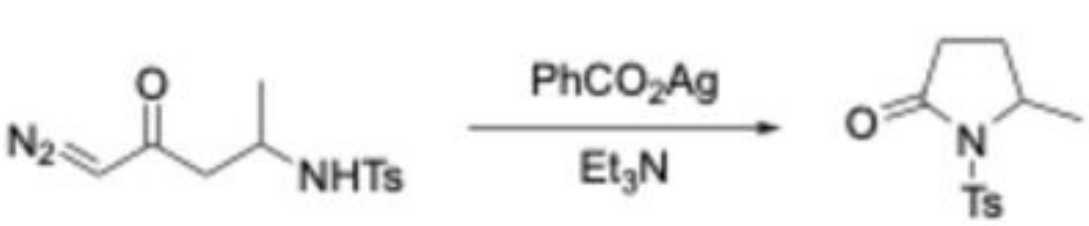
9167102390. 2

9167102391. 3

9167102392. 4

Question Number : 44 Question Id : 916710599 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The intermediates involved in the following transformation are



A. carbocation; **B**. carbanion; **C**. carbene; **D**. ketene

1. **B** and **C**
2. **C** and **D**
3. **A** and **C**
4. **B** and **D**

Options :

9167102393. 1

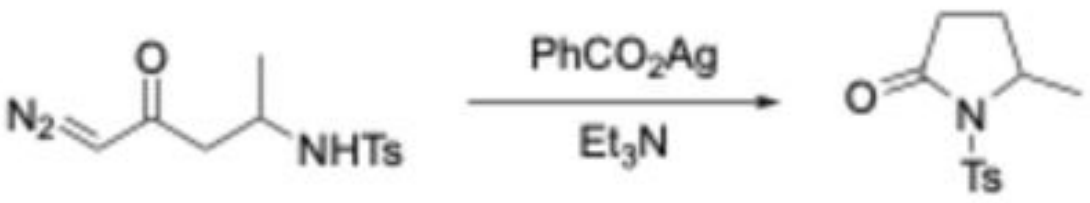
9167102394. 2

9167102395. 3

9167102396. 4

Question Number : 44 Question Id : 916710599 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित रूपांतरण में सम्मिलित मध्यवर्ती हैं



A. कार्बधनायन; **B**. कार्बऋणायन; **C**. कार्बीन; **D**. कीटीन

1. **B** तथा **C**
2. **C** तथा **D**
3. **A** तथा **C**
4. **B** तथा **D**

Options :

9167102393. 1

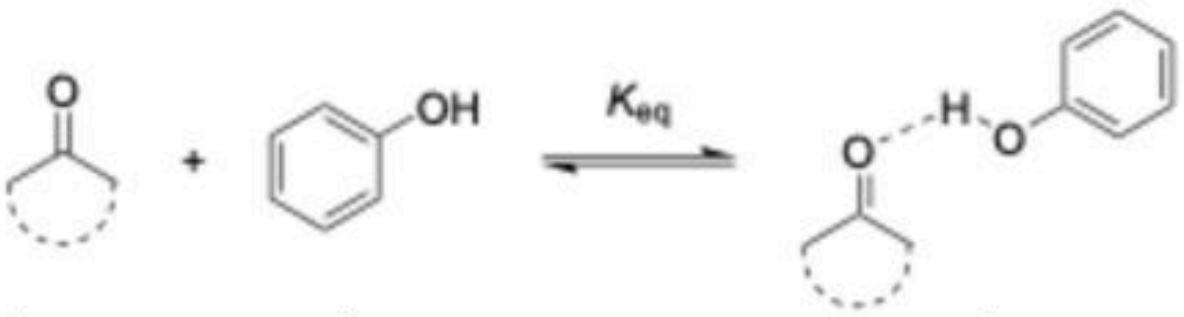
9167102394. 2

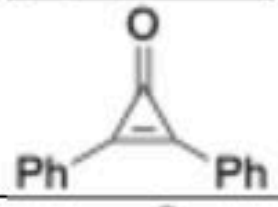
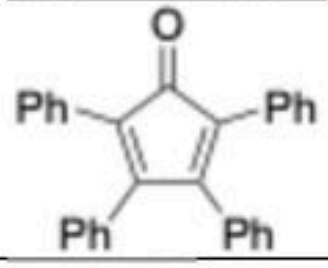
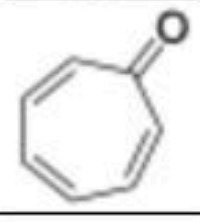
9167102395. 3

9167102396. 4

Question Number : 45 Question Id : 916710600 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct match for the ketones in **Column A** with the K_{eq} values in **Column B** for their H-bonding with phenol (as shown below) is



	Column A		Column B
P		i.	6.2
Q		ii.	31.2
R		iii.	83.2

1. **P – i; Q – ii, R – iii**
2. **P – iii; Q – i, R – ii**
3. **P – iii; Q – ii, R – i**
4. **P – ii; Q – i, R – iii**

Options :

9167102397. 1

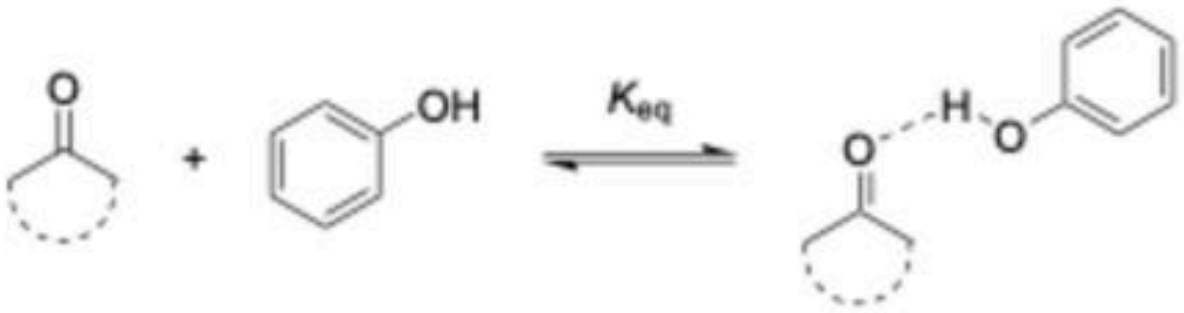
9167102398. 2

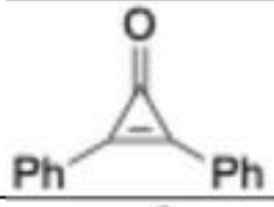
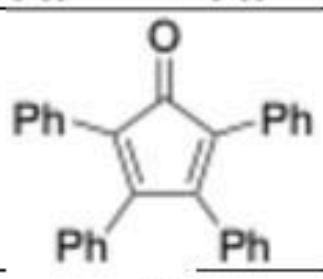
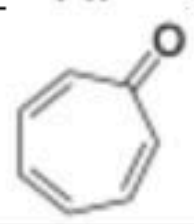
9167102399. 3

9167102400. 4

Question Number : 45 Question Id : 916710600 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

फिनॉल के साथ उनकी H-आबंधन के लिए (जैसा नीचे दिखाया है) **कॉलम A** में कीटोनों (ketones) का **कॉलम B** में K_{eq} मानों के साथ सही मिलान है



	कॉलम A		कॉलम B
P		i.	6.2
Q		ii.	31.2
R		iii.	83.2

1. **P – i; Q – ii, R – iii**
2. **P – iii; Q – i, R – ii**
3. **P – iii; Q – ii, R – i**
4. **P – ii; Q – i, R – iii**

Options :

9167102397. 1

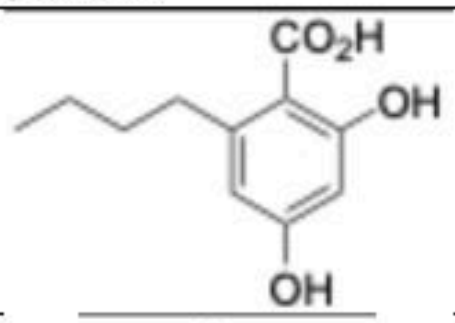
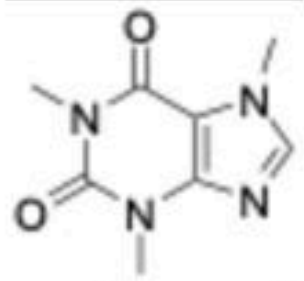
9167102398. 2

9167102399. 3

9167102400. 4

Question Number : 46 Question Id : 916710601 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct match of class of natural products in **Column A** with the compounds in **Column B** is

	Column A		**Column B**
P	alkaloid	**i.**	
Q	terpenoid	**ii.**	
R	polyketide	**iii.**	

1. **P – i; Q – iii, R – ii**
2. **P – ii; Q – i, R – iii**
3. **P – ii; Q – iii, R – i**
4. **P – iii; Q – ii, R – i**

Options :

9167102401. 1

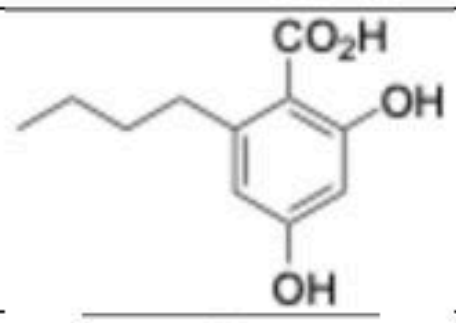
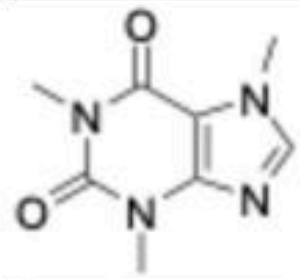
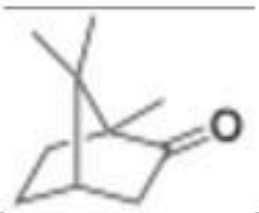
9167102402. 2

9167102403. 3

9167102404. 4

Question Number : 46 Question Id : 916710601 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

कॉलम A में प्राकृतिक उत्पादों के वर्ग का **कॉलम B** में यौगिकों के साथ सही मिलान है

	कॉलम A		**कॉलम B**
P	ऐल्केलॉइड	i.	
Q	टर्पिनॉइड	ii.	
R	पोलीकेटाइड	iii.	

1. **P – i; Q – iii, R – ii**
2. **P – ii; Q – i, R – iii**
3. **P – ii; Q – iii, R – i**
4. **P – iii; Q – ii, R – i**

Options :

9167102401. 1

9167102402. 2

9167102403. 3

9167102404. 4

Question Number : 47 Question Id : 916710602 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Among the following, the amino acid residue in histone that gets acetylated is

1. Alanine
2. Glycine
3. Phenylalanine
4. Lysine

Options :

9167102405. 1

9167102406. 2

9167102407. 3

9167102408. 4

Question Number : 47 Question Id : 916710602 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित में से, हिस्टोन में जो अमीनों अम्ल अवशेष एसीटिलित होता है, वह है

1. एलेनीन
2. ग्लाइसीन
3. फेनिलएलेनीन
4. लाइसीन

Options :

9167102405. 1

9167102406. 2

9167102407. 3

9167102408. 4

Question Number : 48 Question Id : 916710603 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For a hermitian operator $\hat{A}$, consider the following statements.

I. $\hat{A}$ has real eigenvalues
II. $<\hat{A}>$, with respect to any arbitrary state, is **always** ≥ 0
III. $<\hat{A}^2>$, with respect to any arbitrary state, is **always** ≥ 0
IV. $\hat{A}$ **always** commutes with another hermitian operator

The correct **complete** set of options is

1. I only
2. I, II and III
3. I, II, III, IV
4. I and III only

Options :

9167102409. 1

9167102410. 2

9167102411. 3

9167102412. 4

Question Number : 48 Question Id : 916710603 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

किसी हर्मिटी संकारक $\hat{A}$ के लिए, निम्नलिखित कथनों पर विचार करें।

I. $\hat{A}$ के आइगेन मान वास्तविक हैं

II. किसी यादृच्छिक अवस्था के संबंध में, $<\hat{A}>$, **हमेशा** ≥ 0 है

III. किसी यादृच्छिक अवस्था के संबंध में, $<\hat{A}^2>$, **हमेशा** ≥ 0 है

IV. $\hat{A}$ **हमेशा** किसी अन्य हर्मिटी संकारक के साथ दिक्परिवर्तन करता है

विकल्पों का सही **पूर्ण** समुच्चय है

1. केवल I
2. I, II तथा III
3. I, II, III, IV
4. केवल I तथा III

Options :

9167102409. 1

9167102410. 2

9167102411. 3

9167102412. 4

Question Number : 49 Question Id : 916710604 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The degeneracy of a state with energy $\frac{27\,h^2}{8mL^2}$, for a particle confined in a 3D cubic box of length L, is

1. 1
2. 2
3. 4
4. 3

Options :

9167102413. 1

9167102414. 2

9167102415. 3

9167102416. 4

Question Number : 49 Question Id : 916710604 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

लंबाई L के 3D घनीय बॉक्स में सीमित किसी कण के लिए, $\frac{27\,h^2}{8mL^2}$ ऊर्जा अवस्था की अपभ्रष्टता, है

1. 1
2. 2
3. 4
4. 3

Options :

9167102413. 1

9167102414. 2

9167102415. 3

9167102416. 4

Question Number : 50 Question Id : 916710605 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

$\psi(x_1, x_2)$ represents the wavefunction for a two-particle system, where x_i is the combined space and spin coordinates of the i-th particle. The correct anti-symmetric wavefunction is

1. $\psi(x_1, x_2) = (x_1^2 - x_2^2)e^{-(x_1^2+x_2^2)}$
2. $\psi(x_1, x_2) = (x_1^2 + x_2^2)e^{-(x_1^2-x_2^2)}$
3. $\psi(x_1, x_2) = (x_1 - x_2)^2 e^{-(x_1^2+x_2^2)}$
4. $\psi(x_1, x_2) = (x_1 + x_2)^2 e^{-(x_1^2-x_2^2)}$

Options :

9167102417. 1

9167102418. 2

9167102419. 3

9167102420. 4

Question Number : 50 Question Id : 916710605 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

$\psi(x_1, x_2)$ किसी द्वि-कण निकाय के तरंग फलन को निरूपित करता है, जहां x_i , i-th कण की संयुक्त समष्टि तथा स्पिन निर्देशांक है। सही प्रति-सममित तरंग फलन है

1. $\psi(x_1, x_2) = (x_1^2 - x_2^2)e^{-(x_1^2+x_2^2)}$
2. $\psi(x_1, x_2) = (x_1^2 + x_2^2)e^{-(x_1^2-x_2^2)}$
3. $\psi(x_1, x_2) = (x_1 - x_2)^2 e^{-(x_1^2+x_2^2)}$
4. $\psi(x_1, x_2) = (x_1 + x_2)^2 e^{-(x_1^2-x_2^2)}$

Options :

9167102417. 1

9167102418. 2

9167102419. 3

9167102420. 4

Question Number : 51 Question Id : 916710606 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The approximate ground-state energy of He-isoelectronic series is given by $E(Z) = -Z^2 + \frac{5}{8}Z - 0.1576 + \frac{0.0087}{Z}$. According to Valence Bond Theory, the expression for binding energy of H_2 from H^- and H^+ $(H_2 \rightarrow H^- + H^+)$ can be approximated to
[Given: J, K, and S represent Coulomb, exchange and overlap integrals, respectively. Energies are expressed in atomic unit]

1. $0.5239 - \frac{J+K}{1-S^2}$
2. $0.4761 + \frac{J-K}{1-S^2}$
3. $0.4761 - \frac{J+K}{1+S^2}$
4. $0.5239 + \frac{J+K}{1+S^2}$

Options :

9167102421. 1

9167102422. 2

9167102423. 3

9167102424. 4

Question Number : 51 Question Id : 916710606 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

He-सम इलेक्ट्रॉनिक श्रृंखला की सन्निकट निम्नतम-अवस्था ऊर्जा $E(Z) = -Z^2 + \frac{5}{8}Z - 0.1576 + \frac{0.0087}{Z}$ द्वारा दी गई है। संयोजी आबन्ध सिद्धांत के अनुसार, H^- तथा H^+ से H_2 $(H_2 \rightarrow H^- + H^+)$ की आबंधन ऊर्जा के लिए व्यंजक लगभग जो हो सकता है, वह है

[दिया है: J, K, तथा S क्रमशः, कूलॉम, विनिमय तथा अतिव्यापन समाकल को निरूपित करते हैं। ऊर्जाओं को परमाण्विक इकाई में व्यक्त किया हैं]

1. $0.5239 - \frac{J+K}{1-S^2}$
2. $0.4761 + \frac{J-K}{1-S^2}$
3. $0.4761 - \frac{J+K}{1+S^2}$
4. $0.5239 + \frac{J+K}{1+S^2}$

Options :

9167102421. 1

9167102422. 2

9167102423. 3

9167102424. 4

Question Number : 52 Question Id : 916710607 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

$C_3^2 i$ is equivalent to

1. S_6
2. S_6^5
3. C_6^5
4. C_6

Options :

9167102425. 1

9167102426. 2

9167102427. 3

9167102428. 4

Question Number : 52 Question Id : 916710607 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

$C_3^2 i$, जिसके समतुल्य है, वह है

1. S_6
2. S_6^5
3. C_6^5
4. C_6

Options :

9167102425. 1

9167102426. 2

9167102427. 3

9167102428. 4

Question Number : 53 Question Id : 916710608 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The peak of an absorption spectrum of a molecule is observed at 21,000 cm^{-1}.
[Given: $k_B = 8.62 \times 10^{-5}$ eV K^{-1}; energy corresponding to λ (nm) = (1240/λ) eV]

The correct statement is

1. It is a vibrational transition and the energy required is ~100 times the thermal energy at 25 °C.
2. It is an electronic transition and the energy required is ~100 times the thermal energy at 25 °C.
3. It is a vibrational transition and the energy required is ~200 times the thermal energy at 25 °C.
4. It is an electronic transition and the energy required is ~200 times the thermal energy at 25 °C.

Options :

9167102429. 1

9167102430. 2

9167102431. 3

9167102432. 4

Question Number : 53 Question Id : 916710608 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

किसी अणु के अवशोषण स्पेक्ट्रम का शिखर 21,000 cm^{-1} पर प्रेक्षित होता है।
[दिया है: $k_B = 8.62 \times 10^{-5}$ eV K^{-1}; λ (nm) के संगत ऊर्जा = (1240/λ) eV]

सही कथन है

1. यह एक कंपन संक्रमण है तथा 25 °C पर आवश्यक ऊर्जा ऊष्मीय ऊर्जा की ~100 गुना है।
2. यह एक इलेक्ट्रॉनिक संक्रमण है तथा 25 °C पर आवश्यक ऊर्जा ऊष्मीय ऊर्जा की ~100 गुना है।
3. यह एक कंपन संक्रमण है तथा 25 °C पर आवश्यक ऊर्जा ऊष्मीय ऊर्जा की ~200 गुना है।
4. यह एक इलेक्ट्रॉनिक संक्रमण है तथा 25 °C पर आवश्यक ऊर्जा ऊष्मीय ऊर्जा की ~200 गुना है।

Options :

9167102429. 1

9167102430. 2

9167102431. 3

9167102432. 4

Question Number : 54 Question Id : 916710609 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

n moles of a perfect monatomic gas with volume V_1 undergoes an adiabatic free expansion to a final volume $V_2 = 5V_1$. The change in entropy (in J K^{-1} mol^{-1}) of the gas is
[Given R = 8.314 J K^{-1} mol^{-1}]

1. 0
2. 13.38
3. 1.61
4. 8.31

Options :

9167102433. 1

9167102434. 2

9167102435. 3

9167102436. 4

Question Number : 54 Question Id : 916710609 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

आयतन V_1 की किसी आदर्श एकआण्विक गैस के n मोल एक रुद्धोष्म मुक्त प्रसार से अंतिम आयतन $V_2 = 5V_1$ तक प्रसारित होते है। गैस की एन्ट्रॉपी में परिवर्तन ($J\,K^{-1}\,mol^{-1}$ में) है

[दिया है $R = 8.314\ J\,K^{-1}\,mol^{-1}$]

1. 0
2. 13.38
3. 1.61
4. 8.31

Options :

9167102433. 1

9167102434. 2

9167102435. 3

9167102436. 4

Question Number : 55 Question Id : 916710610 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The partition function of two indistinguishable noninteracting particles, where one or both can occupy any of the two available energy levels 0 and ε is

1. $1 + e^{-\varepsilon/k_BT} + e^{-2\varepsilon/k_BT}$
2. $2 + e^{-\varepsilon/k_BT} + e^{-2\varepsilon/k_BT}$
3. $1 + 2\,e^{-\varepsilon/k_BT} + e^{-2\varepsilon/k_BT}$
4. $1 + e^{-\varepsilon/k_BT} + 2\,e^{-2\varepsilon/k_BT}$

Options :

9167102437. 1

9167102438. 2

9167102439. 3

9167102440. 4

Question Number : 55 Question Id : 916710610 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

दो अविभेद्य अन्योन्यक्रियाहिन कणों का विभाजन फलन, जहां एक अथवा दोनों उपलब्ध ऊर्जा स्तर 0 तथा ε में से किसी में भी अध्यासित हो सकते है, वह है

1. $1 + e^{-\varepsilon/k_BT} + e^{-2\varepsilon/k_BT}$
2. $2 + e^{-\varepsilon/k_BT} + e^{-2\varepsilon/k_BT}$
3. $1 + 2\,e^{-\varepsilon/k_BT} + e^{-2\varepsilon/k_BT}$
4. $1 + e^{-\varepsilon/k_BT} + 2\,e^{-2\varepsilon/k_BT}$

Options :

9167102437. 1

9167102438. 2

9167102439. 3

9167102440. 4

Question Number : 56 Question Id : 916710611 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In the standard state at 25 °C, upon reversing the electrodes of the following electrochemical cells, Ag(s) will be deposited on the cathode of

Cell	Anode	Cathode
A	$AgBr/Ag,\ Br^-$	$AgCl/Ag,\ Cl^-$
B	$AgBr/Ag,\ Br^-$	$AgI/Ag,\ I^-$
C	$AgCl/Ag,\ Cl^-$	$AgI/Ag,\ I^-$

[Given, at 25 °C, E^0 (in V) = +0.22 ($AgCl/Ag, Cl^-$); +0.07 ($AgBr/Ag, Br^-$); −0.15 ($AgI/Ag, I^-$)]

1. A
2. B and C
3. C, but not B
4. A, B and C

Options :

9167102441. 1

9167102442. 2

9167102443. 3

9167102444. 4

Question Number : 56 Question Id : 916710611 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

25 °C पर मानक अवस्था में, निम्नलिखित विद्‌धुत रासायनिक सेलों के इलेक्ट्रोडों को परस्पर बदलने पर, जिसके कैथोड में Ag(s) जमा होगा, वह है

Cell	एनोड	कैथोड
A	$AgBr/Ag,\ Br^-$	$AgCl/Ag,\ Cl^-$
B	$AgBr/Ag,\ Br^-$	$AgI/Ag,\ I^-$
C	$AgCl/Ag,\ Cl^-$	$AgI/Ag,\ I^-$

[दिया है, 25 °C पर, E^0 (in V) = +0.22 $(AgCl/Ag, Cl^-)$; +0.07 $(AgBr/Ag, Br^-)$; −0.15 $(AgI/Ag, I^-)$]

1. A
2. B तथा C
3. C, परंतु B नहीं
4. A, B तथा C

Options :

9167102441. 1

9167102442. 2

9167102443. 3

9167102444. 4

Question Number : 57 Question Id : 916710612 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The rate (v) of the reaction $A + 2B \rightarrow P$ is given by

$$v = k[A][B]$$

If initial concentrations of A and B are 2 mM and 4 mM, respectively, and $k =$ 0.01 mol^{-1} L s^{-1}, the half-life (in s) of A is

1. 2.5×10^4
2. 5.0×10^4
3. 2.5×10^5
4. 5.0×10^5

Options :

9167102445. 1

9167102446. 2

9167102447. 3

9167102448. 4

Question Number : 57 Question Id : 916710612 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

अभिक्रिया $A + 2B \rightarrow P$ की दर (v)

$v = k[A][B]$ द्वारा दी गई है

यदि A तथा B की प्रारम्भिक सांद्रताएँ, क्रमशः, 2 mM तथा 4 mM हैं, तथा $k = 0.01$ $mol^{-1}\ L\ s^{-1}$, तो A की अर्द्ध आयु (s में) है

1. 2.5×10^4
2. 5.0×10^4
3. 2.5×10^5
4. 5.0×10^5

Options :

9167102445. 1

9167102446. 2

9167102447. 3

9167102448. 4

Question Number : 58 Question Id : 916710613 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The expression for fractional surface coverage (θ_A) for the dissociative adsorption, $A_2(g) \longrightarrow 2A(surface)$, in the presence of an inhibitor I ($I(g) \longrightarrow I(surface)$) competing for the same site, is
[Given: K_A and K_I are equilibrium constants for adsorption of $A_2(g)$ and I (g), respectively; p_i is the partial pressure of the i^{th} gas]

1. $\frac{K_A^{1/2} p_{A_2}^{1/2}}{\left(1 + K_A^{1/2} p_{A_2}^{1/2}\right)(1+K_I p_I)}$
2. $\frac{K_A^{1/2} p_{A_2}^{1/2} K_I p_I}{\left(1 + K_A^{1/2} p_{A_2}^{1/2}\right)(1+K_I p_I)}$
3. $\frac{K_A^{1/2} p_{A_2}^{1/2}}{\left(1 + K_A^{1/2} p_{A_2}^{1/2} + K_I p_I\right)}$
4. $\frac{K_A^{1/2} p_{A_2}^{1/2} K_I p_I}{\left(1 + K_A^{1/2} p_{A_2}^{1/2} + K_I p_I\right)}$

Options :

9167102449. 1

9167102450. 2

9167102451. 3

9167102452. 4

Question Number : 58 Question Id : 916710613 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

किसी संदमक I (I(g) ⟶ I(पृष्ठीय)) की उपस्थिति में, जो समान स्थल के लिये प्रतिस्पर्धा करता है, वियोजनी अधिशोषण, $A_2(g) \longrightarrow 2A$(पृष्ठीय), के लिए प्रभाजी पृष्ठीय प्रसारण क्षेत्र (θ_A), है

[दिया है: K_A तथा K_I क्रमशः, $A_2(g)$ तथा I (g) के अधिशोषण के लिए साम्य स्थिरांक हैं; p_i , i^{th} गैस का आंशिक दाब है]

1. $\frac{K_A^{1/2} p_{A_2}^{1/2}}{\left(1+K_A^{1/2} p_{A_2}^{1/2}\right)(1+K_I p_I)}$

2. $\frac{K_A^{1/2} p_{A_2}^{1/2} K_I p_I}{\left(1+K_A^{1/2} p_{A_2}^{1/2}\right)(1+K_I p_I)}$

3. $\frac{K_A^{1/2} p_{A_2}^{1/2}}{\left(1+K_A^{1/2} p_{A_2}^{1/2}+K_I p_I\right)}$

4. $\frac{K_A^{1/2} p_{A_2}^{1/2} K_I p_I}{\left(1+K_A^{1/2} p_{A_2}^{1/2}+K_I p_I\right)}$

Options :

9167102449. 1

9167102450. 2

9167102451. 3

9167102452. 4

Question Number : 59 Question Id : 916710614 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following statements:

A. Schottky defects decrease the density of the crystal
B. Schottky defects create vacancy pair(s)
C. Alkali metal halides exhibit Frenkel defect

The option containing correct statement(s) is

1. Only A
2. Both A and B
3. Both B and C
4. Both A and C

Options :

9167102453. 1

9167102454. 2

9167102455. 3

9167102456. 4

Question Number : 59 Question Id : 916710614 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित कथनों पर विचार करें:

A. शॉटकी दोष क्रिस्टल के घनत्व को कम करता है
B. शॉटकी दोष रिक्त युग्म (युग्मों) को उत्पन्न करता है
C. क्षारीय धातु हैलाइड फ्रेंकल दोष प्रदर्शित करते हैं

सही कथन (कथनों) वाला विकल्प है

1. केवल A
2. A तथा B दोनों
3. B तथा C दोनों
4. A तथा C दोनों

Options :

9167102453. 1

9167102454. 2

9167102455. 3

9167102456. 4

Question Number : 60 Question Id : 916710615 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For the wavefunction, $\psi\,(x) = A\,exp\left(-\frac{x^4}{a^4} + ikx\right)$, the ratio of probability density at $x = a$ to that at $x = 2a$ is
[Given: $-\infty \leq x \leq \infty$]

1. e^6
2. e^2
3. 2
4. e^{30}

Options :

9167102457. 1

9167102458. 2

9167102459. 3

9167102460. 4

Question Number : 60 Question Id : 916710615 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

तरंग फलन, $\psi\,(x) = A\,exp\left(-\frac{x^4}{a^4} + ikx\right)$ के लिए, $x = a$ तथा $x = 2a$ के प्रायिकता घनत्वों का अनुपात है
[दिया है: $-\infty \leq x \leq \infty$]

1. e^6
2. e^2
3. 2
4. e^{30}

Options :

9167102457. 1

9167102458. 2

9167102459. 3

9167102460. 4

PART-C

Section Id :	91671018
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	60
Number of Questions to be attempted :	25

Section Marks : 100
Maximum Instruction Time : 0
Sub-Section Number : 1
Sub-Section Id : 91671018
Question Shuffling Allowed : Yes

Question Number : 61 Question Id : 916710616 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following statements for ozone molecule.

A. It is Raman-active
B. It is IR-active
C. It belongs to C_{2h} point group
D. It is a diamagnetic molecule

The option with the correct statements is

1. A, B, and C only
2. A, B, and D only
3. A, C, and D only
4. B, C, and D only

Options :

9167102461. 1

9167102462. 2

9167102463. 3

9167102464. 4

Question Number : 61 Question Id : 916710616 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

ओज़ोन अणु के लिए निम्नलिखित कथनों पर विचार करें।

A. यह रमन-सक्रिय है

B. यह IR-सक्रिय है

C. यह C_{2h} बिंदु समूह से संबंधित है

D. यह प्रतिचुंबकीय अणु है

सही कथनों वाला विकल्प है

1. केवल A, B, तथा C
2. केवल A, B, तथा D
3. केवल A, C, तथा D
4. केवल B, C, तथा D

Options :

9167102461. 1

9167102462. 2

9167102463. 3

9167102464. 4

Question Number : 62 Question Id : 916710617 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct order of rate for the following isotope exchange reaction

$[M(CN)_6]^{3-} + 6\ {}^{14}CN^- \rightarrow [M({}^{14}CN)_6]^{3-} + 6\ CN^-$

(where, M = Cr, Mn, and Fe)

is

1. Fe > Mn > Cr
2. Mn > Fe > Cr
3. Fe > Cr > Mn
4. Cr > Mn > Fe

Options :

9167102465. 1

9167102466. 2

9167102467. 3

9167102468. 4

Question Number : 62 Question Id : 916710617 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित समस्थानिक विनिमय अभिक्रिया के दर का सही क्रम

$[M(CN)_6]^{3-} + 6\ {}^{14}CN^- \rightarrow [M({}^{14}CN)_6]^{3-} + 6\ CN^-$

(जहां, M = Cr, Mn, तथा Fe)

है

1. Fe > Mn > Cr
2. Mn > Fe > Cr
3. Fe > Cr > Mn
4. Cr > Mn > Fe

Options :

9167102465. 1

9167102466. 2

9167102467. 3

9167102468. 4

Question Number : 63 Question Id : 916710618 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Given below are the oxohalide ions (column I) and their bond lengths (column II) and bond angles (column III).

Column I Oxohalide ion	Column II X−O (pm)	Column III O−X−O angle (°)
a. ClO_3^-	p. 165	i. 100
b. BrO_3^-	q. 149	ii. 107
c. IO_3^-	r. 181	iii. 104

The option with the correct match is

1. (a−r−ii), (b−p−i), (c−q−iii)
2. (a−q−i), (b−r−iii), (c−p−ii)
3. (a−r−iii), (b−q−i), (c−p−ii)
4. (a−q−ii), (b−p−iii), (c−r−i)

Options :

9167102469. 1

9167102470. 2

9167102471. 3

9167102472. 4

Question Number : 63 Question Id : 916710618 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

ऑक्सोहैलाइड आयन (कॉलम I) तथा उनके आबन्ध लंबाई (कॉलम II) तथा आबन्ध कोण (कॉलम III) निचे दिए गए हैं।

कॉलम I ऑक्सोहैलाइड आयन	कॉलम II X–O (pm)	कॉलम III O–X–O कोण (°)
a. ClO_3^-	p. 165	i. 100
b. BrO_3^-	q. 149	ii. 107
c. IO_3^-	r. 181	iii. 104

सही मिलान वाला विकल्प है

1. (a–r–ii), (b–p–i), (c–q–iii)
2. (a–q–i), (b–r–iii), (c–p–ii)
3. (a–r–iii), (b–q–i), (c–p–ii)
4. (a–q–ii), (b–p–iii), (c–r–i)

Options :

9167102469. 1

9167102470. 2

9167102471. 3

9167102472. 4

Question Number : 64 Question Id : 916710619 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct sequence of reagent addition for the qualitative analysis of Pb^{2+}, Cd^{2+}, Sr^{2+} and Ni^{2+} ions in an aqueous solution of a mixture of their nitrate-containing salts, is

1. (i) HCl (aq.) (ii) H_2S (acidic) (iii) H_2S (basic) (iv) $(NH_4)_2CO_3$ (aq.)
2. (i) H_2S (acidic) (ii) H_2S (basic) (iii) HCl (aq.) (iv) $(NH_4)_2CO_3$ (aq.)
3. (i) $(NH_4)_2CO_3$ (aq.) (ii) H_2S (acidic) (iii) H_2S (basic) (iv) HCl (aq.)
4. (i) HCl (aq.) (ii) H_2S (basic) (iii) H_2S (acidic) (iv) $(NH_4)_2CO_3$ (aq.)

Options :

9167102473. 1

9167102474. 2

9167102475. 3

9167102476. 4

Question Number : 64 Question Id : 916710619 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

उनके नाइट्रेट-युक्त लवणों के मिश्रण के जलीय विलयन में Pb^{2+}, Cd^{2+}, Sr^{2+} तथा Ni^{2+} आयनों के गुणात्मक विश्लेषण के लिए अभिकर्मक मिलाने का सही क्रम, है

1. (i) HCl (जलीय) (ii) H_2S (अम्लीय) (iii) H_2S (क्षारीय) (iv) $(NH_4)_2CO_3$ (जलीय)
2. (i) H_2S (अम्लीय) (ii) H_2S (क्षारीय) (iii) HCl (जलीय) (iv) $(NH_4)_2CO_3$ (जलीय)
3. (i) $(NH_4)_2CO_3$ (जलीय) (ii) H_2S (अम्लीय) (iii) H_2S (क्षारीय) (iv) HCl (जलीय)
4. (i) HCl (जलीय) (ii) H_2S (क्षारीय) (iii) H_2S (अम्लीय) (iv) $(NH_4)_2CO_3$ (जलीय)

Options :

9167102473. 1

9167102474. 2

9167102475. 3

9167102476. 4

Question Number : 65 Question Id : 916710620 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The **Raschig** reaction, involving partial oxidation of NH_3 with NaOCl, produces **P**, which upon treatment with KIO_3 and HCl, forms KCl, water, compounds **Q** and **R**. The compounds **P**, **Q**, and **R**, respectively, are

1. NCl_3, Cl_2, I_2
2. N_2H_4, N_2, ICl
3. N_2H_4, O_2, I_2
4. NCl_3, N_2, ICl

Options :

9167102477. 1

9167102478. 2

9167102479. 3

9167102480. 4

Question Number : 65 Question Id : 916710620 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

राशिग अभिक्रिया (**Raschig** reaction), जिसमें NaOCl के साथ NH_3 का आंशिक ऑक्सीकरण होता है, से **P** प्राप्त होता है, जो KIO_3 तथा HCl के साथ अभिक्रिया करने पर KCl, जल, यौगिक **Q** तथा **R** बनाता है। यौगिक **P**, **Q**, तथा **R**, हैं, क्रमशः

1. NCl_3, Cl_2, I_2
2. N_2H_4, N_2, ICl
3. N_2H_4, O_2, I_2
4. NCl_3, N_2, ICl

Options :

9167102477. 1

9167102478. 2

9167102479. 3

9167102480. 4

Question Number : 66 Question Id : 916710621 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The table below contains the following compounds with their characteristics

Compounds	Oxidation state of phosphorus	Number of acidic hydrogens
a. Hypophosphoric acid	p. 5	i. 2
b. Pyrophosphorous acid	q. 1	ii. 3
c. Hypophosphorous acid	r. 4	iii. 4
d. Orthophosphoric acid	s. 3	iv. 1

The option with the correct match is

1. (a−r−iii), (b−s−i), (c−q−iv), (d−p−ii)
2. (a−s−ii), (b−r−iii), (c−q−iv), (d−p−i)
3. (a−p−ii), (b−r−iv), (c−q−i), (d−s−iii)
4. (a−r−iii), (b−s−ii), (c−q−iv), (d−p−i)

Options :

9167102481. 1

9167102482. 2

9167102483. 3

9167102484. 4

Question Number : 66 Question Id : 916710621 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्न तालिका में यौगिकों को उनकी विशेषताओं के साथ दिया गया है

यौगिक	फॉस्फोरस की ऑक्सीकरण अवस्था	अम्लीय हाइड्रोजनों की संख्या
a. हाइपोफॉस्फोरिक अम्ल	p. 5	i. 2
b. पाइरोफॉस्फोरस अम्ल	q. 1	ii. 3
c. हाइपोफॉस्फोरस अम्ल	r. 4	iii. 4
d. ऑर्थोफॉस्फोरिक अम्ल	s. 3	iv. 1

सही मिलान वाला विकल्प है

1. (a–r–iii), (b–s–i), (c–q–iv), (d–p–ii)
2. (a–s–ii), (b–r–iii), (c–q–iv), (d–p–i)
3. (a–p–ii), (b–r–iv), (c–q–i), (d–s–iii)
4. (a–r–iii), (b–s–ii), (c–q–iv), (d–p–i)

Options :

9167102481. 1

9167102482. 2

9167102483. 3

9167102484. 4

Question Number : 67 Question Id : 916710622 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The total number of isomers including pair(s) of enantiomers for the octahedral complex with the general formula Ma_2b_2cd is

1. 6 including 1 pair
2. 6 including 2 pairs
3. 8 including 1 pair
4. 8 including 2 pairs

Options :

9167102485. 1

9167102486. 2

9167102487. 3

9167102488. 4

Question Number : 67 Question Id : 916710622 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

सामान्य सूत्र Ma_2b_2cd वाले अष्टफलकीय संकुल के लिए प्रतिबिम्बरूपी समावयवों के युग्म(युग्मों) सहित समावयवों की कुल संख्या है

1. 6 जिसमें 1 युग्म सम्मिलित है
2. 6 जिसमें 2 युग्म सम्मिलित हैं
3. 8 जिसमें 1 युग्म सम्मिलित है
4. 8 जिसमें 2 युग्म सम्मिलित हैं

Options :

9167102485. 1

9167102486. 2

9167102487. 3

9167102488. 4

Question Number : 68 Question Id : 916710623 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The calculated magnetic moment in B.M. unit of a tetrahedral transition metal complex is
[Given, free ion term $^4F_{9/2}$, 10 Dq = 3200 cm^{-1} and $|\lambda| = 200\ cm^{-1}$]

1. 2.90
2. 3.38
3. 4.35
4. 4.83

Options :

9167102489. 1

9167102490. 2

9167102491. 3

9167102492. 4

Question Number : 68 Question Id : 916710623 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

किसी चतुष्फलकीय संक्रमण धातु संकुल का परिकलित चुंबकीय आघूर्ण B.M. की इकाई में है

[दिया है, मुक्त आयन पद $^4F_{9/2}$, 10 Dq = 3200 cm^{-1} तथा $|\lambda| = 200\ cm^{-1}$]

1. 2.90
2. 3.38
3. 4.35
4. 4.83

Options :

9167102489. 1

9167102490. 2

9167102491. 3

9167102492. 4

Question Number : 69 Question Id : 916710624 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following outer-sphere electron transfer reaction:
$MnO_4^- + [Fe(CN)_6]^{4-} \rightarrow MnO_4^{2-} + [Fe(CN)_6]^{3-}$

[Given at 25 °C, E^0 for MnO_4^-/ MnO_4^{2-} = 0.56 V, $[Fe(CN)_6]^{3-}/ [Fe(CN)_6]^{4-}$ = 0.36 V; Self−exchange rate constant, k_{11} for Mn complex = 3600 $M^{-1}s^{-1}$, Self−exchange rate constant, k_{22} for Fe complex = 300 $M^{-1}s^{-1}$, assume correction factor, f_{12} = 1]

The cross−exchange rate constant (k_{12}, $M^{-1}s^{-1}$) for the given reaction is

1. 1.8×10^3
2. 4.8×10^6
3. 5.1×10^4
4. 2.5×10^5

Options :

9167102493. 1

9167102494. 2

9167102495. 3

9167102496. 4

Question Number : 69 Question Id : 916710624 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित बाह्य-मंडलीय इलेक्ट्रॉन स्थानांतरण अभिक्रिया पर विचार करें:

$MnO_4^- + [Fe(CN)_6]^{4-} \rightarrow MnO_4^{2-} + [Fe(CN)_6]^{3-}$

[दिया है 25 °C पर, MnO_4^-/ MnO_4^{2-} के लिए $E^0 = 0.56$ V, $[Fe(CN)_6]^{3-}/ [Fe(CN)_6]^{4-}$ के लिए $E^0 = 0.36$ V; Mn संकुल के लिए स्व-विनिमय दर स्थिरांक, $k_{11} = 3600\ M^{-1}s^{-1}$, Fe संकुल के लिए स्व-विनिमय दर स्थिरांक, $k_{22} = 300\ M^{-1}s^{-1}$, संशोधन गुणक, $f_{12} = 1$ मानें]

दी गई अभिक्रिया के लिए तिर्यक-विनिमय (cross–exchange) दर स्थिरांक (k_{12}, $M^{-1}s^{-1}$) है

1. 1.8×10^3
2. 4.8×10^6
3. 5.1×10^4
4. 2.5×10^5

Options :

9167102493. 1

9167102494. 2

9167102495. 3

9167102496. 4

Question Number : 70 Question Id : 916710625 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Column I contains inner transition elements and Column II includes ores, structural property and application.

Column I		Column II	
a.	Th	i.	Pitchblende
b.	U	ii.	BCC structure in its metallic form
c.	Eu	iii.	Laser
d.	Nd	iv.	Monazite

The option with the correct match is

1. (a−ii), (b−iv), (c−iii), (d−i)
2. (a−iv), (b−i), (c−ii), (d−iii)
3. (a−i), (b−iv), (c−ii), (d−iii)
4. (a−iv), (b−i), (c−iii), (d−ii)

Options :

9167102497. 1

9167102498. 2

9167102499. 3

9167102500. 4

Question Number : 70 Question Id : 916710625 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

कॉलम I में अन्तः संक्रमण तत्व हैं तथा कॉलम II में अयस्क, संरचनात्मक गुण तथा उपयोग सम्मिलित हैं।

कॉलम I		कॉलम II	
a.	Th	i.	पिचब्लैंड
b.	U	ii.	अपने धात्विक रूप में BCC संरचना
c.	Eu	iii.	लेजर
d.	Nd	iv.	मोनेजाइट

सही मिलान वाला विकल्प है

1. (a–ii), (b–iv), (c–iii), (d–i)
2. (a–iv), (b–i), (c–ii), (d–iii)
3. (a–i), (b–iv), (c–ii), (d–iii)
4. (a–iv), (b–i), (c–iii), (d–ii)

Options :

9167102497. 1

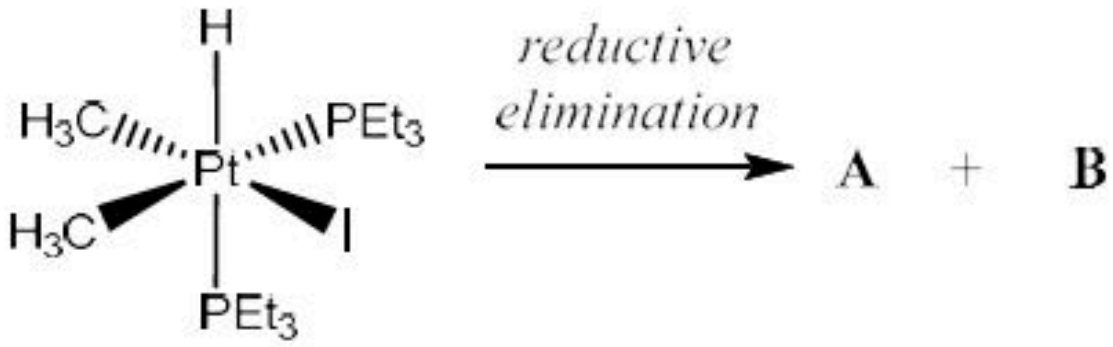
9167102498. 2

9167102499. 3

9167102500. 4

Question Number : 71 Question Id : 916710626 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following reaction.

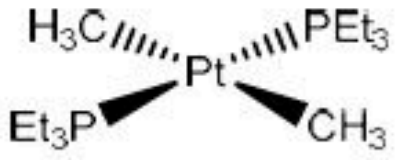


The **most likely** products **A** and **B**, respectively, are

1.  and CH_4

2.  and $H_3C—CH_3$

3.  and CH_3I

4.  and HI

Options :

9167102501. 1

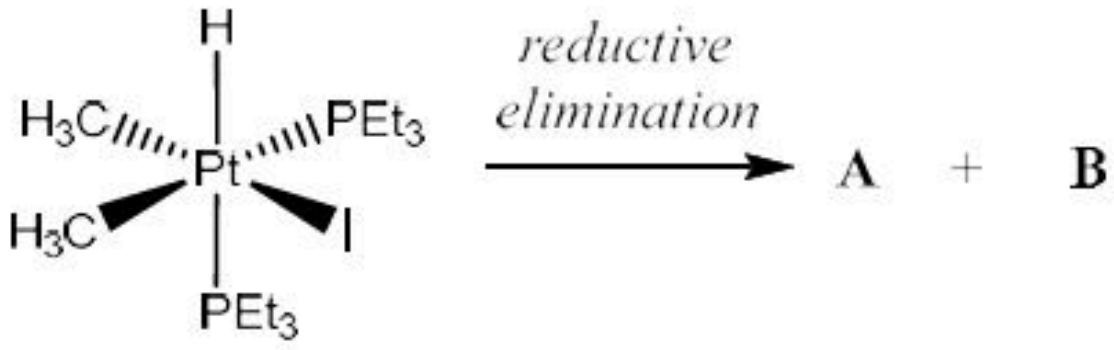
9167102502. 2

9167102503. 3

9167102504. 4

Question Number : 71 Question Id : 916710626 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित अभिक्रिया पर विचार करें।



सबसे अधिक संभावित उत्पाद **A** तथा **B**, हैं, क्रमशः

1.  and CH_4

2.  and $H_3C—CH_3$

3.  and CH_3I

4.  and HI

Options :

9167102501. 1

9167102502. 2

9167102503. 3

9167102504. 4

Question Number : 72 Question Id : 916710627 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct order of ν_{C-S} (in cm^{-1}) and ν_{C-N} (in cm^{-1}) in *trans*−$[Pd(AsPh_3)_2(\underline{N}CS)_2]$ (**A**) and *trans*−$[Pd(AsPh_3)_2(\underline{S}CN)_2]$ (**B**) is

1. ν_{C-S} in **A** < ν_{C-S} in **B** ; ν_{C-N} in **A** < ν_{C-N} in **B**
2. ν_{C-S} in **A** ≈ ν_{C-S} in **B** ; ν_{C-N} in **A** ≈ ν_{C-N} in **B**
3. ν_{C-S} in **B** < ν_{C-S} in **A** ; ν_{C-N} in **A** < ν_{C-N} in **B**
4. ν_{C-S} in **B** < ν_{C-S} in **A** ; ν_{C-N} in **B** < ν_{C-N} in **A**

Options :

9167102505. 1

9167102506. 2

9167102507. 3

9167102508. 4

Question Number : 72 Question Id : 916710627 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

trans−$[Pd(AsPh_3)_2(\underline{N}CS)_2]$ (**A**) तथा *trans*−$[Pd(AsPh_3)_2(\underline{S}CN)_2]$ (**B**) में ν_{C-S} (cm^{-1} में) तथा ν_{C-N} (cm^{-1} में) का सही क्रम है

1. **A** में ν_{C-S} < **B** में ν_{C-S} ; **A** में ν_{C-N} < **B** में ν_{C-N}
2. **A** में ν_{C-S} ≈ **B** में ν_{C-S} ; **A** में ν_{C-N} ≈ **B** में ν_{C-N}
3. **B** में ν_{C-S} < **A** में ν_{C-S} ; **A** में ν_{C-N} < **B** में ν_{C-N}
4. **B** में ν_{C-S} < **A** में ν_{C-S} ; **B** में ν_{C-N} < **A** में ν_{C-N}

Options :

9167102505. 1

9167102506. 2

9167102507. 3

9167102508. 4

Question Number : 73 Question Id : 916710628 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The catalytic intermediate species involved in the **Wacker** process are

1. Pd–vinyl alcohol, Pd–β–hydroxyethyl, Pd–ethylene
2. Pd–β–hydroxyethyl, Pd–vinyl alcohol, Pd–acyl
3. Pd–dioxygen, Pd–β–hydroxyethyl, Pd–ethylene
4. Pd–β–hydroxyethyl, Pd–vinyl alcohol, Pd–dioxygen

Options :

9167102509. 1

9167102510. 2

9167102511. 3

9167102512. 4

Question Number : 73 Question Id : 916710628 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

वाकर प्रक्रम (**Wacker** process) में सम्मिलित उत्प्रेरकी मध्यवर्ती स्पीशीज़ हैं

1. Pd–विनाइल ऐल्कोहॉल, Pd–β–हाइड्रॉक्सीऐथिल, Pd–ऐथिलीन
2. Pd–β–हाइड्रॉक्सीऐथिल, Pd–विनाइल ऐल्कोहॉल, Pd–ऐसिल
3. Pd–डाइऑक्सीजन, Pd–β–हाइड्रॉक्सीऐथिल, Pd–ऐथिलीन
4. Pd–β–हाइड्रॉक्सीऐथिल, Pd–विनाइल ऐल्कोहॉल, Pd– डाइऑक्सीजन

Options :

9167102509. 1

9167102510. 2

9167102511. 3

9167102512. 4

Question Number : 74 Question Id : 916710629 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The structures of $[B_5H_{11}]$, $[C_2B_{10}H_{12}]$ and $[B_{11}H_{14}]^-$, respectively, are

1. nido, arachno, closo
2. nido, closo, arachno
3. arachno, closo, nido
4. arachno, nido, closo

Options :

9167102513. 1

9167102514. 2

9167102515. 3

9167102516. 4

Question Number : 74 Question Id : 916710629 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

$[B_5H_{11}]$, $[C_2B_{10}H_{12}]$ तथा $[B_{11}H_{14}]^-$, की संरचनाएँ, हैं, क्रमशः

1. निडो, अराकनों, क्लोजो
2. निडो, क्लोजो, अराकनों
3. अराकनों, क्लोजो, निडो
4. अराकनों, निडो, क्लोजो

Options :

9167102513. 1

9167102514. 2

9167102515. 3

9167102516. 4

Question Number : 75 Question Id : 916710630 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Match the physical methods in Column I with the best suited information in Column II and III

Column I	Column II	Column III
a. Electron Paramagnetic Resonance spectroscopy	p. Radio frequency	i. nature of O_2 bound to haemoglobin
b. Nuclear Magnetic Resonance spectroscopy	q. Force constant	ii. d−block metals with odd number of unpaired electrons
c. Resonance Raman spectroscopy	r. Microwave	iii. fluxionality in organometallic compounds

1. (a−r−ii), (b−p−iii), (c−q−i)
2. (a−p−iii), (b−r−ii), (c−q−i)
3. (a−r−ii), (b−q−iii), (c−p−i)
4. (a−r−i), (b−q−iii), (c−p−ii)

Options :

9167102517. 1

9167102518. 2

9167102519. 3

9167102520. 4

Question Number : 75 Question Id : 916710630 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

कॉलम I में दी गई भौतिक विधियों का मिलान कॉलम II तथा III में दी गई उस जानकारी से करें जिसके लिए वह सबसे उपयुक्त है

कॉलम I	कॉलम II	कॉलम III
a. इलेक्ट्रॉन अनुचुंबकीय अनुनाद स्पेक्ट्रमिकी	p. रेडियो आवृति	i. हीमोग्लोबिन से आबद्धित O_2 की प्रकृति
b. नाभिकीय चुंबकीय अनुनाद स्पेक्ट्रमिकी	q. बल स्थिरांक	ii. अयुग्मित इलेक्ट्रॉनों की विषम संख्या वाले d-ब्लॉक धातु
c. अनुनाद रमन स्पेक्ट्रमिकी	r. सूक्ष्मतरंग	iii. कार्ब-धात्विक यौगिकों में प्रवाहशीलता (fluxionality)

1. (a–r–ii), (b–p–iii), (c–q–i)
2. (a–p–iii), (b–r–ii), (c–q–i)
3. (a–r–ii), (b–q–iii), (c–p–i)
4. (a–r–i), (b–q–iii), (c–p–ii)

Options :

9167102517. 1

9167102518. 2

9167102519. 3

9167102520. 4

Question Number : 76 Question Id : 916710631 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following statements about hemerythrin

A. Non−heme binuclear iron centers linked by two bridging carboxylate groups
B. Heme protein coordinated by amino acid side chains
C. Coordination of O_2 occurs at only one of the Fe atoms
D. Identical active site is found in methane monooxygenase, acid phosphatases, and some ribonucleotide reductases

The option with all correct statements is

1. A, C, and D only
2. B and D only
3. B, C, and D only
4. A and C only

Options :

9167102521. 1

9167102522. 2

9167102523. 3

9167102524. 4

Question Number : 76 Question Id : 916710631 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

हीमएरिथ्रिन के बारे में निम्नलिखित कथनों पर विचार करें

A. गैर-हीम द्विनाभिकीय आयरन केंद्र दो सेतु कार्बोक्सीलेट समूहों द्वारा जुड़े रहते हैं

B. हीम प्रोटीन अमीनों अम्ल पार्श्व शृंखलाओं द्वारा समन्वयित रहती है

C. O_2 का समन्वय Fe परमाणुओं में से केवल किसी एक पर होता है

D. मीथेन मोनोऑक्सीजिनेज, अम्ल फॉसफेटेजेज, तथा कुछ राइबोन्यूक्लियोटाइड रेडक्टेजेज में समान सक्रिय स्थल प्राप्त होते हैं

सभी सही कथनों वाला विकल्प है

1. केवल A, C, तथा D
2. केवल B तथा D
3. केवल B, C, तथा D
4. केवल A तथा C

Options :

9167102521. 1

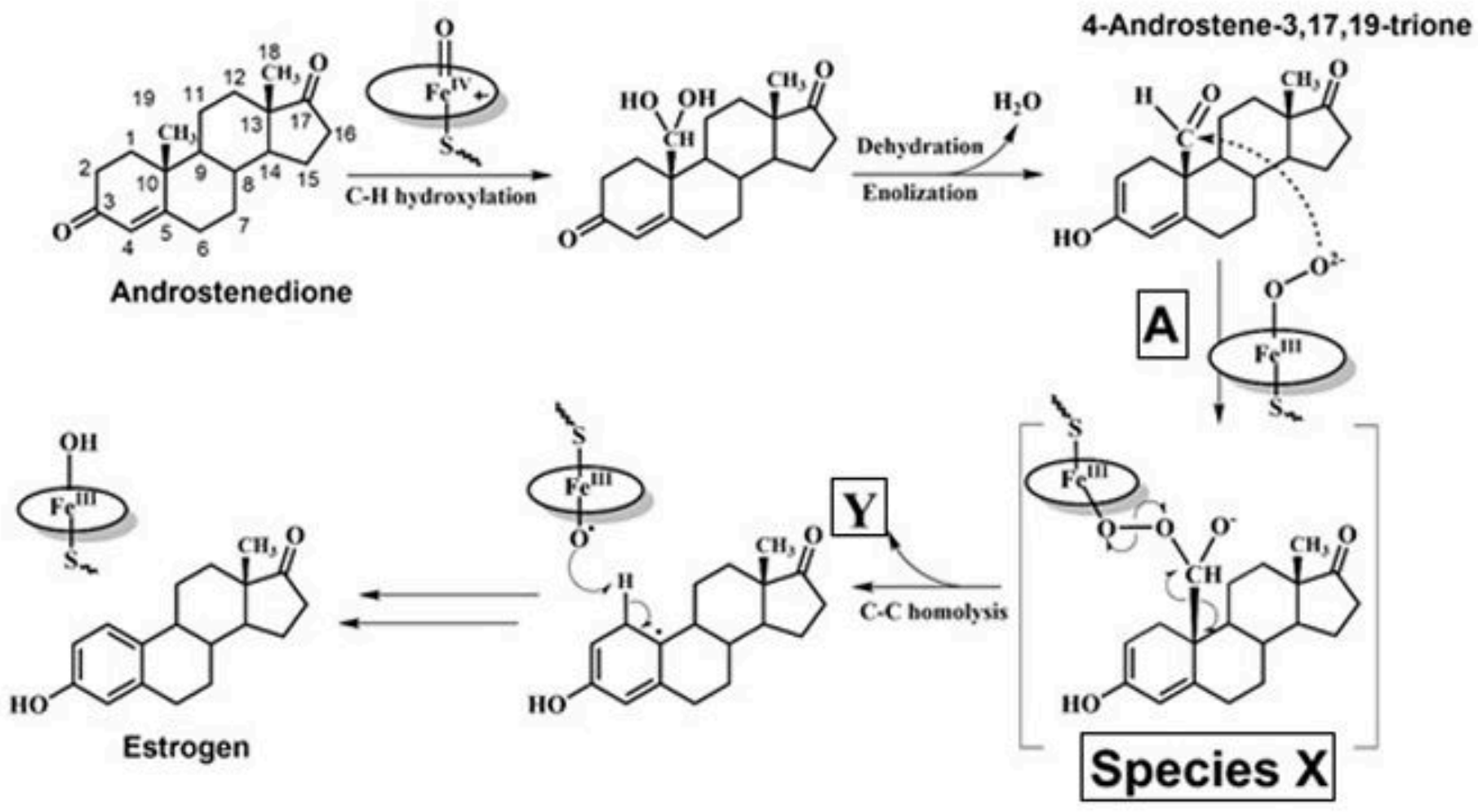
9167102522. 2

9167102523. 3

9167102524. 4

Question Number : 77 Question Id : 916710632 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The synthesis of Estrogen from Androstenedione in humans is catalyzed by aromatase which is a cytochrome P450 enzyme. In the reaction mechanism described below, the missing reaction step **A**, description of the intermediate **species X**, and chemical species **Y**, respectively, are



1. Electrophilic attack, peroxide, and CO_2
2. Nucleophilic attack, peroxyhemiacetal, and CO_2
3. Nucleophilic attack, peroxyhemiacetal, and $HCOO^-$
4. Electrophilic attack, peroxide, and $HCOO^-$

Options :

9167102525. 1

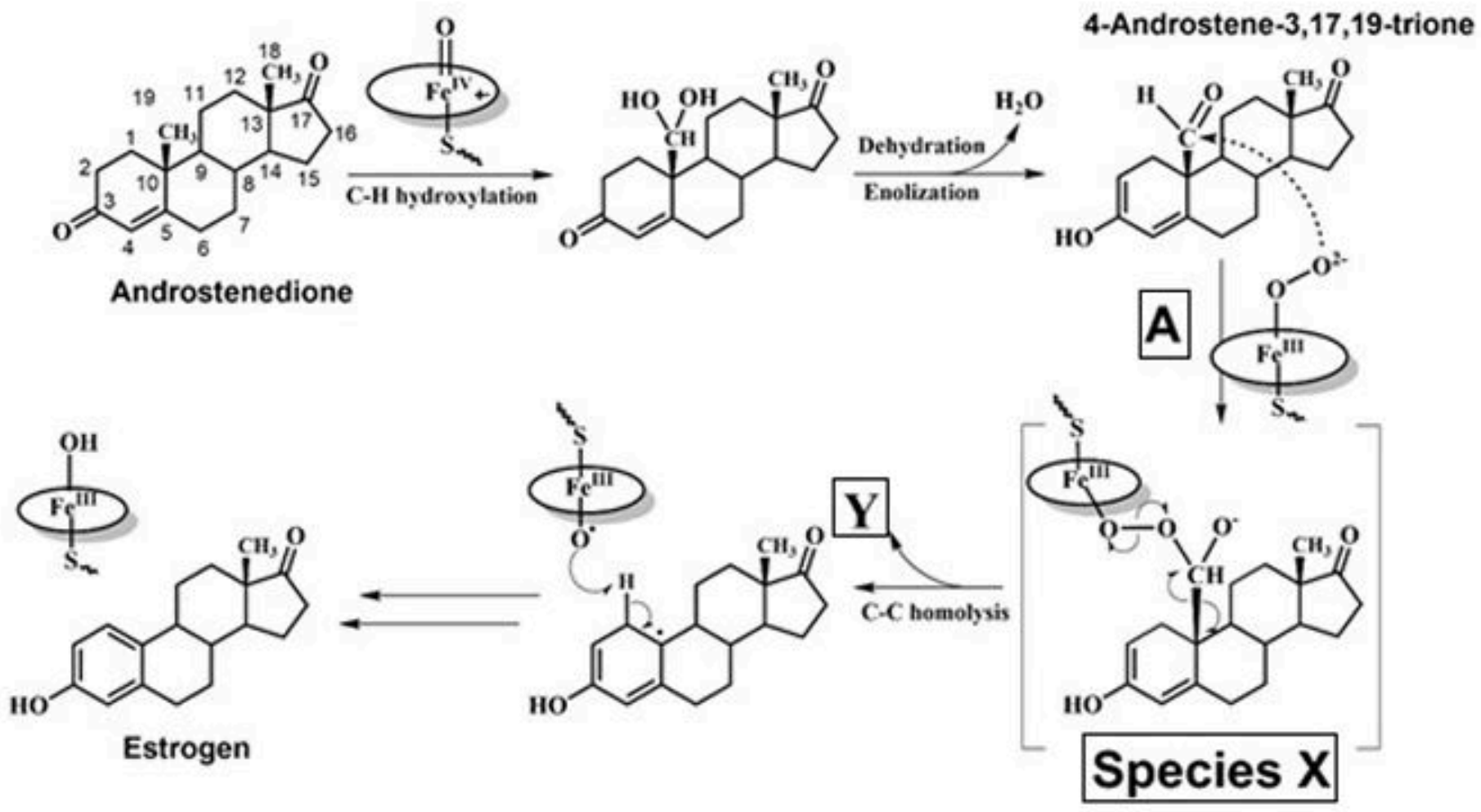
9167102526. 2

9167102527. 3

9167102528. 4

Question Number : 77 Question Id : 916710632 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

मानवों में एंड्रोस्टेनेडिओन से एस्ट्रोजन का संश्लेषण ऐरोमेटेज द्वारा उत्प्रेरित किया जाता है जो एक साइटोक्रोम P450 एन्ज़ाइम है। निम्न वर्णित अभिक्रिया क्रियाविधि में, गायब अभिक्रिया पद **A**, मध्यवर्ती **स्पीशीज़ X**, तथा रासायनिक स्पीशीज़ **Y** का वर्णन, हैं, क्रमशः



1. इलेक्ट्रॉनस्नेही आक्रमण, परॉक्साइड, तथा CO_2
2. नाभिकस्नेही आक्रमण, परॉक्सीहेमीऐसीटल, तथा CO_2
3. नाभिकस्नेही आक्रमण , परॉक्सीहेमीऐसीटल, तथा $HCOO^-$
4. इलेक्ट्रॉनस्नेही आक्रमण, परॉक्साइड, तथा $HCOO^-$

Options :

9167102525. 1

9167102526. 2

9167102527. 3

9167102528. 4

Question Number : 78 Question Id : 916710633 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Given below are enzymes (column I), the metal in their active sites (column II) and the class of reactions they catalyze (column III)

Column I	Column II	Column III
a. Catalase	p. Copper	i. Hydrolysis reaction
b. Urease	q. Copper and iron	ii. Decomposition reaction
c. Cytochrome *c* oxidase	r. Iron	iii. Phenol to quinone
d. Laccase	s. Nickel	iv. Oxygen to water

The option with the correct match is

1. (a–q–ii), (b–s–i), (c–p–iv), (d–r–iii)
2. (a–q–iii), (b–r–iv), (c–s–i), (d–p–ii)
3. (a–r–iv), (b–p–iii), (c–q–i), (d–s–ii)
4. (a–r–ii), (b–s–i), (c–q–iv), (d–p–iii)

Options :

9167102529. 1

9167102530. 2

9167102531. 3

9167102532. 4

Question Number : 78 Question Id : 916710633 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

एन्ज़ाइम (कॉलम I), उनके सक्रिय स्थलों में धातु (कॉलम II) तथा जिन अभिक्रिया-वर्ग को वो उत्प्रेरित करते है (कॉलम III) निचे दिए गए हैं

कॉलम I	कॉलम II	कॉलम III
a. कैटेलेज	p. कॉपर	i. जलअपघटन अभिक्रिया
b. यूरिएज	q. कॉपर तथा आयरन	ii. अपघटन अभिक्रिया
c. साइटोक्रोम *c* ऑक्सीडेज	r. आयरन	iii. फिनॉल से क्विनॉन
d. लैक्केज	s. निकल	iv. ऑक्सीजन से जल

सही मिलान वाला विकल्प है

1. (a–q–ii), (b–s–i), (c–p–iv), (d–r–iii)
2. (a–q–iii), (b–r–iv), (c–s–i), (d–p–ii)
3. (a–r–iv), (b–p–iii), (c–q–i), (d–s–ii)
4. (a–r–ii), (b–s–i), (c–q–iv), (d–p–iii)

Options :

9167102529. 1

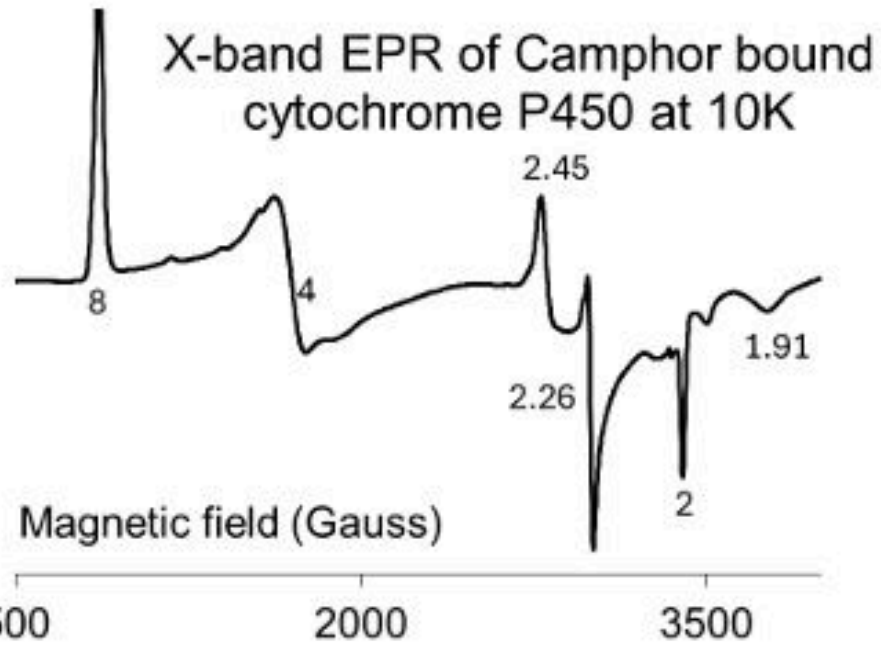
9167102530. 2

9167102531. 3

9167102532. 4

Question Number : 79 Question Id : 916710634 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The X−band EPR spectrum of camphor−bound cytochrome P450 at 10 K shows a mixture of high-spin and low-spin ferric species.



The correct set of g−values for the high-spin and low-spin species, respectively, are

1. High-spin: 8, 4, 2 and low-spin: 2.45, 2.26, 1.91
2. High-spin: 8, 4, 2.26 and low-spin: 2.45, 2, 1.91
3. High-spin: 8, 2.45, 2.26 and low-spin: 4, 2, 1.91
4. High-spin: 4, 2.45, 2.26 and low-spin: 8, 2, 1.91

Options :

9167102533. 1

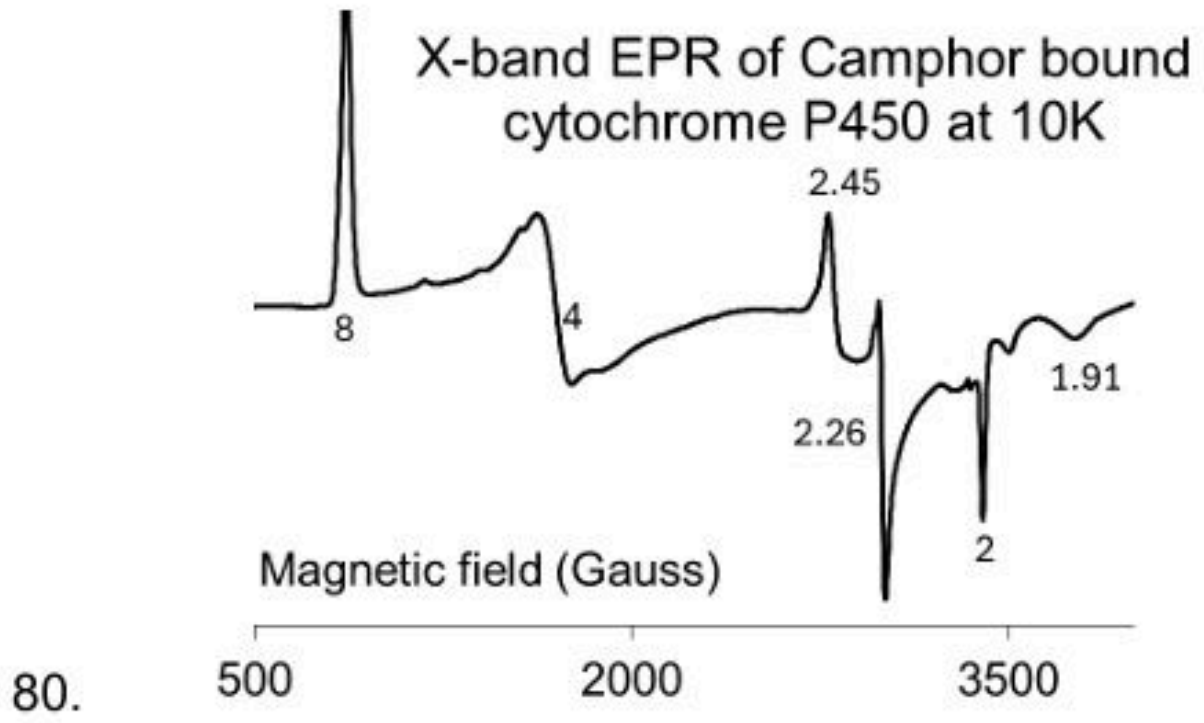
9167102534. 2

9167102535. 3

9167102536. 4

Question Number : 79 Question Id : 916710634 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

10 K पर कैम्फर-आबद्ध साइटोक्रोम P450 का X–बैंड EPR स्पेक्ट्रम उच्च-प्रचक्रण तथा निम्न-प्रचक्रण फैरिक स्पीशीज़ का मिश्रण दर्शाता है।



80.

उच्च-प्रचक्रण तथा निम्न-प्रचक्रण स्पीशीज़ के लिए, g–मानों का सही समुच्चय, हैं, क्रमशः

1. उच्च-प्रचक्रण: 8, 4, 2 तथा निम्न-प्रचक्रण: 2.45, 2.26, 1.91
2. उच्च-प्रचक्रण: 8, 4, 2.26 तथा निम्न-प्रचक्रण: 2.45, 2, 1.91
3. उच्च-प्रचक्रण: 8, 2.45, 2.26 तथा निम्न-प्रचक्रण: 4, 2, 1.91
4. उच्च-प्रचक्रण: 4, 2.45, 2.26 तथा निम्न-प्रचक्रण: 8, 2, 1.91

Options :

9167102533. 1

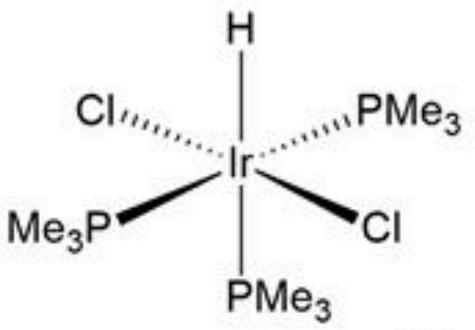
9167102534. 2

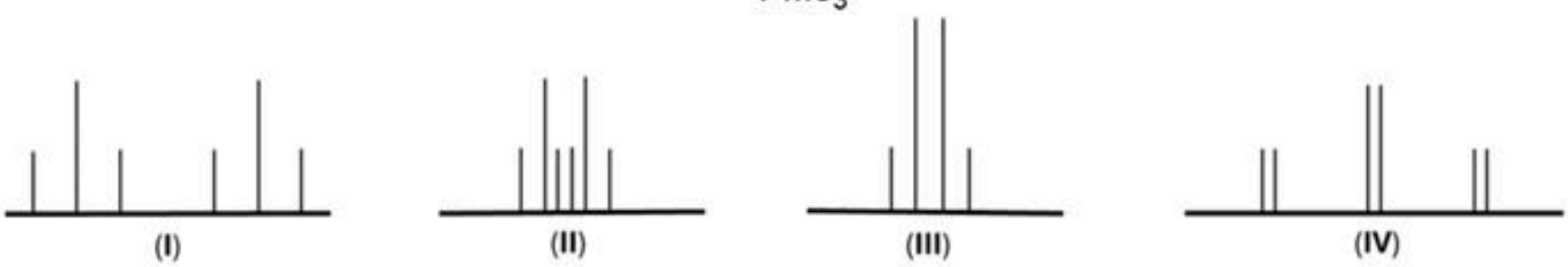
9167102535. 3

9167102536. 4

Question Number : 80 Question Id : 916710635 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The ^{1}H NMR spectral pattern in the hydride region for the given compound, [Given, ^{31}P: I = ½, 100%; ^{1}H: I = ½, 99.98%]





is

1. IV
2. I
3. III
4. II

Options :

9167102537. 1

9167102538. 2

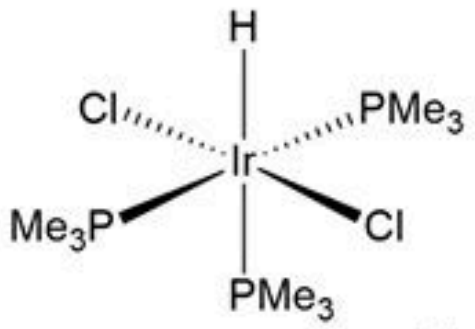
9167102539. 3

9167102540. 4

Question Number : 80 Question Id : 916710635 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

दिए गए यौगिक के लिए हाइड्राइड क्षेत्र में ^{1}H NMR स्पेक्ट्रमी प्रतिरूप

[दिया है, ^{31}P: I = ½, 100%; ^{1}H: I = ½, 99.98%]





के

1. IV
2. I
3. III
4. II

Options :

9167102537. 1

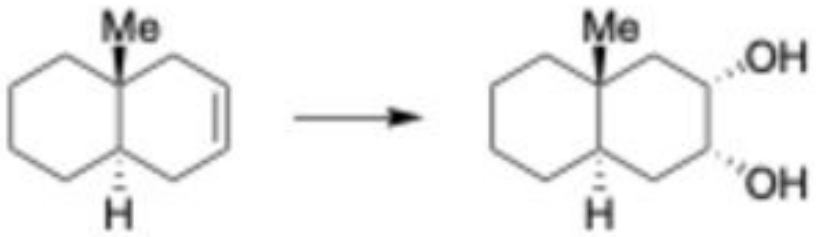
9167102538. 2

9167102539. 3

9167102540. 4

Question Number : 81 Question Id : 916710636 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct set of reagents to effect the following transformation is



1. OsO_4, NMO
2. i. I_2, AgOAc, H_2O; ii. NaOH, H_2O
3. i. I_2, AgOBz; ii. NaOH, H_2O
4. OsO_4, $NaIO_4$

Options :

9167102541. 1

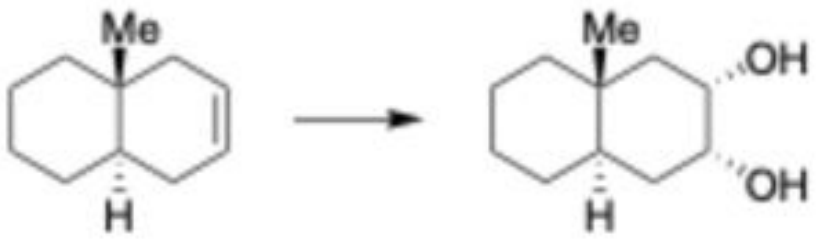
9167102542. 2

9167102543. 3

9167102544. 4

Question Number : 81 Question Id : 916710636 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित रूपांतरण को प्रभावी करने के लिए अभिकर्मकों का सही समुच्चय है



1. OsO_4, NMO
2. i. I_2, AgOAc, H_2O; ii. NaOH, H_2O
3. i. I_2, AgOBz; ii. NaOH, H_2O
4. OsO_4, $NaIO_4$

Options :

9167102541. 1

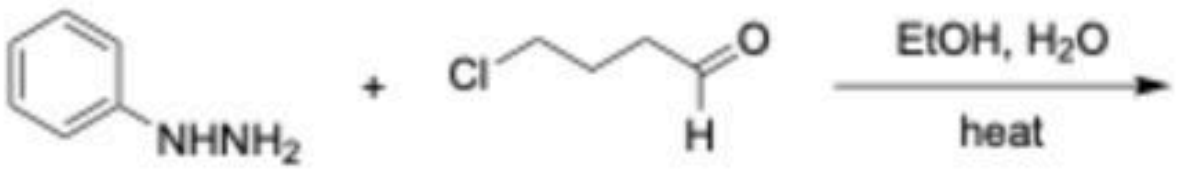
9167102542. 2

9167102543. 3

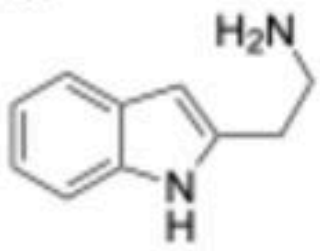
9167102544. 4

Question Number : 82 Question Id : 916710637 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

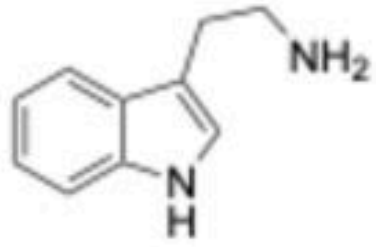
The major product formed in the following reaction is



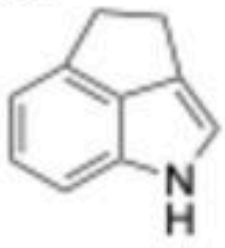
1.



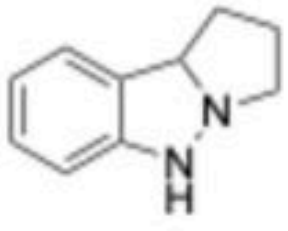
2.



3.



4.



Options :

9167102545. 1

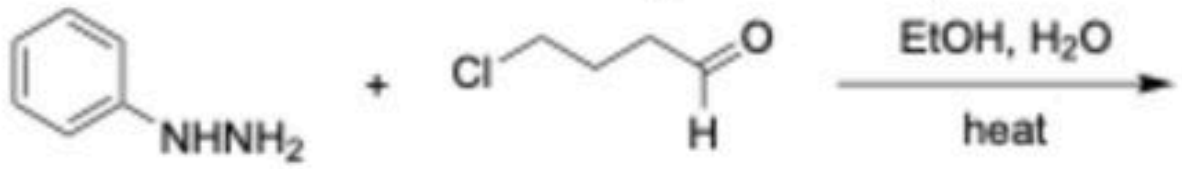
9167102546. 2

9167102547. 3

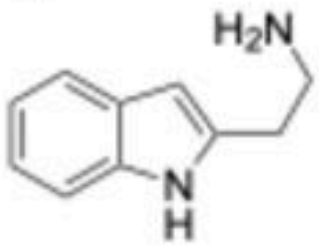
9167102548. 4

Question Number : 82 Question Id : 916710637 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

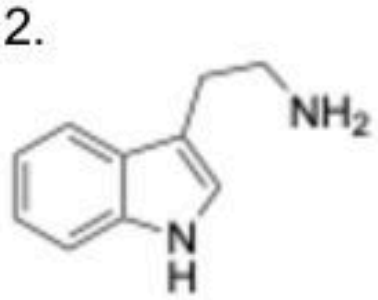
निम्नलिखित अभिक्रिया में विरचित मुख्य उत्पाद है



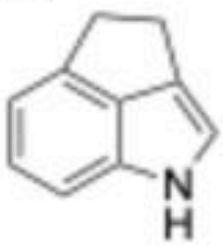
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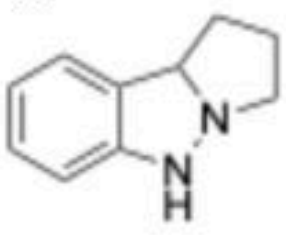
2.



3.



4.



Options :

9167102545. 1

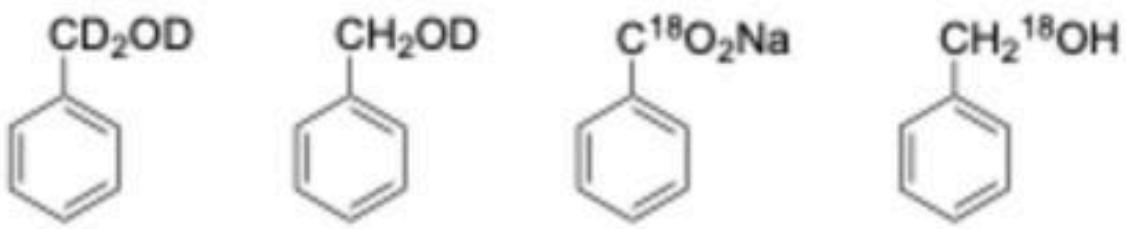
9167102546. 2

9167102547. 3

9167102548. 4

Question Number : 83 Question Id : 916710638 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The Cannizzaro reaction of benzaldehyde with NaOH was carried out independently in i) D_2O and ii) $H_2{}^{18}O$. The major isotopically labelled products obtained in these reactions are



1. **A**, **B**, **D** only
2. **B**, **C**, **D** only
3. **A**, **D** only
4. **B**, **C** only

Options :

9167102549. 1

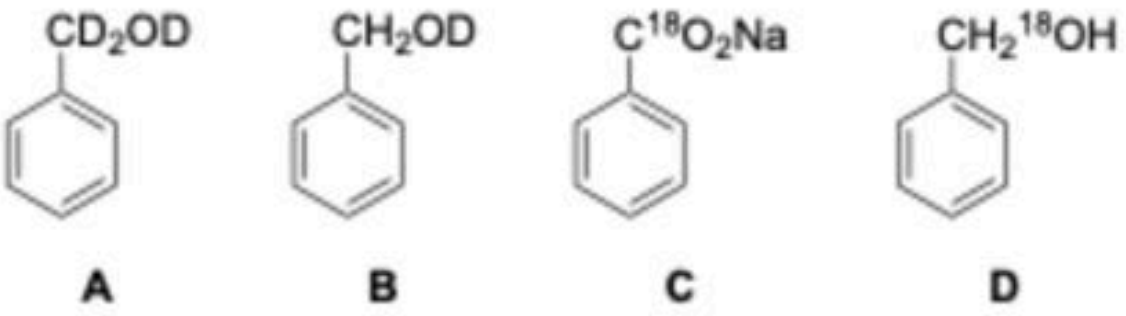
9167102550. 2

9167102551. 3

9167102552. 4

Question Number : 83 Question Id : 916710638 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

बेन्जेल्डिहाइड की NaOH के साथ केनिज़ारों अभिक्रिया स्वतंत्र रूप से i) D_2O तथा ii) $H_2{}^{18}O$ में की गई। इन अभिक्रियाओं में प्राप्त मुख्य समस्थानिक चिन्हित उत्पाद हैं



1. केवल **A**, **B**, **D**
2. केवल **B**, **C**, **D**
3. केवल **A**, **D**
4. केवल **B**, **C**

Options :

9167102549. 1

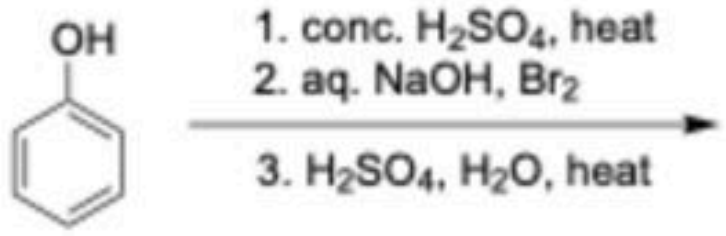
9167102550. 2

9167102551. 3

9167102552. 4

Question Number : 84 Question Id : 916710639 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

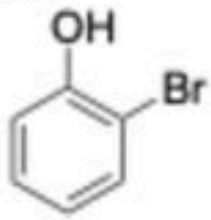
The major product formed in the following reaction sequence is



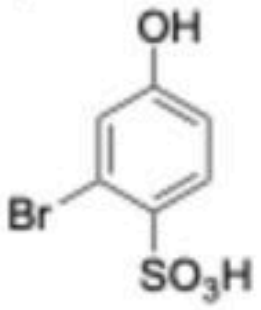
1.



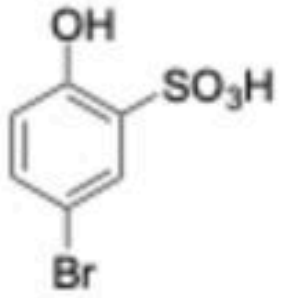
2.



3.



4.



Options :

9167102553. 1

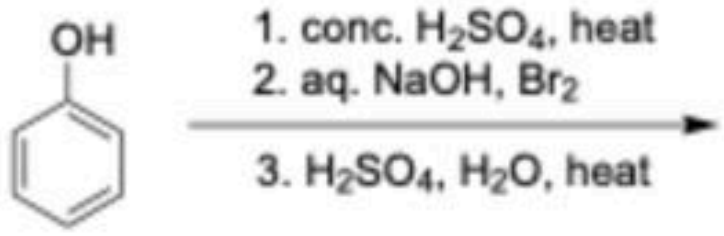
9167102554. 2

9167102555. 3

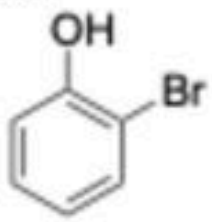
9167102556. 4

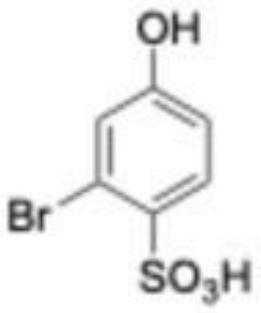
Question Number : 84 Question Id : 916710639 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

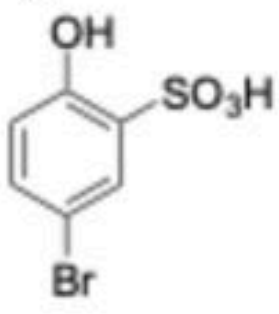
निम्नलिखित अभिक्रिया क्रम में विरचित मुख्य उत्पाद है



1.


2.


3.


4.


Options :

9167102553. 1

9167102554. 2

9167102555. 3

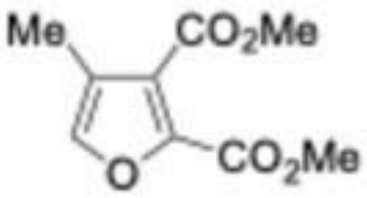
9167102556. 4

Question Number : 85 Question Id : 916710640 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

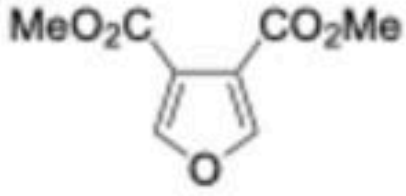
The major product formed in the following reaction is



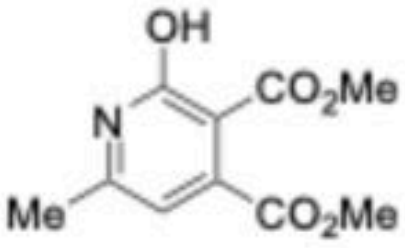
1.



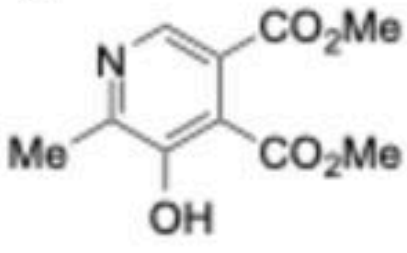
2.



3.



4.



Options :

9167102557. 1

9167102558. 2

9167102559. 3

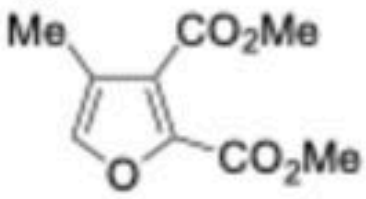
9167102560. 4

Question Number : 85 Question Id : 916710640 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

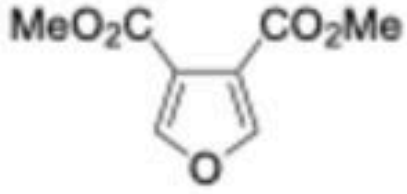
निम्नलिखित अभिक्रिया में विरचित मुख्य उत्पाद है



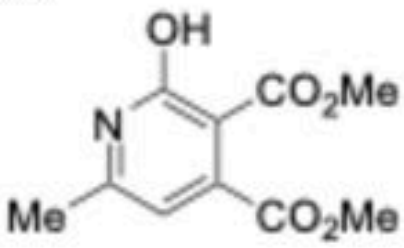
1.



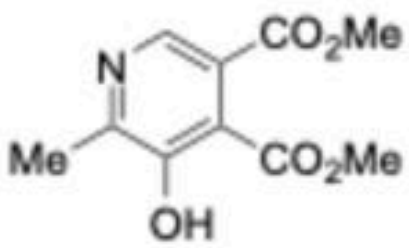
2.



3.



4.



Options :

9167102557. 1

9167102558. 2

9167102559. 3

9167102560. 4

Question Number : 86 Question Id : 916710641 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The ^{1}H NMR of mixture of ethyl iodide and bromoform gives three signals at δ 6.80, 3.20 and 1.85 ppm with integration of 1, 3, 4.5, respectively. The molar ratio of ethyl iodide and bromoform is

1. 3 : 1
2. 1.5 : 1
3. 1 : 3
4. 1 : 1.5

Options :

9167102561. 1

9167102562. 2

9167102563. 3

9167102564. 4

Question Number : 86 Question Id : 916710641 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

ऐथिल आयोडाइड तथा ब्रोमोफॉर्म के मिश्रण का ^{1}H NMR क्रमशः, 1, 3, 4.5, समाकलन के साथ δ 6.80, 3.20 तथा 1.85 ppm पर तीन सिगनल देता है। ऐथिल आयोडाइड तथा ब्रोमोफॉर्म का मोलर अनुपात है

1. 3 : 1
2. 1.5 : 1
3. 1 : 3
4. 1 : 1.5

Options :

9167102561. 1

9167102562. 2

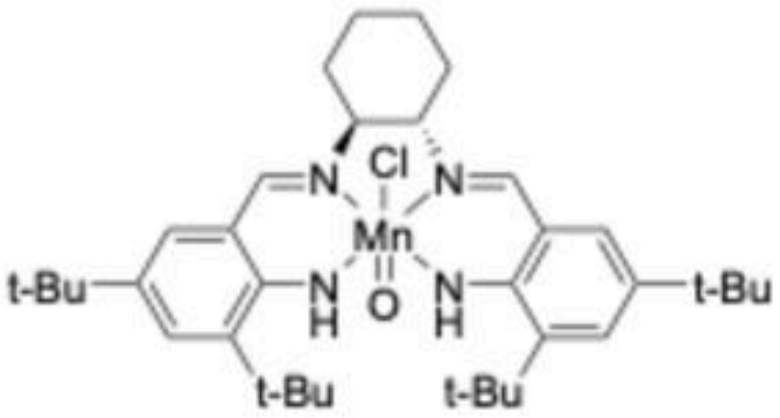
9167102563. 3

9167102564. 4

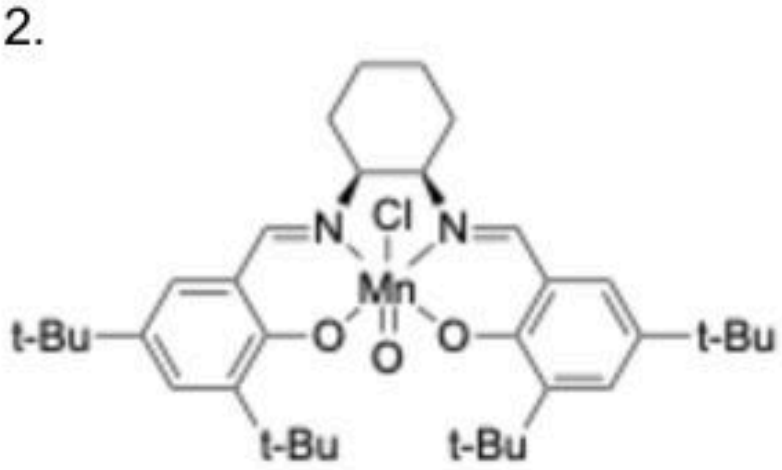
Question Number : 87 Question Id : 916710642 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The structure of active catalyst involved in Jacobsen asymmetric epoxidation is

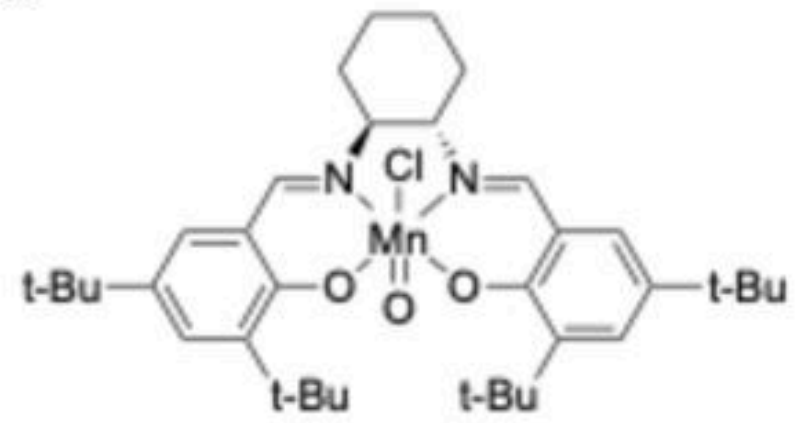
1.



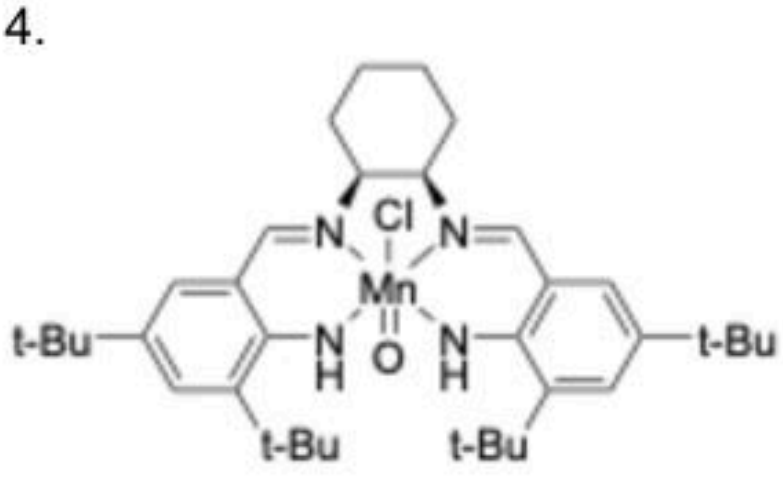
2.



3.



4.



Options :

9167102565. 1

9167102566. 2

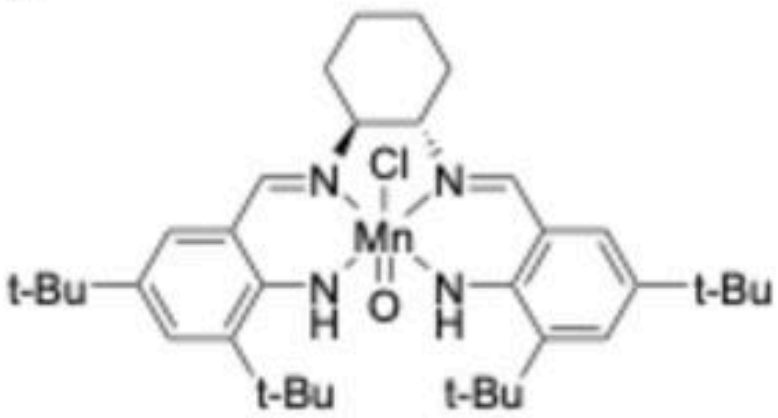
9167102567. 3

9167102568. 4

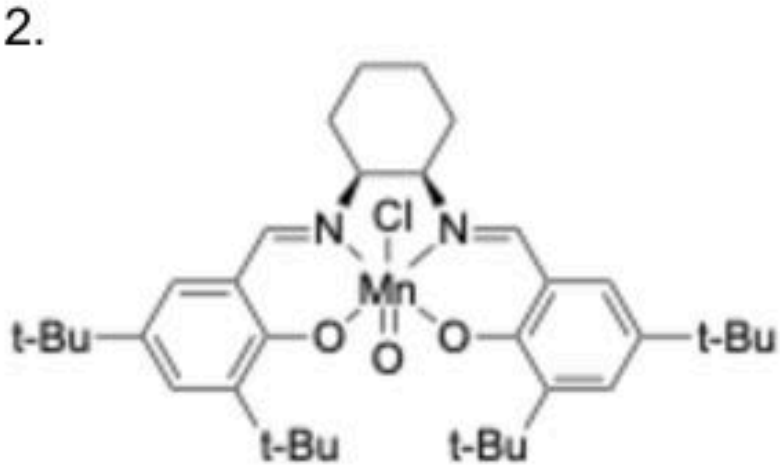
Question Number : 87 Question Id : 916710642 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

जैकबसन असममित इपॉक्सीकारण में सम्मिलित सक्रिय उत्प्रेरक की संरचना है

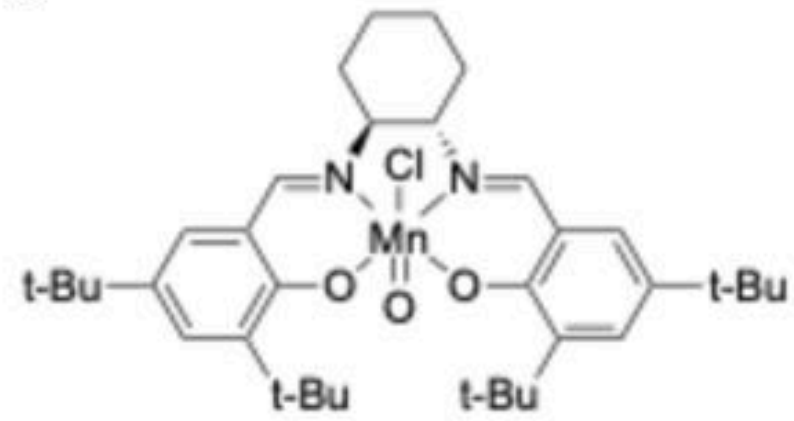
1.



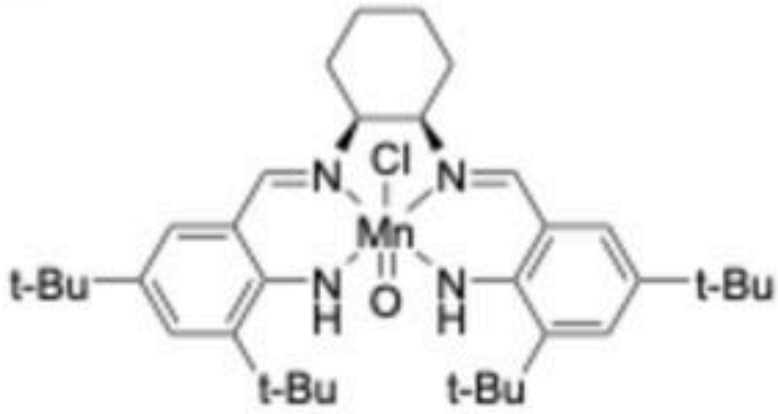
2.



3.



4.



Options :

9167102565. 1

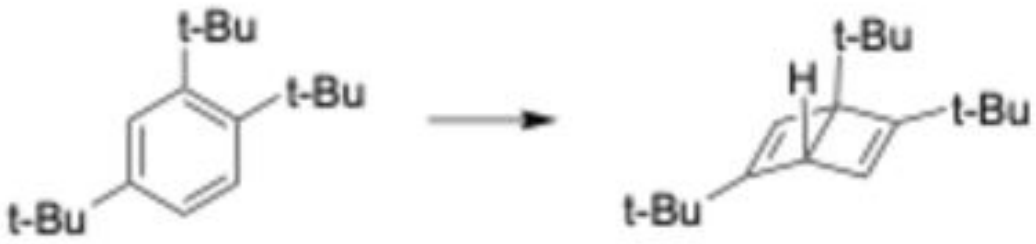
9167102566. 2

9167102567. 3

9167102568. 4

Question Number : 88 Question Id : 916710643 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The following electrocyclic ring closing reaction is



A. 4 e^- conrotatory ring closure
B. 4 e^- disrotatory ring closure
C. allowed under thermal conditions
D. allowed under photochemical conditions

1. A and C
2. A and D
3. B and C
4. B and D

Options :

9167102569. 1

9167102570. 2

9167102571. 3

9167102572. 4

Question Number : 88 Question Id : 916710643 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित इलेक्ट्रोसाइक्लिक वलय संवरण अभिक्रिया है



A. $4\ e^-$ समघूर्णनी वलय संवरण

B. $4\ e^-$ विषमघूर्णनी वलय संवरण

C. तापीय दशाओं पर अनुमत

D. प्रकाशरासायनिक दशाओं पर अनुमत

1. A तथा C
2. A तथा D
3. B तथा C
4. B तथा D

Options :

9167102569. 1

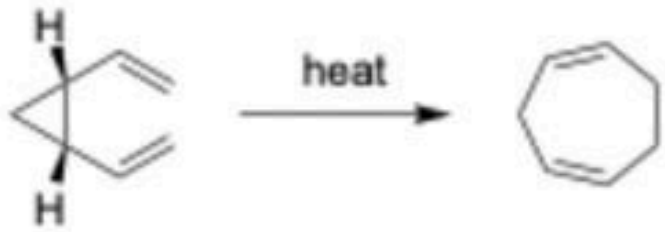
9167102570. 2

9167102571. 3

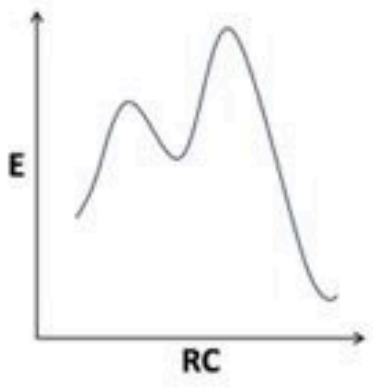
9167102572. 4

Question Number : 89 Question Id : 916710644 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

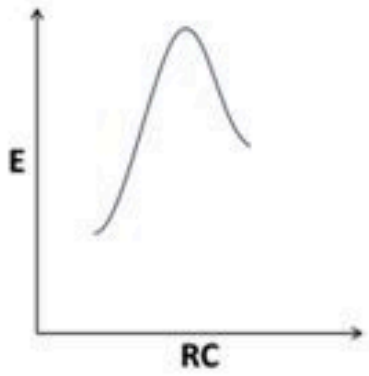
The energy profile diagram that corresponds to the following reaction is



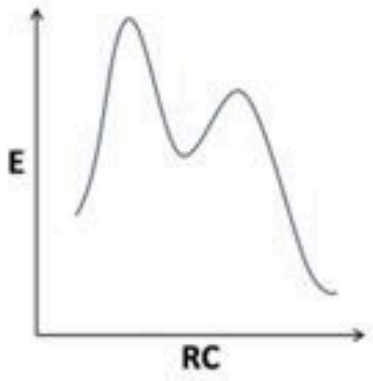
1.



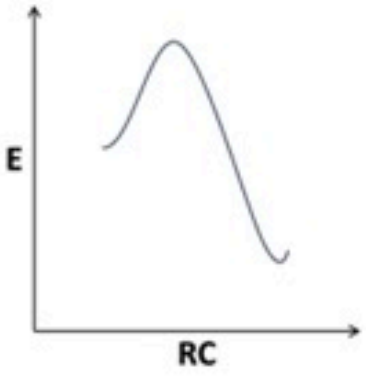
2.



3.



4.



Options :

9167102573. 1

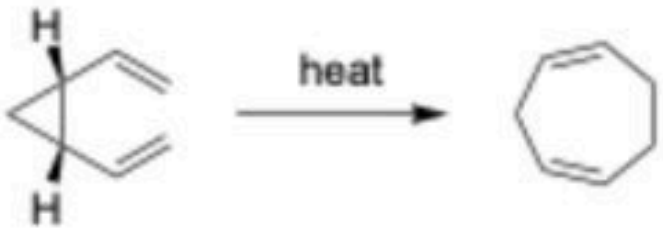
9167102574. 2

9167102575. 3

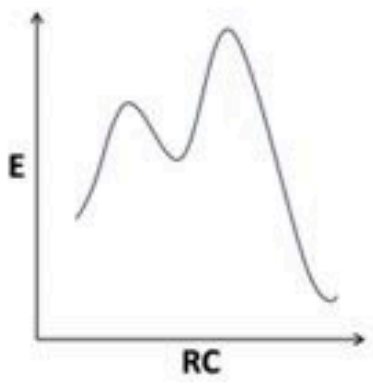
9167102576. 4

Question Number : 89 Question Id : 916710644 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

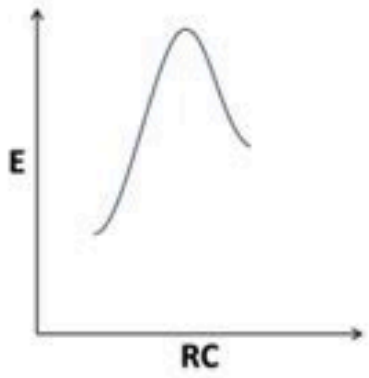
जो ऊर्जा प्रोफाइल आरेख निम्नलिखित अभिक्रिया के संगत है, वह है



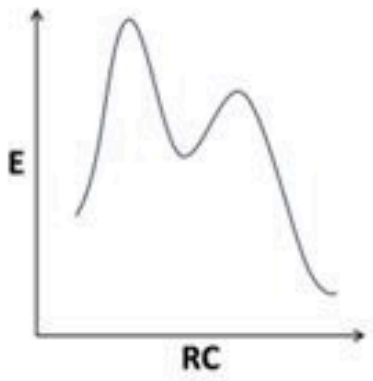
1.



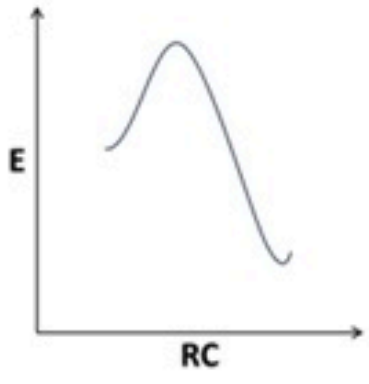
2.



3.



4.



Options :

9167102573. 1

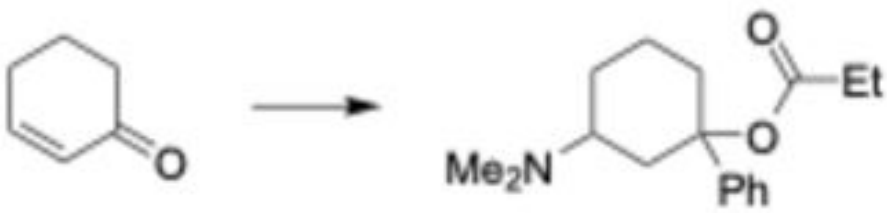
9167102574. 2

9167102575. 3

9167102576. 4

Question Number : 90 Question Id : 916710645 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct sequence of reagents to effect the following transformation is



1. Me_2NH/Et_2O; PhLi; $(EtCO)_2O$/pyridine
2. PhLi; $(EtCO)_2O$/pyridine; Me_2NH/Et_2O
3. Me_2NH/Et_2O; PhLi; $(EtCO)_2O$/pyridine
4. Me_2NH/Et_2O; $(EtCO)_2O$/pyridine; PhLi

Options :

9167102577. 1

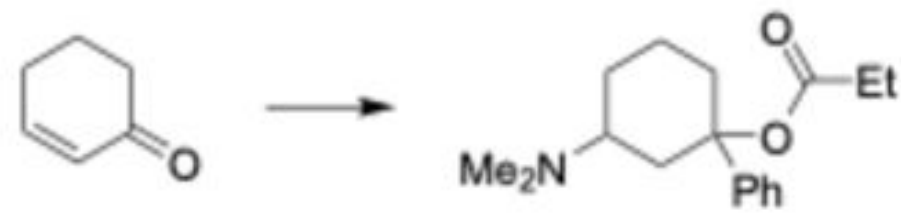
9167102578. 2

9167102579. 3

9167102580. 4

Question Number : 90 Question Id : 916710645 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित रूपांतरण को प्रभावी करने वाले अभिकर्मकों का सही क्रम है



1. PhLi; Me_2NH/Et_2O; $(EtCO)_2O$/पिरिडीन
2. PhLi; $(EtCO)_2O$/पिरिडीन; Me_2NH/Et_2O
3. Me_2NH/Et_2O; PhLi; $(EtCO)_2O$/पिरिडीन
4. Me_2NH/Et_2O; $(EtCO)_2O$/पिरिडीन; PhLi

Options :

9167102577. 1

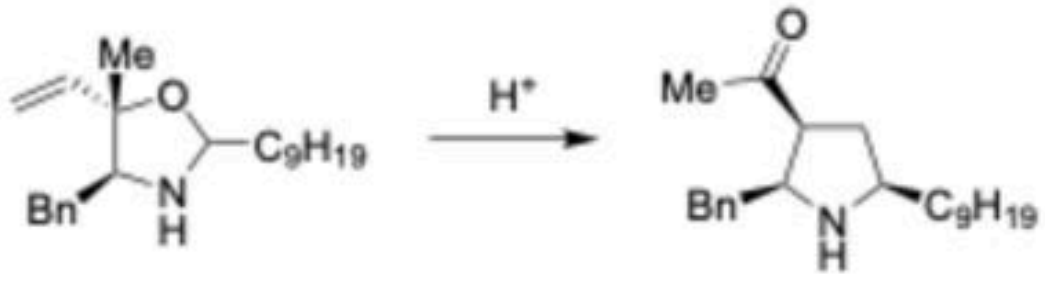
9167102578. 2

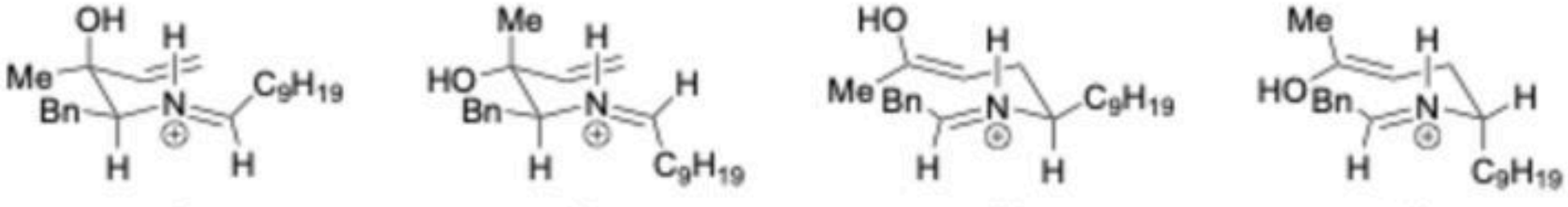
9167102579. 3

9167102580. 4

Question Number : 91 Question Id : 916710646 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The intermediates involved in the following reaction are





1. **I** and **IV**
2. **II** and **III**
3. **I** and **III**
4. **II** and **IV**

Options :

9167102581. 1

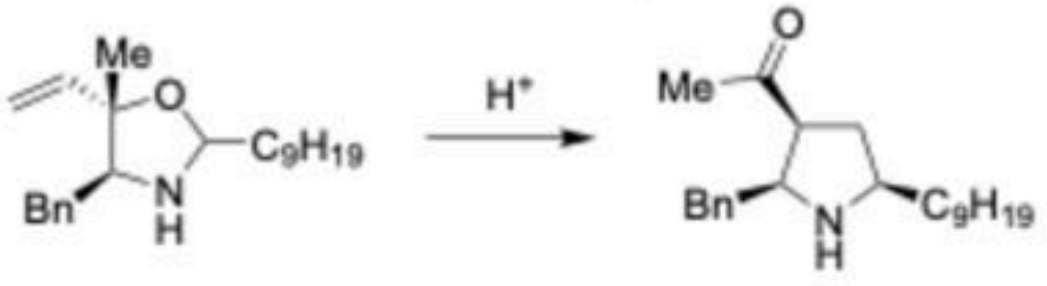
9167102582. 2

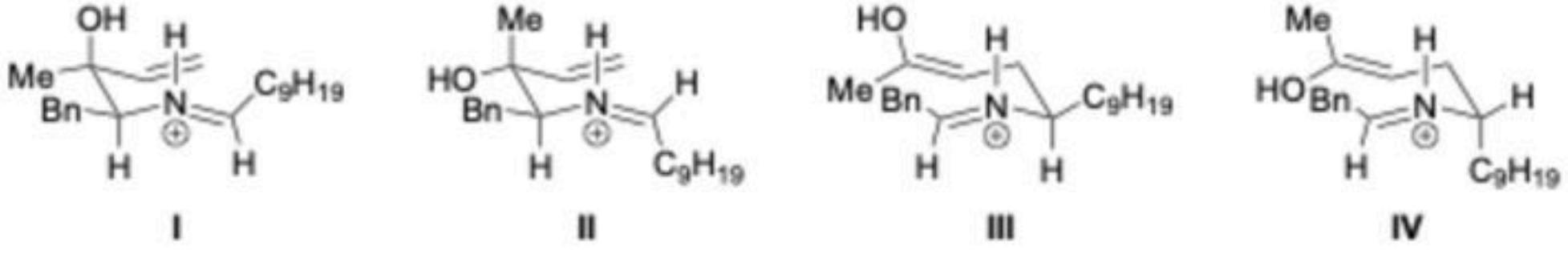
9167102583. 3

9167102584. 4

Question Number : 91 Question Id : 916710646 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित अभिक्रिया में सम्मिलित मध्यवर्ती हैं





1. I तथा IV
2. II तथा III
3. I तथा III
4. II तथा IV

Options :

9167102581. 1

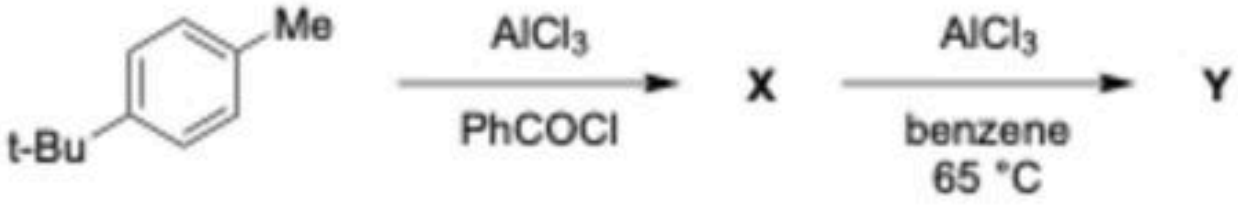
9167102582. 2

9167102583. 3

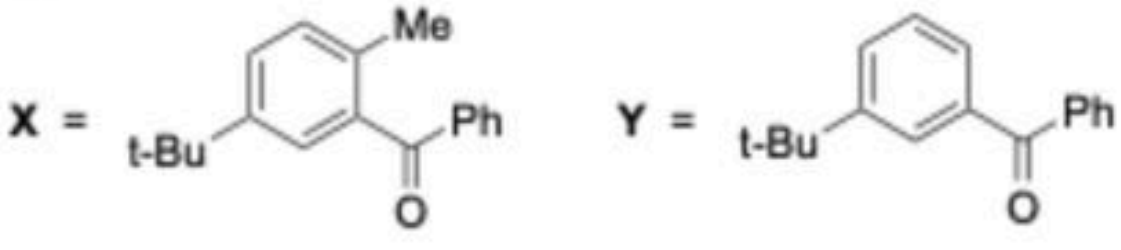
9167102584. 4

Question Number : 92 Question Id : 916710647 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

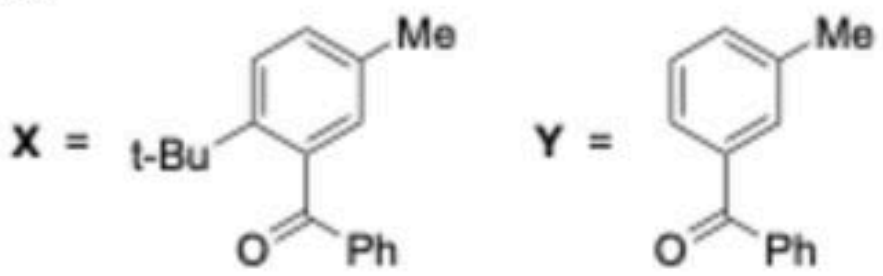
The major products **X** and **Y** formed in the following reaction sequence are



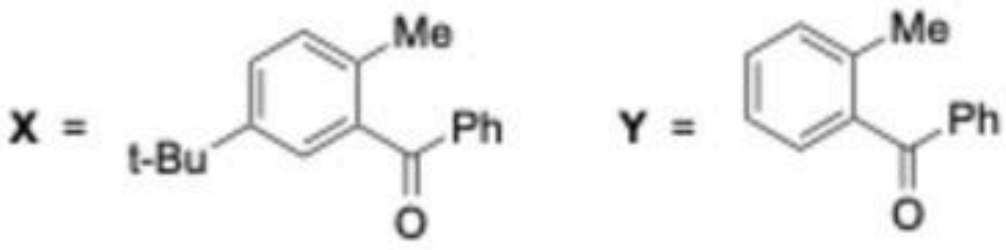
1.



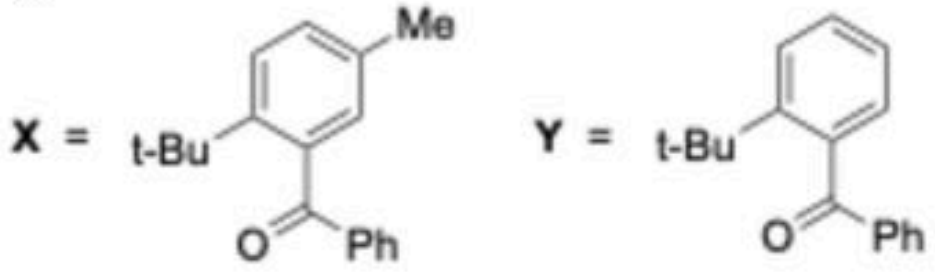
2.



3.



4.



Options :

9167102585. 1

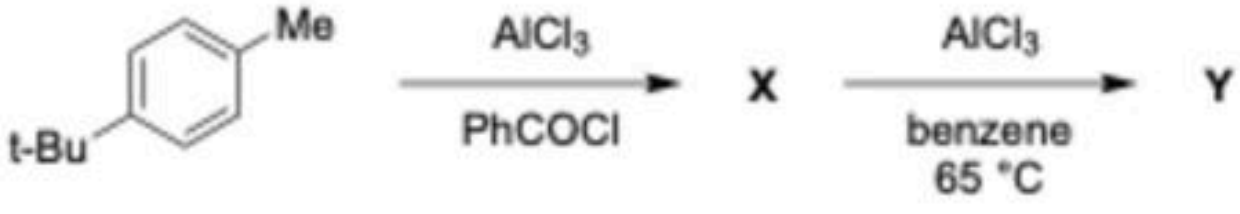
9167102586. 2

9167102587. 3

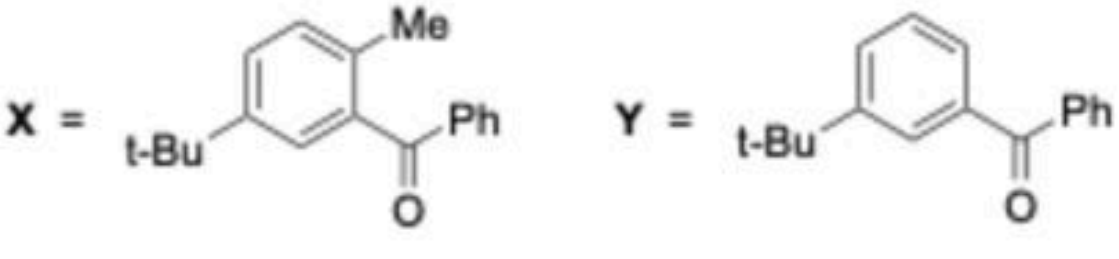
9167102588. 4

Question Number : 92 Question Id : 916710647 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

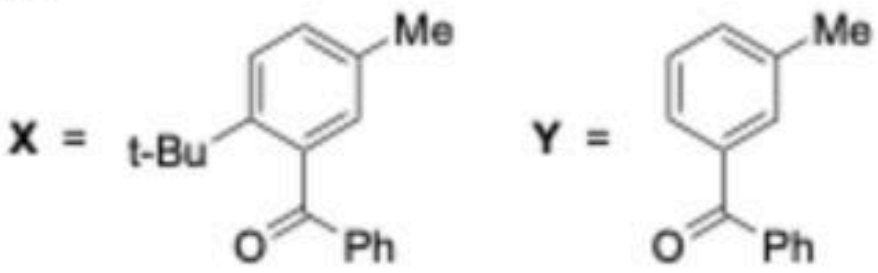
निम्नलिखित अभिक्रिया क्रम में विरचित मुख्य उत्पाद **X** तथा **Y** हैं



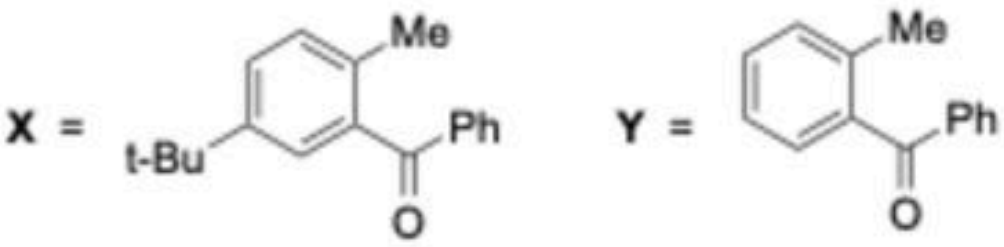
1.



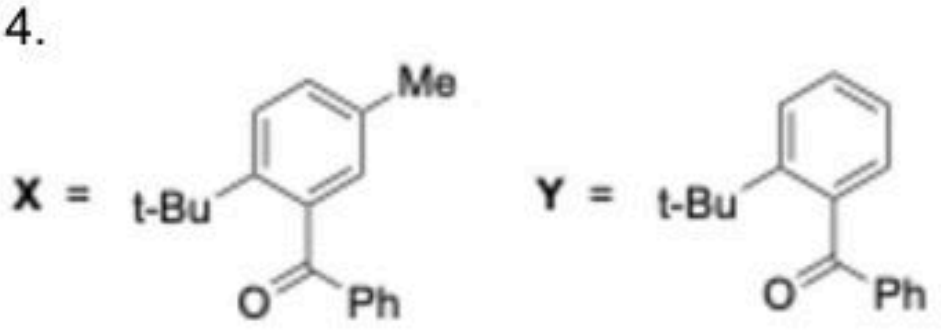
2.



3.



4.



Options :

9167102585. 1

9167102586. 2

9167102587. 3

9167102588. 4

Question Number : 93 Question Id : 916710648 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct reagent to effect the following reaction is



1. TBAF
2. $Pd/C, H_2$
3. PTSA, MeOH
4. $Hg(ClO_4)_2, CaCO_3$

Options :

9167102589. 1

9167102590. 2

9167102591. 3

9167102592. 4

Question Number : 93 Question Id : 916710648 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित अभिक्रिया को प्रभावी करने वाला सही अभिकर्मक है



1. TBAF
2. $Pd/C, H_2$
3. PTSA, MeOH
4. $Hg(ClO_4)_2, CaCO_3$

Options :

9167102589. 1

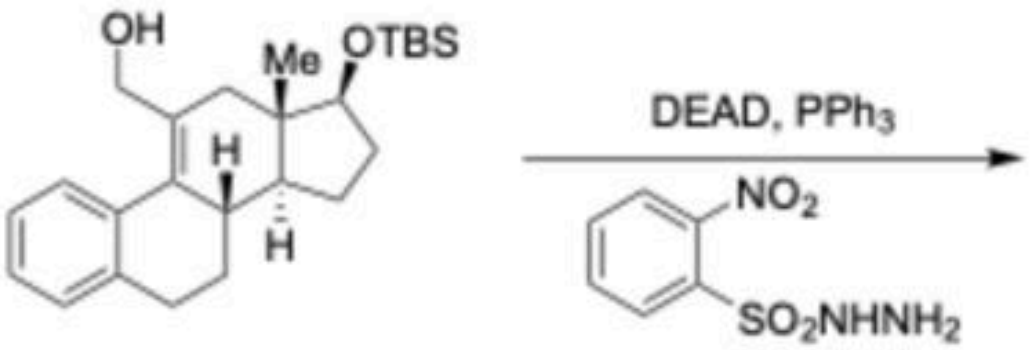
9167102590. 2

9167102591. 3

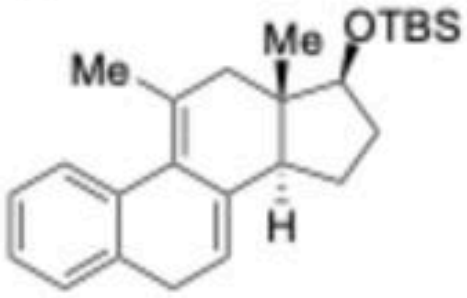
9167102592. 4

Question Number : 94 Question Id : 916710649 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

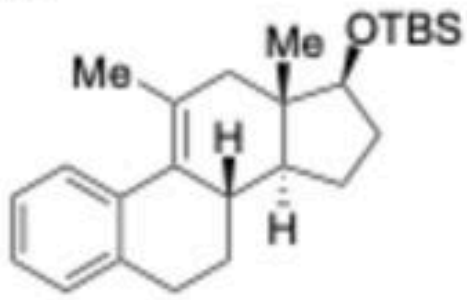
The major product formed in the following reaction is



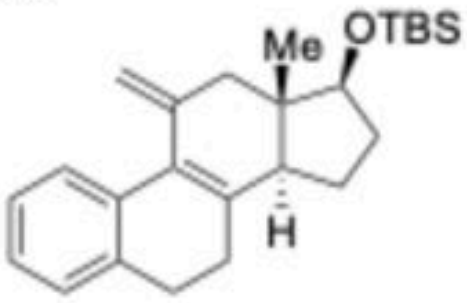
1.



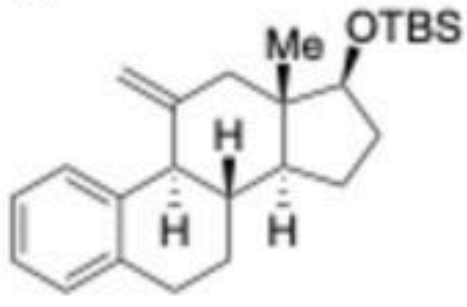
2.



3.



4.



Options :

9167102593. 1

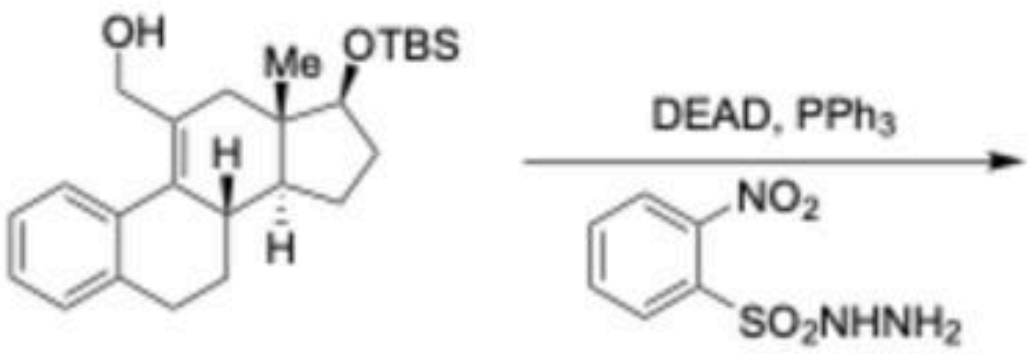
9167102594. 2

9167102595. 3

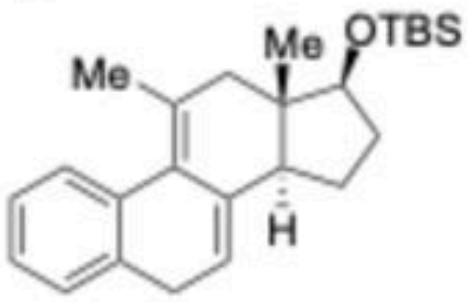
9167102596. 4

Question Number : 94 Question Id : 916710649 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

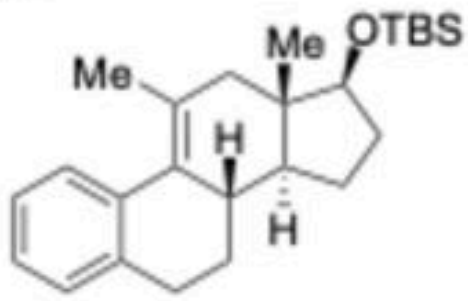
निम्नलिखित अभिक्रिया में विरचित मुख्य उत्पाद है



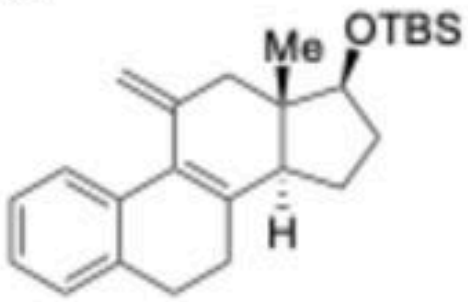
1.



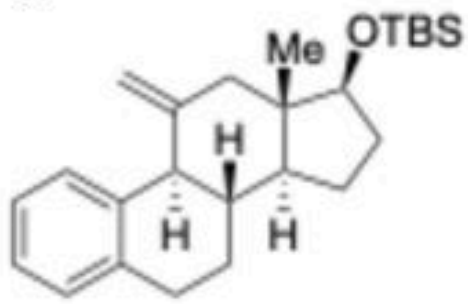
2.



3.



4.



Options :

9167102593. 1

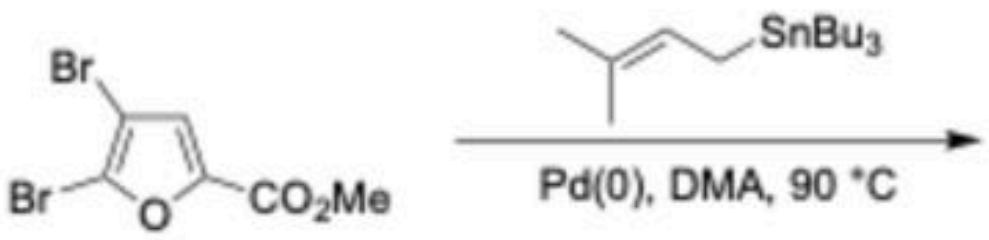
9167102594. 2

9167102595. 3

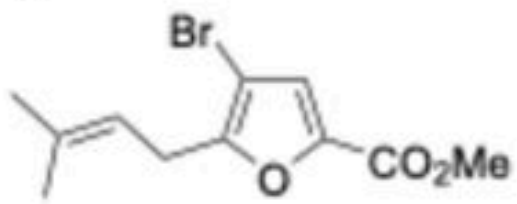
9167102596. 4

Question Number : 95 Question Id : 916710650 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

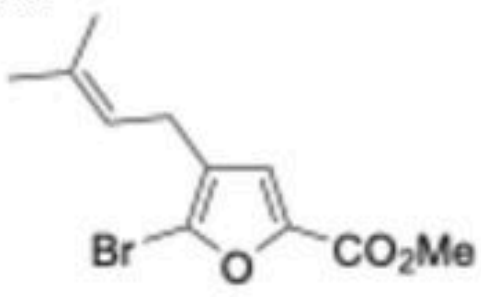
The major product formed in the following reaction is



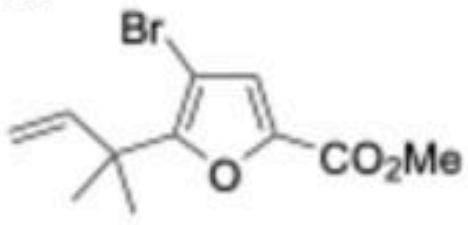
1.



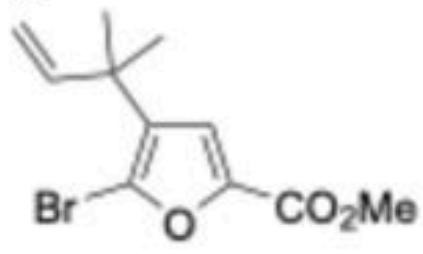
2.



3.



4.



Options :

9167102597. 1

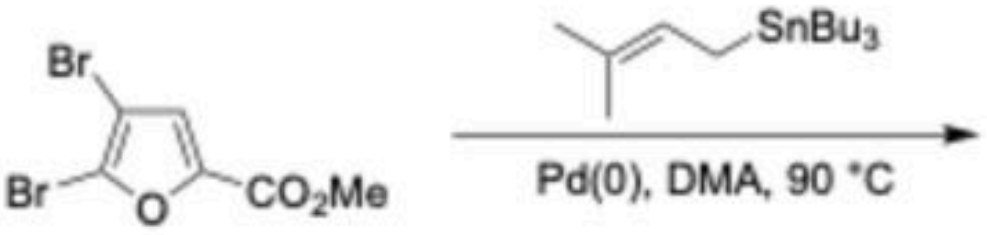
9167102598. 2

9167102599. 3

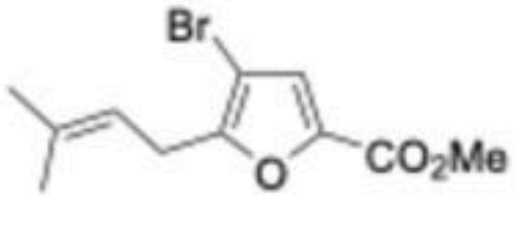
9167102600. 4

Question Number : 95 Question Id : 916710650 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

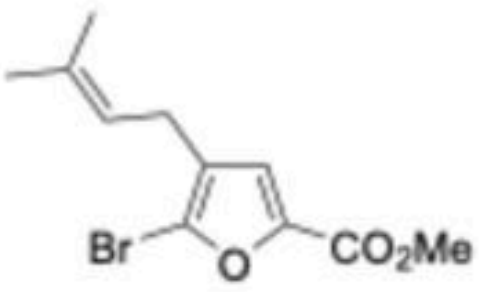
निम्नलिखित अभिक्रिया में विरचित मुख्य उत्पाद है



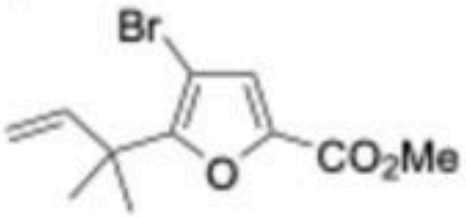
1.



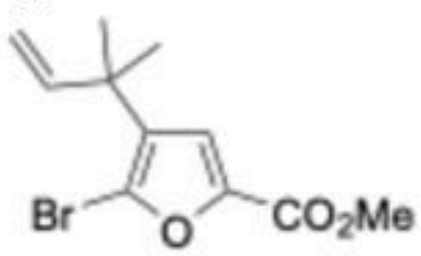
2.



3.



4.



Options :

9167102597. 1

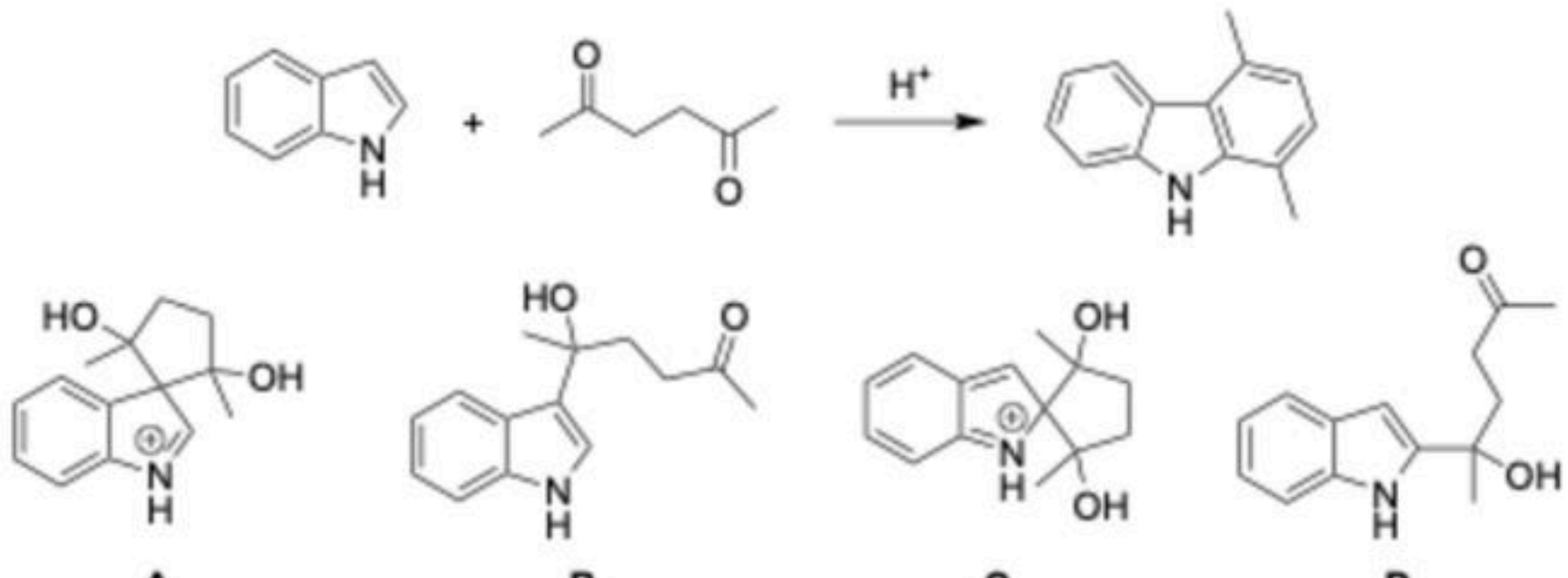
9167102598. 2

9167102599. 3

9167102600. 4

Question Number : 96 Question Id : 916710651 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The intermediates involved in the following transformation are



1. **A** and **B**
2. **C** and **D**
3. **B** and **D**
4. **A** and **C**

Options :

9167102601. 1

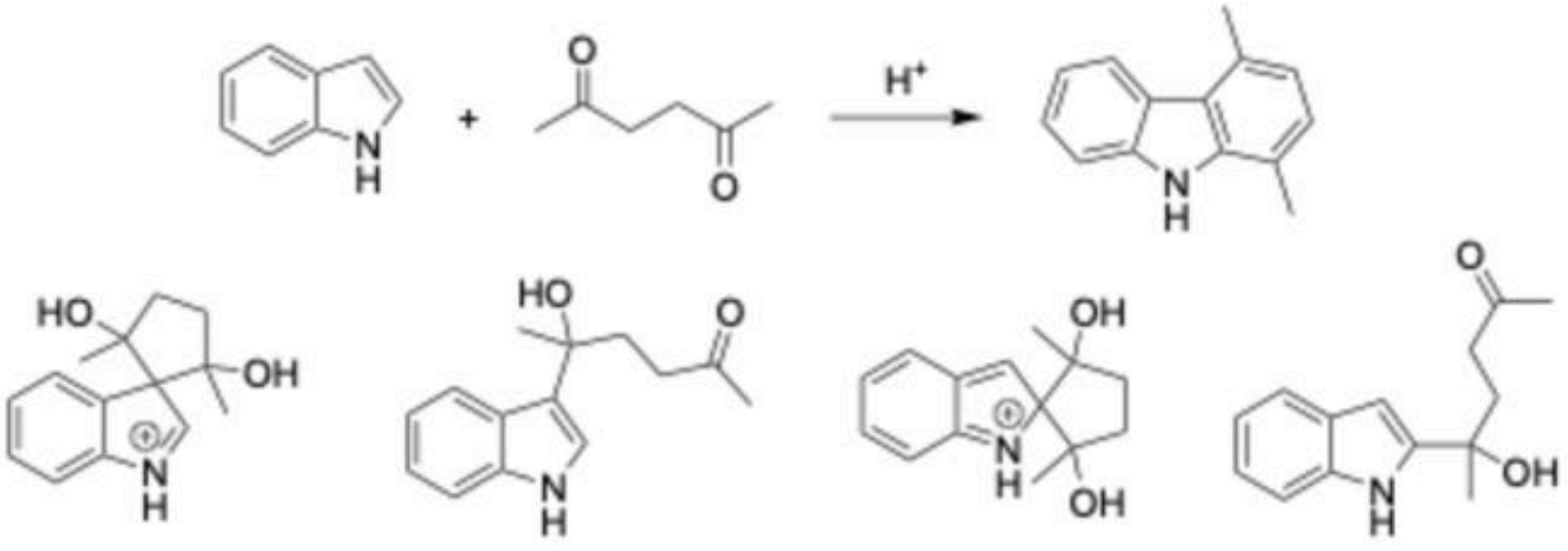
9167102602. 2

9167102603. 3

9167102604. 4

Question Number : 96 Question Id : 916710651 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित रूपांतरण में सम्मिलित मध्यवर्ती हैं



A B C D

1. **A** तथा **B**
2. **C** तथा **D**
3. **B** तथा **D**
4. **A** तथा **C**

Options :

9167102601. 1

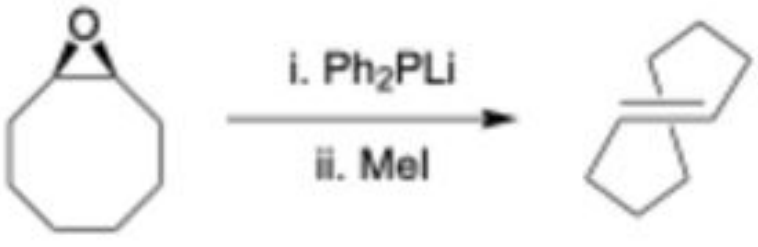
9167102602. 2

9167102603. 3

9167102604. 4

Question Number : 97 Question Id : 916710652 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In the following reaction, formation of the alkene occurs through



1. a *cis* intermediate undergoing an *anti*-elimination
2. a *trans* intermediate undergoing an *anti*-elimination
3. a *cis* intermediate undergoing a *syn*-elimination
4. a *trans* intermediate undergoing a *syn*-elimination

Options :

9167102605. 1

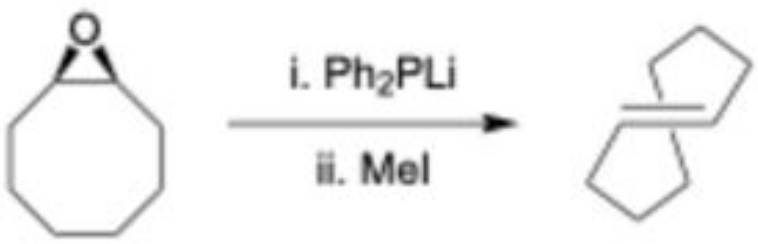
9167102606. 2

9167102607. 3

9167102608. 4

Question Number : 97 Question Id : 916710652 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित अभिक्रिया में, ऐल्कीन का विरचन जिससे होता है, वह है



1. एक समपक्ष (*cis*) मध्यवर्ती के प्रति-विलोपन से गुजरकर
2. एक विपक्ष (*trans*) मध्यवर्ती के प्रति-विलोपन से गुजरकर
3. एक समपक्ष (*cis*) मध्यवर्ती के सम-विलोपन से गुजरकर
4. एक विपक्ष (*trans*) मध्यवर्ती के सम-विलोपन से गुजरकर

Options :

9167102605. 1

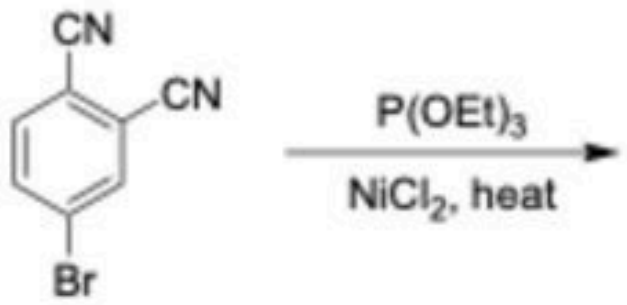
9167102606. 2

9167102607. 3

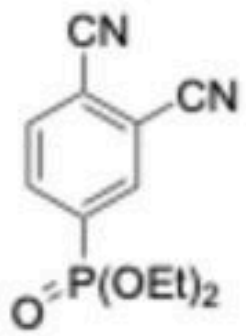
9167102608. 4

Question Number : 98 Question Id : 916710653 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

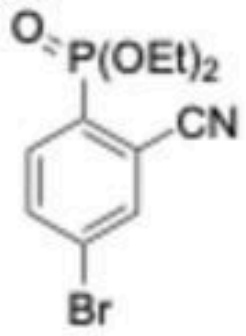
The major product formed in the following reaction is



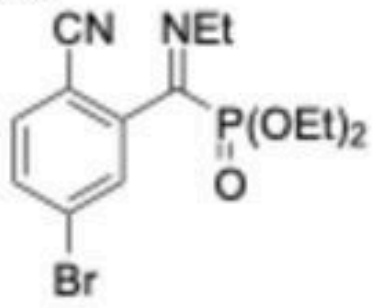
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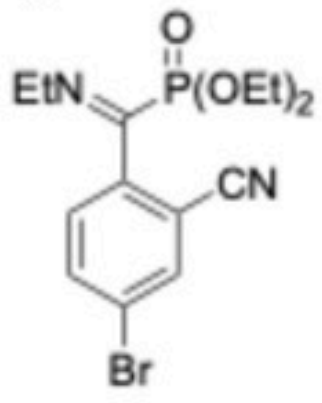
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3.



4.



Options :

9167102609. 1

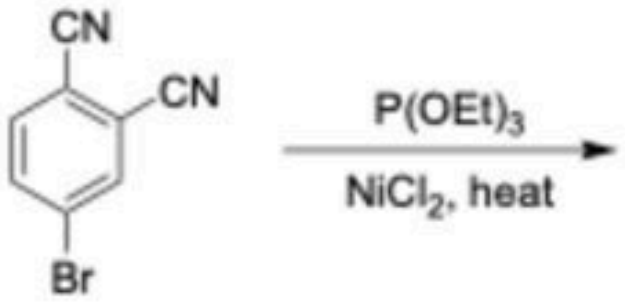
9167102610. 2

9167102611. 3

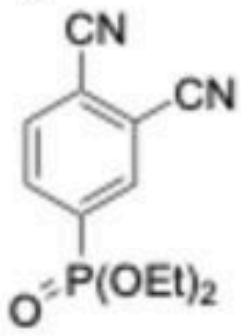
9167102612. 4

Question Number : 98 Question Id : 916710653 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

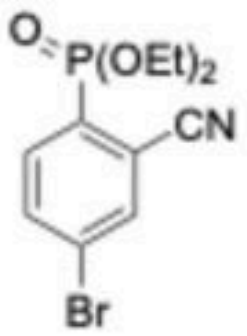
निम्नलिखित अभिक्रिया में विरचित मुख्य उत्पाद है



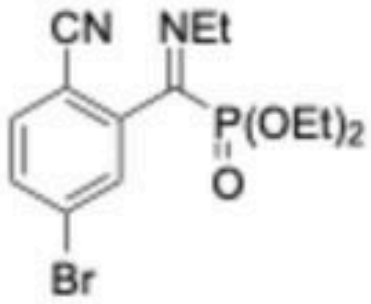
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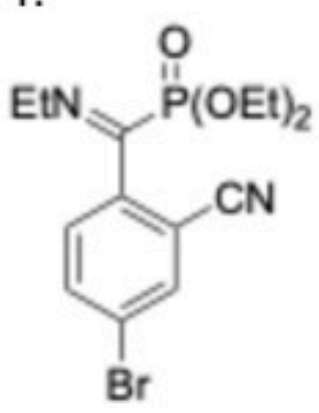
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3.



4.



Options :

9167102609. 1

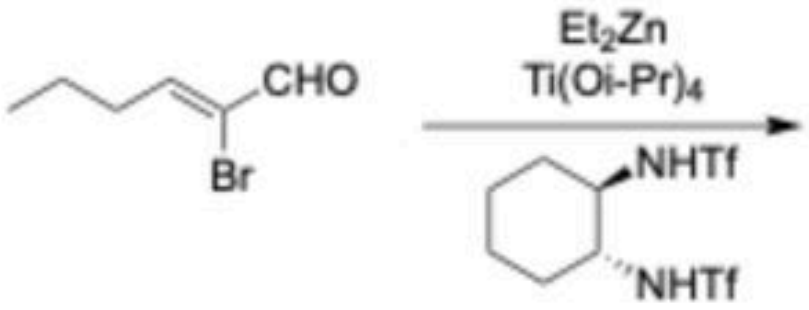
9167102610. 2

9167102611. 3

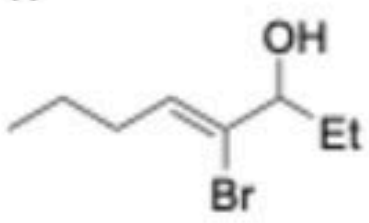
9167102612. 4

Question Number : 99 Question Id : 916710654 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

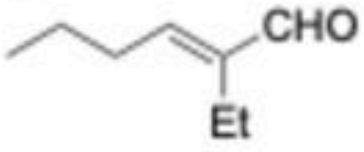
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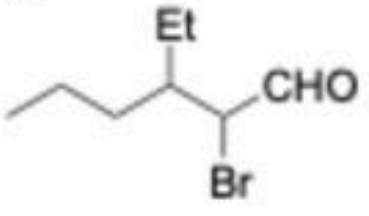
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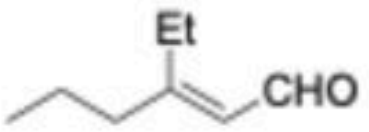
2.



3.



4.



Options :

9167102613. 1

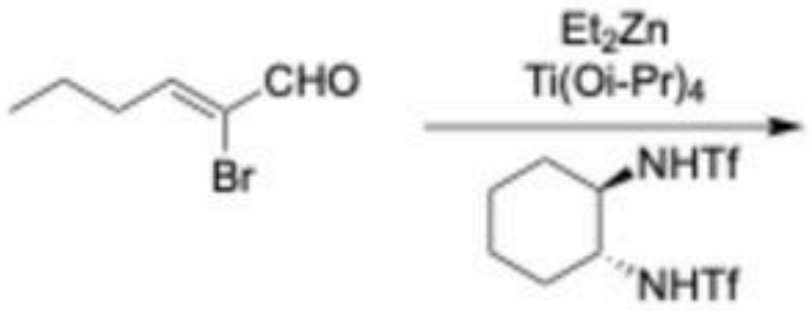
9167102614. 2

9167102615. 3

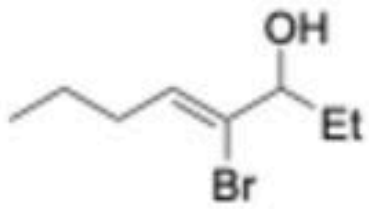
9167102616. 4

Question Number : 99 Question Id : 916710654 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

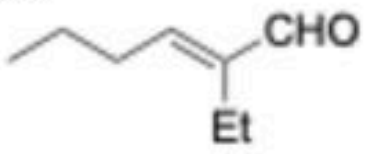
निम्नलिखित अभिक्रिया में विरचित मुख्य उत्पाद है



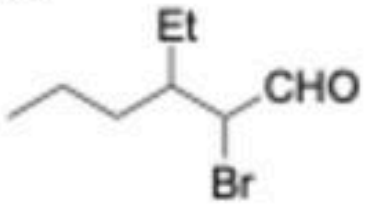
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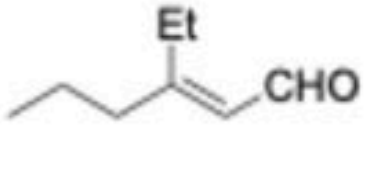
2.



3.



4.



Options :

9167102613. 1

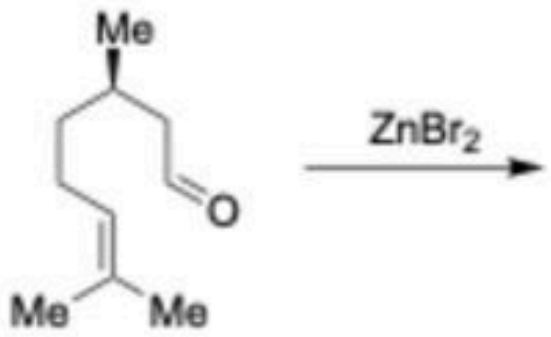
9167102614. 2

9167102615. 3

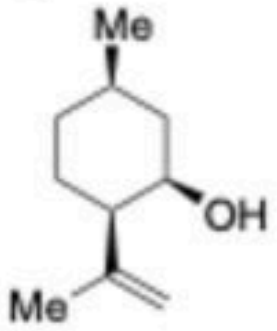
9167102616. 4

Question Number : 100 Question Id : 916710655 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

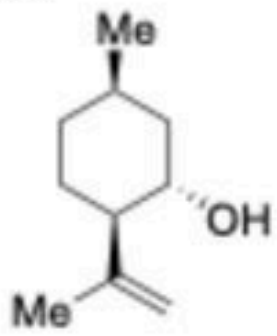
The major product formed in the following reaction is



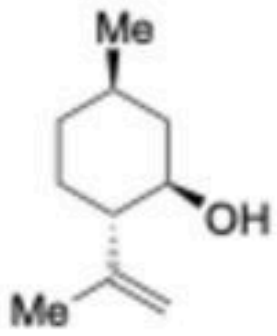
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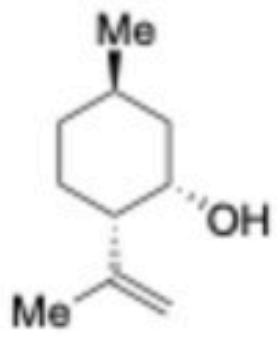
2.



3.



4.



Options :

9167102617. 1

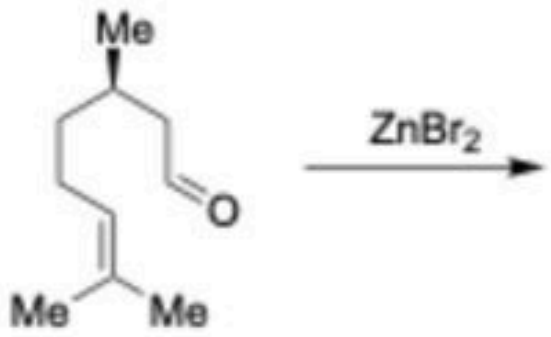
9167102618. 2

9167102619. 3

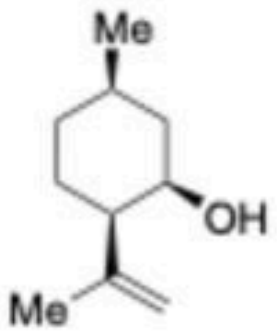
9167102620. 4

Question Number : 100 Question Id : 916710655 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

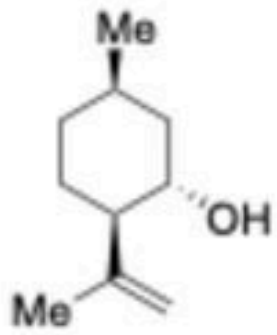
निम्नलिखित अभिक्रिया में विरचित मुख्य उत्पाद है



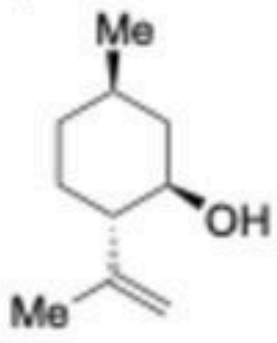
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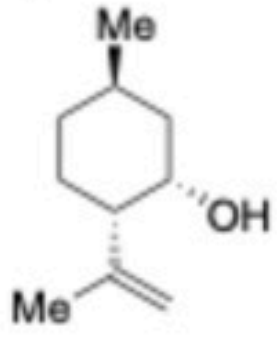
2.



3.



4.



Options :

9167102617. 1

9167102618. 2

9167102619. 3

9167102620. 4

Question Number : 101 Question Id : 916710656 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The energy (in units of $\frac{h^2}{8mL^2}$) of the ground state of a system of six noninteracting electrons, confined in a 3-dimensional box with lengths L, $L/2$ and $L/4$, is

1. 74
2. 126
3. 156
4. 148

Options :

9167102621. 1

9167102622. 2

9167102623. 3

9167102624. 4

Question Number : 101 Question Id : 916710656 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

लंबाई $L, L/2$ तथा $L/4$, के 3-विमीय बॉक्स में सीमित, छः अन्योन्यक्रियाहिन इलेक्ट्रॉनों के किसी निकाय के निम्नतम अवस्था की ऊर्जा ($\frac{h^2}{8mL^2}$ की इकाइयों में), है

1. 74
2. 126
3. 156
4. 148

Options :

9167102621. 1

9167102622. 2

9167102623. 3

9167102624. 4

Question Number : 102 Question Id : 916710657 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The Hamiltonian of a two-dimensional quantum harmonic oscillator is

$$H = \frac{p_x^2}{2m} + \frac{p_y^2}{2m} + \frac{1}{2}m\omega^2 x^2 + 2m\omega^2 y^2,$$

where m and ω are positive constants. The degeneracy of the level with energy $E = \frac{25}{2}\hbar\omega$ is

1. 5
2. 6
3. 7
4. 8

Options :

9167102625. 1

9167102626. 2

9167102627. 3

9167102628. 4

Question Number : 102 Question Id : 916710657 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

किसी द्वि-विमीय क्वांटम आवर्ती दोलक का हैमिल्टनी

$$H = \frac{p_x^2}{2m} + \frac{p_y^2}{2m} + \frac{1}{2}m\omega^2 x^2 + 2m\omega^2 y^2, \text{ है}$$

जहां m तथा ω धनात्मक स्थिरांक हैं। ऊर्जा स्तर $E = \frac{25}{2}\hbar\omega$ की अपभ्रष्टता है

1. 5
2. 6
3. 7
4. 8

Options :

9167102625. 1

9167102626. 2

9167102627. 3

9167102628. 4

Question Number : 103 Question Id : 916710658 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Given the trial wavefunction $\phi(x) = ae^{-\alpha x^2} + be^{-\beta|x|}$ for the system having potential $V(x) = \frac{1}{2}m\omega^2 x^2$, the variationally optimized ground-state energy of the system is obtained with the parameters

1. $a = 1,\ b = 0$
2. $a = 1/\sqrt{2},\ b = 1/\sqrt{2}$
3. $a = 0,\ b = 1$
4. $a = 1,\ b = 1$

Options :

9167102629. 1

9167102630. 2

9167102631. 3

9167102632. 4

Question Number : 103 Question Id : 916710658 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

विभव $V(x) = \frac{1}{2}m\omega^2 x^2$ वाले निकाय के लिए परीक्षण तरंग फलन $\phi(x) = ae^{-\alpha x^2} + be^{-\beta|x|}$ दिया है, जिन प्राचलों से निकाय की विचरणी इष्टतमीकृत निम्नतम-अवस्था ऊर्जा प्राप्त करते है, वह हैं

1. $a = 1,\ b = 0$
2. $a = 1/\sqrt{2},\ b = 1/\sqrt{2}$
3. $a = 0,\ b = 1$
4. $a = 1,\ b = 1$

Options :

9167102629. 1

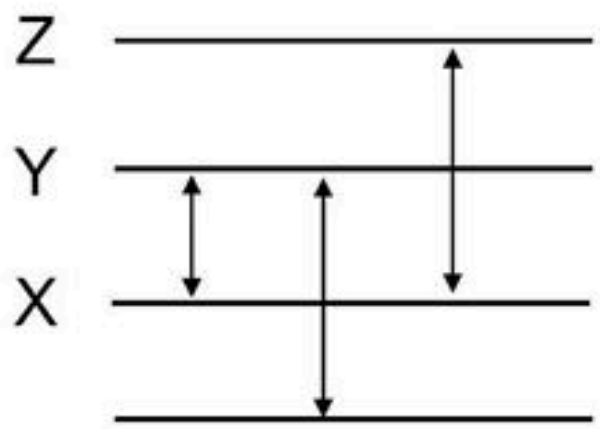
9167102630. 2

9167102631. 3

9167102632. 4

Question Number : 104 Question Id : 916710659 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The allowed electronic transitions among four different atomic energy levels are indicated in the diagram below.



Given that the lowest energy state is a ^3P state, a possible set of correct energy levels (X, Y and Z) is

1. $X=^3D_1$, $Y=^3P_1$ and $Z=^3D_2$
2. $X=^3P_1$, $Y=^3D_1$ and $Z=^3D_2$
3. $X=^3P_2$, $Y=^3D_1$ and $Z=^3P_1$
4. $X=^3P_1$, $Y=^3P_2$ and $Z=^3D_1$

Options :

9167102633. 1

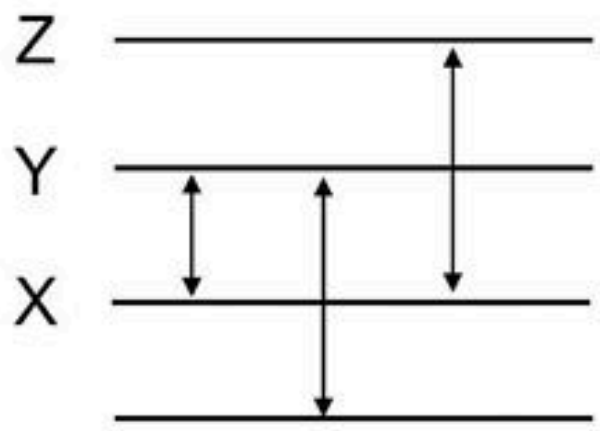
9167102634. 2

9167102635. 3

9167102636. 4

Question Number : 104 Question Id : 916710659 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्न आरेख में चार विभिन्न परमाण्विक ऊर्जा स्तरों के मध्य अनुमत इलेक्ट्रॉनिक संक्रमणों को इंगित किया है।



दिया गया है कि निम्नतम ऊर्जा अवस्था ^3P अवस्था है, सही ऊर्जा स्तरों (X, Y तथा Z) का संभावित समुच्चय है

1. $X=^3D_1$, $Y=^3P_1$ तथा $Z=^3D_2$
2. $X=^3P_1$, $Y=^3D_1$ तथा $Z=^3D_2$
3. $X=^3P_2$, $Y=^3D_1$ तथा $Z=^3P_1$
4. $X=^3P_1$, $Y=^3P_2$ तथा $Z=^3D_1$

Options :

9167102633. 1

9167102634. 2

9167102635. 3

9167102636. 4

Question Number : 105 Question Id : 916710660 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The energies, $E_{\pm}$ (in atomic units) of bonding (+) and antibonding (–) MOs of H_2^+, obtained by linear combination of 1s orbitals of H-atoms (utilizing variation principle), are

[$J = \langle 1s_A \left| -\frac{1}{r_B} \right| 1s_A \rangle + \frac{1}{R}$, $K = \langle 1s_A \left| -\frac{1}{r_A} \right| 1s_B \rangle + \frac{S}{R}$, $S = \langle 1s_A | 1s_B \rangle$, R is internuclear distance]

1. $-1 - J \pm K$
2. $-\frac{1}{2} - \frac{J \pm K}{1 \pm S}$
3. $-1 + \frac{J \pm K}{1 \pm S}$
4. $-\frac{1}{2} + \frac{J \pm K}{1 \pm S}$

Options :

9167102637. 1

9167102638. 2

9167102639. 3

9167102640. 4

Question Number : 105 Question Id : 916710660 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

H-परमाणुओं के 1s कक्षकों के रैखिक संयोजन से प्राप्त H_2^+ के आबंधित (+) तथा अनाबंधित(−) MOs की, विचरण सिद्धांत का प्रयोग से प्राप्त ऊर्जाएँ $E_{\pm}$(परमाण्विक इकाइयों में), हैं

[$J = \langle 1s_A \left| -\frac{1}{r_B} \right| 1s_A \rangle + \frac{1}{R}$, $K = \langle 1s_A \left| -\frac{1}{r_A} \right| 1s_B \rangle + \frac{S}{R}$, $S = \langle 1s_A | 1s_B \rangle$,
R अंतरानाभिक दूरी है]

1. $-1 - J \pm K$
2. $-\frac{1}{2} - \frac{J \pm K}{1 \pm S}$
3. $-1 + \frac{J \pm K}{1 \pm S}$
4. $-\frac{1}{2} + \frac{J \pm K}{1 \pm S}$

Options :

9167102637. 1

9167102638. 2

9167102639. 3

9167102640. 4

Question Number : 106 Question Id : 916710661 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A nonlinear polyatomic molecule belongs to D_{2d} point group. The character table of the point group is given below.

D_{2d}	E	$2S_4$	C_2	$2C_2'$	$2\sigma_d$
A_1	1	1	1	1	1
A_2	1	1	1	−1	−1
B_1	1	−1	1	1	−1
B_2	1	−1	1	−1	1
E	2	0	−2	0	0

The symmetry of one of the normal modes is E. The symmetry of the second excited state of this mode in terms of the irreducible representations of the point group of the molecule is

1. $2A_1+2B_2$
2. $2A_1+B_1+B_2$
3. $A_2+2B_1+B_2$
4. $A_1+A_2+B_1+B_2$

Options :

9167102641. 1

9167102642. 2

9167102643. 3

9167102644. 4

Question Number : 106 Question Id : 916710661 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

एक अरैखिक बहुपरमाण्विक अणु बिंदु समूह D_{2d} से संबंधित है। बिंदु समूह की अभिलक्षणिक सारणी निम्न दी है।

D_{2d}	E	$2S_4$	C_2	$2C_2'$	$2\sigma_d$
A_1	1	1	1	1	1
A_2	1	1	1	−1	−1
B_1	1	−1	1	1	−1
B_2	1	−1	1	−1	1
E	2	0	−2	0	0

सामान्य मोडो में किसी एक की सममिति E है। अणु के बिंदु समूह के अखंडनीय निरूपणों के पदों में इस मोड के द्वितीय उत्तेजित अवस्था की सममिति है

1. $2A_1+2B_2$
2. $2A_1+B_1+B_2$
3. $A_2+2B_1+B_2$
4. $A_1+A_2+B_1+B_2$

Options :

9167102641. 1

9167102642. 2

9167102643. 3

9167102644. 4

Question Number : 107 Question Id : 916710662 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The observed frequencies of first and third overtones of a gaseous diatomic molecule are $1050\ \mathrm{cm}^{-1}$ and $2068\ \mathrm{cm}^{-1}$, respectively. The magnitude of (dimensionless) anharmonicity constant is closest to

1. 3.5×10^{-3}
2. 5.5×10^{-3}
3. 7.5×10^{-3}
4. 9.5×10^{-3}

Options :

9167102645. 1

9167102646. 2

9167102647. 3

9167102648. 4

Question Number : 107 Question Id : 916710662 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

किसी गैसीय द्विपरमाण्विक अणु की प्रथम तथा तृतीय अधिस्वरकों की प्रेक्षित आवृतियाँ क्रमशः, $1050\ cm^{-1}$ तथा $2068\ cm^{-1}$ हैं। अप्रसंवादिता स्थिरांक का परिमाण (विमाहीन) जिसके निकटतम है, वह है

1. 3.5×10^{-3}
2. 5.5×10^{-3}
3. 7.5×10^{-3}
4. 9.5×10^{-3}

Options :

9167102645. 1

9167102646. 2

9167102647. 3

9167102648. 4

Question Number : 108 Question Id : 916710663 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The symmetry labels of three normal modes of water are $\Gamma_1 = A_1$, $\Gamma_2 = A_1$ and $\Gamma_3 = B_2$. The polarization of light required for overtone [(0,0,0) to (0,0,3)] and combination [(0,0,0) to (1,0,1)] transitions, respectively, are

[The symmetry of the dipole moment operators μ_x, μ_y and μ_z, respectively, are $\Gamma_{\mu_x} = B_1$, $\Gamma_{\mu_y} = B_2$ and $\Gamma_{\mu_z} = A_1$]

1. z and z
2. y and x
3. x and y
4. y and y

Options :

9167102649. 1

9167102650. 2

9167102651. 3

9167102652. 4

Question Number : 108 Question Id : 916710663 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

जल के तीन सामान्य मोडों के सममिति लेबल $\Gamma_1 = A_1$, $\Gamma_2 = A_1$ तथा $\Gamma_3 = B_2$ हैं। अधिस्वरक [(0,0,0) से (0,0,3)] में तथा संयोजन [(0,0,0) से (1,0,1)] में संक्रमणों के लिए आवश्यक प्रकाश के ध्रुवण, हैं, क्रमशः

[द्विध्रुवीय आघूर्ण संकारकों μ_x, μ_y तथा μ_z, की सममिति, क्रमशः, $\Gamma_{\mu_x} = B_1$, $\Gamma_{\mu_y} = B_2$ तथा $\Gamma_{\mu_z} = A_1$ हैं]

1. z तथा z
2. y तथा x
3. x तथा y
4. y तथा y

Options :

9167102649. 1

9167102650. 2

9167102651. 3

9167102652. 4

Question Number : 109 Question Id : 916710664 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The maximum work available from combustion of 1.0 mol of methane gas at 298 K is 810 kJ mol^{-1}, and energy available as heat at constant pressure, at 298 K, is 890 kJ mol^{-1}.

ΔS^o (in J K^{-1} mol^{-1}) for this combustion process is closest to

[Assume ideal gas behaviour; Gas constant R = 8.31 J K^{-1} mol^{-1}]

1. -268
2. -252
3. -204
4. -2718

Options :

9167102653. 1

9167102654. 2

9167102655. 3

9167102656. 4

Question Number : 109 Question Id : 916710664 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

298 K पर मीथेन गैस के 1.0 मोल के दहन से उपलब्ध अधिकतम कार्य 810 kJ mol^{-1} है, तथा 298 K पर, नियत दाब पर ऊष्मा के रूप में उपलब्ध ऊर्जा, 890 kJ mol^{-1} है

इस दहन प्रक्रिया के लिए ΔS^o (J K^{-1} mol^{-1}में) जिसके निकटतम है, वह है

[आदर्श गैस व्यवहार मानें; गैस स्थिरांक R = 8.31 J K^{-1} mol^{-1}]

1. −268
2. −252
3. −204
4. −2718

Options :

9167102653. 1

9167102654. 2

9167102655. 3

9167102656. 4

Question Number : 110 Question Id : 916710665 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The mean molar volume (V_m) of a binary solution of liquid A and liquid B is given by

$$V_m = a + bx + c(x - 0.5)^2$$

where x is the mole fraction of liquid B and a, b and c are constants. The partial molar volume of A is given by

1. $b + 2cx - c$
2. $a + cx^2 - \frac{c}{4}$
3. $a - cx^2 + \frac{c}{4}$
4. $b + cx^2 - ax$

Options :

9167102657. 1

9167102658. 2

9167102659. 3

9167102660. 4

Question Number : 110 Question Id : 916710665 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

द्रव A तथा द्रव B के किसी द्विअंगी विलयन का माध्य मोलर आयतन (V_m)

$V_m = a + bx + c(x - 0.5)^2$ द्वारा दिया गया है

जहां x द्रव B का मोल प्रभाज है तथा a, b तथा c स्थिरांक हैं। जिसके द्वारा A का आंशिक मोलर आयतन दिया गया है, वह है

1. $b + 2cx - c$
2. $a + cx^2 - \frac{c}{4}$
3. $a - cx^2 + \frac{c}{4}$
4. $b + cx^2 - ax$

Options :

9167102657. 1

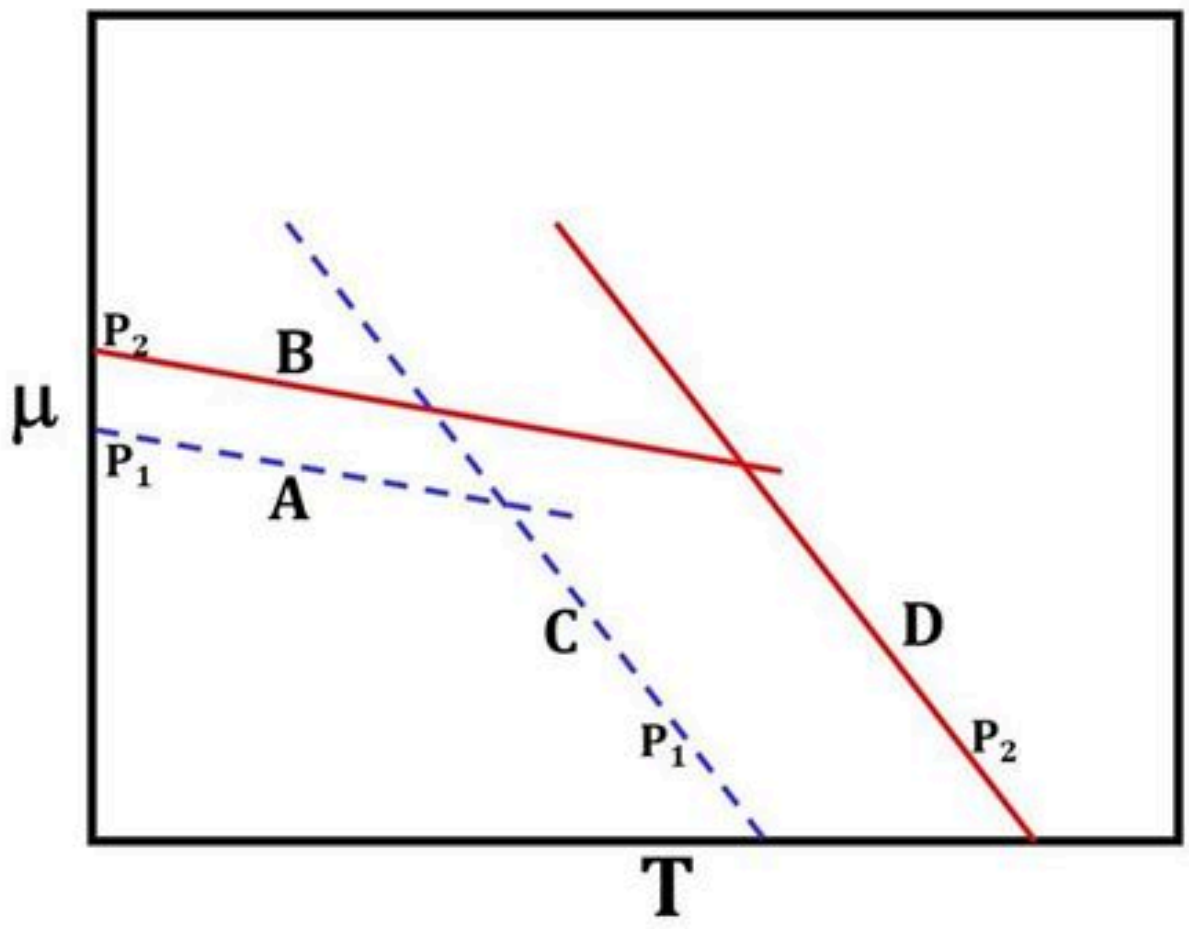
9167102658. 2

9167102659. 3

9167102660. 4

Question Number : 111 Question Id : 916710666 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The following figure shows the variation of chemical potential (μ) of a pure substance in its liquid or solid form with temperature, when the pressure is increased from P_1 *to* P_2. The lines **A, B, C, D** shown in the figure are at constant pressure P_1 *or* P_2.



The correct option about the information shown in this figure is

1. **A** is for ice and **C** is for liquid water; $S_m(C) = \left(\frac{\partial \mu_C}{\partial p}\right)_T$
2. **A** and **B** are for an organic liquid; $V_m(B) = -\left(\frac{\partial \mu_B}{\partial T}\right)_p$
3. **A** and **B** are for ice; $S_m(B) = -\left(\frac{\partial \mu_B}{\partial T}\right)_p$
4. **A** is for solid and **C** is for liquid form of an organic substance; $S_m(A) = -\left(\frac{\partial \mu_A}{\partial T}\right)_p$

Options :

9167102661. 1

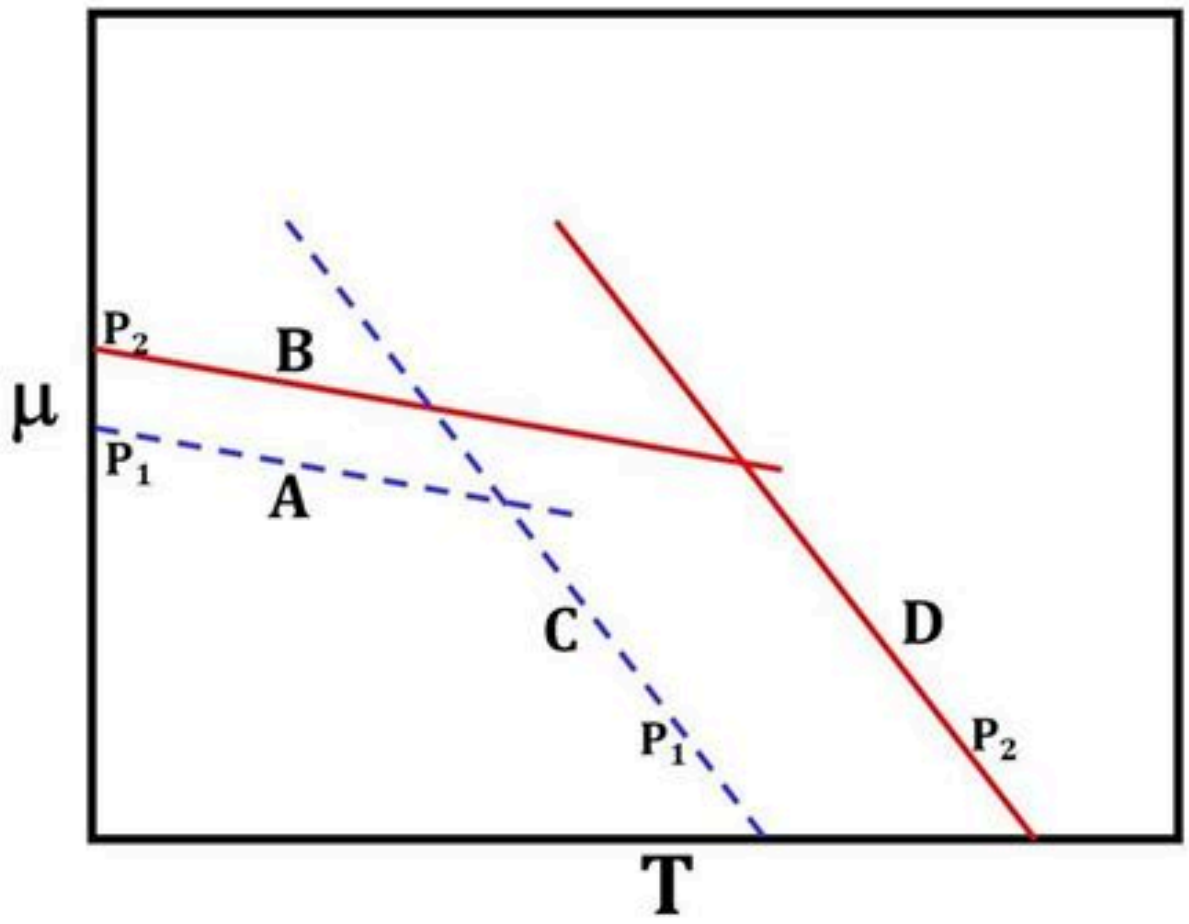
9167102662. 2

9167102663. 3

9167102664. 4

Question Number : 111 Question Id : 916710666 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित चित्र तापमान के साथ अपने द्रव या ठोस रूप में किसी शुद्ध पदार्थ के रासायनिक विभव (μ) के विचरण को दर्शाता है, जब दाब P_1 से P_2 तक बढ़ाया जाता है। चित्र में दर्शायी गई रेखाएँ **A, B, C, D** नियत दाब P_1 या P_2 पर हैं।



इस चित्र में दर्शित जानकारी के बारे में सही विकल्प है

1. **A** बर्फ के लिए है तथा **C** द्रव जल के लिए है; $S_m(C) = \left(\frac{\partial \mu_C}{\partial p}\right)_T$
2. **A** तथा **B** किसी कार्बनिक द्रव के लिए हैं; $V_m(B) = -\left(\frac{\partial \mu_B}{\partial T}\right)_p$
3. **A** तथा **B** बर्फ के लिए हैं; $S_m(B) = -\left(\frac{\partial \mu_B}{\partial T}\right)_p$
4. किसी कार्बनिक पदार्थ के, **A** ठोस के लिए तथा **C** द्रव रूप के लिए है; $S_m(A) = -\left(\frac{\partial \mu_A}{\partial T}\right)_p$

Options :

9167102661. 1

9167102662. 2

9167102663. 3

9167102664. 4

Question Number : 112 Question Id : 916710667 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The average energy of an ensemble of noninteracting particles is $1000\ k_BT$ at a temperature T. Each particle can have energy of either 0 or k_BT. The number of particles in the ensemble is closest to

[k_B: Boltzmann constant]

1. 1738
2. 3718
3. 7183
4. 8731

Options :

9167102665. 1

9167102666. 2

9167102667. 3

9167102668. 4

Question Number : 112 Question Id : 916710667 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

अन्योन्यक्रियाहिन कणों के किसी समुच्चय की औसत ऊर्जा तापमान T पर $1000\ k_BT$ है। प्रत्येक कण की ऊर्जा 0 या k_BT हो सकती है। समुच्चय में कणों की संख्या जिसके निकटतम है, वह है

[k_B: बोल्ट्जमान स्थिरांक]

1. 1738
2. 3718
3. 7183
4. 8731

Options :

9167102665. 1

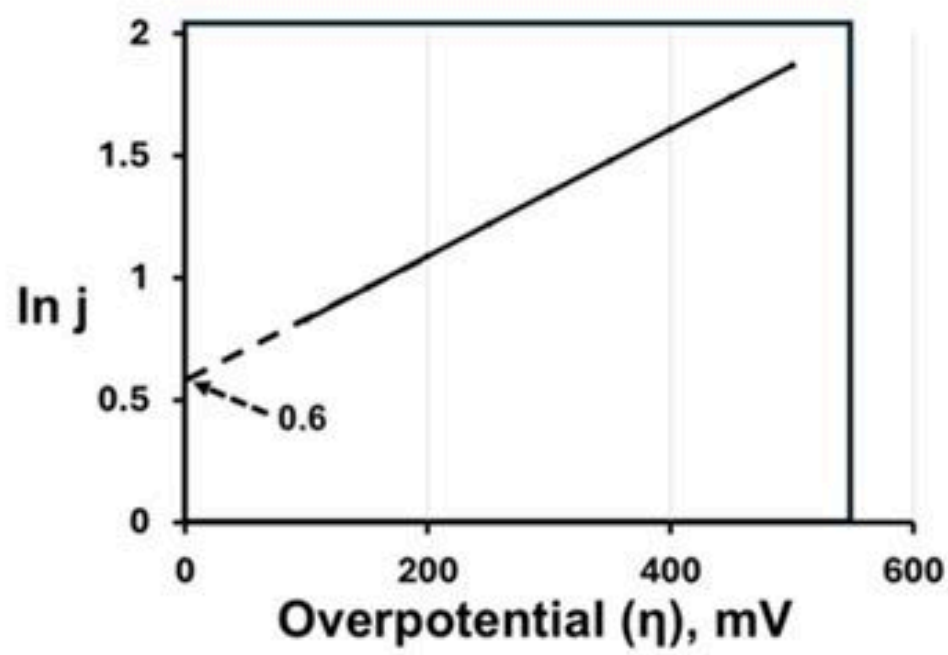
9167102666. 2

9167102667. 3

9167102668. 4

Question Number : 113 Question Id : 916710668 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The following figure shows a plot of **ln j** versus **η** for the platinum electrode of area 1 cm^2 in contact with an aqueous solution of Fe^{3+} (10^{-3} M) and Fe^{2+} (10^{-3} M) at 300 K. Here **j** and **η** represent current (in mA) and overpotential (in mV), respectively.



The charge transfer resistance (in Ω) for this system is closest to

1. 1.36
2. 4.91
3. 14.2
4. 49.1

Options :

9167102669. 1

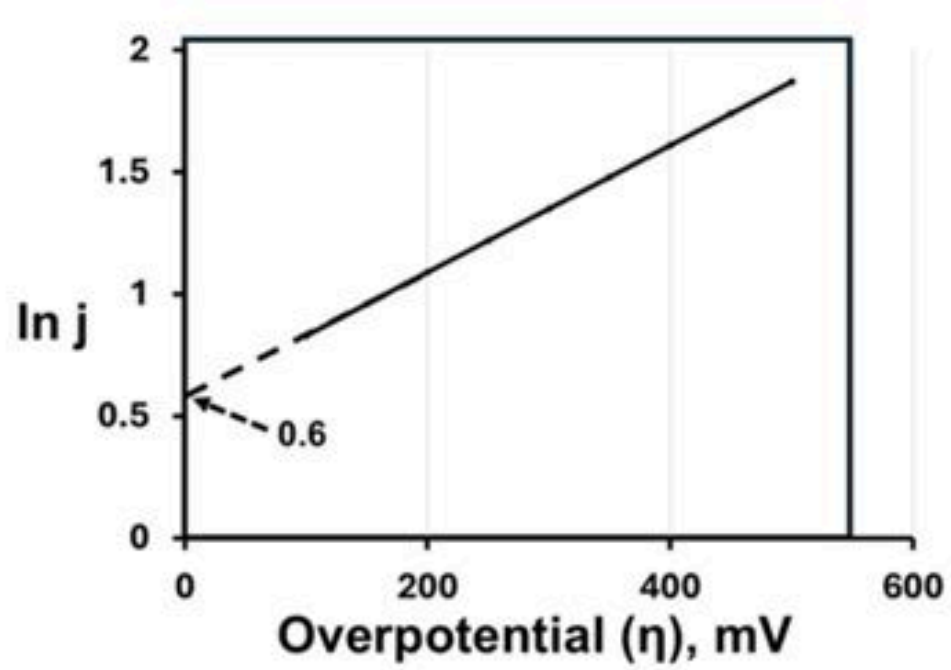
9167102670. 2

9167102671. 3

9167102672. 4

Question Number : 113 Question Id : 916710668 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

300 K पर, Fe^{3+} (10^{-3} M) तथा Fe^{2+} (10^{-3} M) के जलीय विलयन के संपर्क में 1 cm^2 क्षेत्रफल के प्लेटिनम इलेक्ट्रोड के लिए, निम्नलिखित चित्र **η** के विरुद्ध **ln j** के आरेख को प्रदर्शित करता है। यहाँ **j** तथा **η** क्रमशः, धारा (mA में) तथा अतिविभव (mV में) को निरूपित करते हैं।



इस निकाय के लिए आवेश स्थानांतरण प्रतिरोध (Ω में) जिसके निकटतम है, वह है

1. 1.36
2. 4.91
3. 14.2
4. 49.1

Options :

9167102669. 1

9167102670. 2

9167102671. 3

9167102672. 4

Question Number : 114 Question Id : 916710669 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

An enzyme (E) catalyzes the conversion of a substrate (S) to product (P) according to the following mechanism

$$E + S \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} ES \xrightarrow{k_2} ES' \xrightarrow{k_3} E + P$$

Applying steady state approximation to ES and ES', the expression for the rate of reaction is

[$[E]_0$ and $[S]_0$ are initial concentration of enzyme and substrate, respectively and $[S]_0 \gg [E]_0$]

1. $k_3[E]_0[S]_0$
2. $\frac{k_1k_2[E]_0[S]_0}{(k_{-1}+k_2)+k_1[S]_0}$
3. $\frac{k_1k_2[E]_0[S]_0}{(k_{-1}+k_2)+k_1\left(1+\frac{k_2}{k_3}\right)[S]_0}$
4. $\frac{k_1k_2[E]_0[S]_0}{(k_{-1}+k_2)+k_2\left(1+\frac{k_1}{k_3}\right)[S]_0}$

Options :

9167102673. 1

9167102674. 2

9167102675. 3

9167102676. 4

Question Number : 114 Question Id : 916710669 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

एक एन्ज़ाइम(E) निम्नलिखित क्रियाविधि के अनुसार अभिकारक (S) को उत्पाद (P) में रूपांतरण को उत्प्रेरित करता है

$$E + S \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} ES \xrightarrow{k_2} ES' \xrightarrow{k_3} E + P$$

ES तथा ES' में स्थायी दशा सन्निकटन लागू करने पर, अभिक्रिया की दर के लिए व्यंजक है

[$[E]_0$ तथा $[S]_0$ क्रमशः, एन्ज़ाइम तथा अभिकारक की प्रारम्भिक सांद्रता हैं तथा $[S]_0 \gg [E]_0$]

1. $k_3[E]_0[S]_0$
2. $\frac{k_1k_2[E]_0[S]_0}{(k_{-1}+k_2)+k_1[S]_0}$
3. $\frac{k_1k_2[E]_0[S]_0}{(k_{-1}+k_2)+k_1\left(1+\frac{k_2}{k_3}\right)[S]_0}$
4. $\frac{k_1k_2[E]_0[S]_0}{(k_{-1}+k_2)+k_2\left(1+\frac{k_1}{k_3}\right)[S]_0}$

Options :

9167102673. 1

9167102674. 2

9167102675. 3

9167102676. 4

Question Number : 115 Question Id : 916710670 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following gas phase reaction:

$$A + B \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} A^* + B$$

$$A^* \xrightarrow{k_2} C$$

Considering $[A]_0$ and $[B]_0$ to be moderate and using steady state approximation, the correct option for the overall order of the reaction is

1. 1st order, when $k_{-1} >> k_2$
2. zero order, when $k_{-1} >> k_2$
3. zero order, when $k_{-1} << k_2$
4. 1st order, when $k_{-1} << k_2$

Options :

9167102677. 1

9167102678. 2

9167102679. 3

9167102680. 4

Question Number : 115 Question Id : 916710670 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

निम्नलिखित गैस प्रावस्था अभिक्रिया पर विचार करें:

$$A + B \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} A^* + B$$

$$A^* \xrightarrow{k_2} C$$

$[A]_0$ तथा $[B]_0$ को मध्यम मानते हुए तथा स्थायी दशा सन्निकटन का प्रयोग करने पर, अभिक्रिया की समग्र कोटि के लिए सही विकल्प है

1. 1^{st} कोटि, जब $k_{-1} >> k_2$
2. शून्य कोटि, जब $k_{-1} >> k_2$
3. शून्य कोटि, जब $k_{-1} << k_2$
4. 1^{st} कोटि, जब $k_{-1} << k_2$

Options :

9167102677. 1

9167102678. 2

9167102679. 3

9167102680. 4

Question Number : 116 Question Id : 916710671 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A graph of surface tension of an aqueous solution of a surfactant as a function of concentration gives a slope $[\frac{d\gamma}{d\ln(c/c^o)}]$ of -4.8×10^{-3} N m^{-1} at 289 K. The area (in Å^2) occupied by each surfactant molecule at the surface is closest to

$[c^o = 1 \text{ mol L}^{-1}]$

1. 41
2. 62
3. 83
4. 104

Options :

9167102681. 1

9167102682. 2

9167102683. 3

9167102684. 4

Question Number : 116 Question Id : 916710671 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

सांद्रता के फलन के रूप में किसी पृष्ठसक्रियक के जलीय विलयन के पृष्ठ तनाव का आरेख 289 K पर -4.8×10^{-3} N m^{-1} का ढाल $[\frac{d\gamma}{d \ln(c/c^o)}]$ देता है। पृष्ठ पर प्रत्येक पृष्ठसक्रियक अणु द्वारा अध्यासित क्षेत्रफल ($Å^2$ में) जिसके निकटतम है, वह है

$[c^o = 1 \text{ mol } L^{-1}]$

1. 41
2. 62
3. 83
4. 104

Options :

9167102681. 1

9167102682. 2

9167102683. 3

9167102684. 4

Question Number : 117 Question Id : 916710672 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A metal can exist in two different crystalline forms: face centered cubic (*fcc*) lattice and body centered cubic (*bcc*) lattice with unit cell edge lengths of 2 Å and 4 Å, respectively. The ratio of the density of the *fcc* lattice to that of the *bcc* lattice is

1. 2
2. 8
3. 4
4. 16

Options :

9167102685. 1

9167102686. 2

9167102687. 3

9167102688. 4

Question Number : 117 Question Id : 916710672 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

एक धातु दो विभिन्न क्रिस्टली रूप में मौजूद रह सकता है: क्रमशः 2 Å तथा 4 Å की एकांक सेल भुजा लम्बाइयों के साथ फलक केंद्रित घनीय (*fcc*) जालक तथा काय केंद्रित घनीय (*bcc*) जालक में। *fcc* जालक तथा *bcc* जालक के घनत्व का अनुपात है

1. 2
2. 8
3. 4
4. 16

Options :

9167102685. 1

9167102686. 2

9167102687. 3

9167102688. 4

Question Number : 118 Question Id : 916710673 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following statements related to the glass transition temperature (T_g) of a polymer.

A. T_g of the polymer increases with its molecular weight
B. T_g of the polymer increases upon addition of a plasticizer
C. T_g of the polymer is always lower than its melting temperature (T_m)

The correct complete set of options is

1. A and B
2. A and C
3. B and C
4. A, B and C

Options :

9167102689. 1

9167102690. 2

9167102691. 3

9167102692. 4

Question Number : 118 Question Id : 916710673 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

किसी बहुलक के कांच संक्रमण तापमान (T_g) से संबंधित निम्नलिखित कथनों पर विचार करें।

A. अपने आण्विक भार के साथ बहुलक का T_g बढ़ता है
B. सुघट्यकर को मिलाने पर बहुलक का T_g बढ़ता है
C. अपने गलनांक (T_m) की तुलना में बहुलक का T_g हमेशा कम होता है

विकल्पों का सही पूर्ण समुच्चय है

1. A तथा B
2. A तथा C
3. B तथा C
4. A, B तथा C

Options :

9167102689. 1

9167102690. 2

9167102691. 3

9167102692. 4

Question Number : 119 Question Id : 916710674 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

After 5 measurements, the length of an object is 20 ± 1 cm (mean $\pm$ standard error). The number of measurements needed to achieve a standard error of 0.25 cm is

1. 10
2. 20
3. 40
4. 80

Options :

9167102693. 1

9167102694. 2

9167102695. 3

9167102696. 4

Question Number : 119 Question Id : 916710674 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

5 मापनों के बाद, किसी वस्तु की लंबाई 20 ± 1 cm है (माध्य $\pm$ मानक त्रुटि)। 0.25 cm की मानक त्रुटि को प्राप्त करने के लिए आवश्यक मापनों की संख्या है

1. 10
2. 20
3. 40
4. 80

Options :

9167102693. 1

9167102694. 2

9167102695. 3

9167102696. 4

Question Number : 120 Question Id : 916710675 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

0.5 M solution (A) of a substance transmits 10% of the incident light. Another solution (B) of the same substance under identical experimental conditions transmits 1% of the incident light. The concentration (in M) of the substance in the solution B is

1. 8
2. 10
3. 1
4. 5

Options :

9167102697. 1

9167102698. 2

9167102699. 3

9167102700. 4

Question Number : 120 Question Id : 916710675 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

किसी पदार्थ का 0.5 M विलयन (A) आपतित प्रकाश का 10% संचारित करता है। समान प्रायोगिक दशाओं पर उसी पदार्थ का अन्य विलयन (B) आपतित प्रकाश का 1% संचारित करता है। विलयन B में पदार्थ की सांद्रता (M में) है

1. 8
2. 10
3. 1
4. 5

Options :

9167102697. 1

9167102698. 2

9167102699. 3

9167102700. 4