CHEMISTRY
12 Jan. 2019 [Session : 9.30 AM to 12.00 PM]
JEE MAIN PAPER ONLINE

1. A metal on combustion in excess air forms X. X upon hydrolysis with water yields H_2O_2 and O_2 along with another product. The metal is
एक धातु, वायु के आधिक्य में, दहन होने पर X बनाती है। X जल के साथ अपघटित H_2O_2 तथा O_2 और कुछ अन्य उत्पाद देता है। धातु है –
(1) Li (2) Rb (3) Mg (4) Na

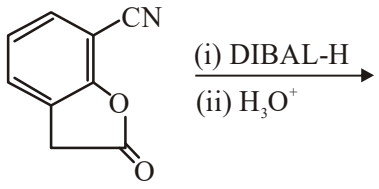
A. 2

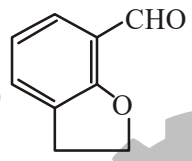
Sol. $Rb + \underset{\text{excess}}{O_2} \longrightarrow RbO_2$

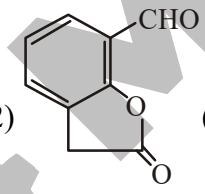
$2RbO_2 + 2H_2O \longrightarrow RbOH + H_2O_2 + O_2$

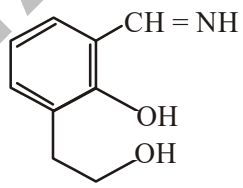
Question ID : 4165299729
Option 1 ID : 41652938374 Option 2 ID : 41652938376
Option 3 ID : 41652938377 Option 4 ID : 41652938375

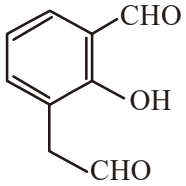
2. The major product of the following reaction is :
निम्न अभिक्रिया का मुख्य उत्पाद है –



(1) 

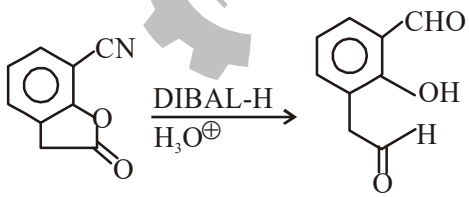
(2) 

(3) 

(4) 

A. 4

Sol. DIBAL-H followed by hydrolysis converts nitrile to aldehyde and ester to aldehyde and alcohol.



Question ID : 4165299721
Option 1 ID : 41652938345 Option 2 ID : 41652938342
Option 3 ID : 41652938344 Option 4 ID : 41652938343

3. The molecule that has minimum / no role in the formation of photochemical smog, is :
उस अणु को बताइये जिसकी प्रकाश रासायनिक धूमकुहा के बनने मं कम से कम/कुछ नहीं भूमिका होती है –
(1) O_3 (2) N_2 (3) $CH_2 = O$ (4) NO

A. 2

Sol. NO, O_3 and HCHO are involved in the formation photochemical smog.

N_2 has no role in photochemical smog

Question ID : 4165299735

Option 1 ID : 41652938398 Option 2 ID : 41652938399

Option 3 ID : 41652938401 Option 4 ID : 41652938400

4. 50 mL of 0.5 M oxalic acid is needed to neutralize 25 mL of sodium hydroxide solution. The amount of NaOH in 50 mL of the given sodium hydroxide solution is :

25 mL सोडियम हाइड्रॉक्साइड विलयन के उदासीनीकरण के लिए 0.5 M आक्जेलिक अम्ल के 50 mL की आवश्यकता होती है। दिये गये सोडियम हाइड्रॉक्साइड विलयन के 50 mL में NaOH की मात्रा होगी –

(1) 10 g (2) 20 g (3) 80 g (4) 40 g

A. BONUS

Sol. $2 \times 50 \times 0.5 = 25 \times M$

$\Rightarrow \quad M = 2$

$\therefore \quad$ Moles of NaOH in 50 mL $= \frac{2 \times 50}{1000}$

$= \frac{2}{20} = \frac{1}{10}$

$\therefore \quad$ Weight = 4 grams

No option is correct

Question ID : 4165299736

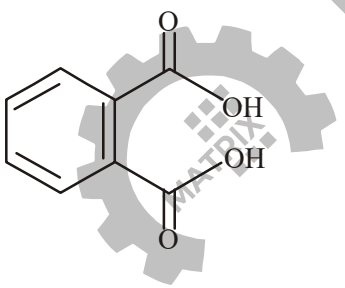
Option 1 ID : 41652938405 Option 2 ID : 41652938402

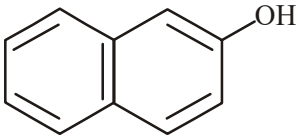
Option 3 ID : 41652938404 Option 4 ID : 41652938403

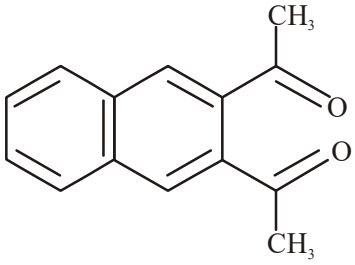
-----5-----(Answer nahi diya hai)

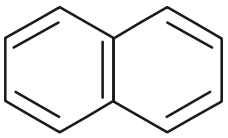
5. Among the following four aromatic compounds, which one will have lowest melting point :

निम्न चार एरोमैटिक यौगिकों में से किसका गलनांक निम्नतम होगा ?

(1) 

(2) 

(3) 

(4) 

A. 4

Sol. In general, polarity increases the intermolecular force of attraction and as result increaes the melting point.

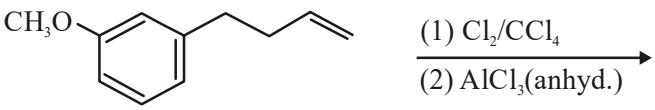
Question ID : 4165299725

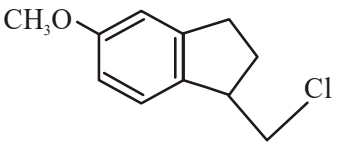
Option 1 ID : 41652938360 Option 2 ID : 41652938359

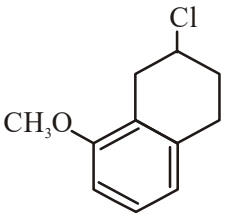
Option 3 ID : 41652938361 Option 4 ID : 41652938358

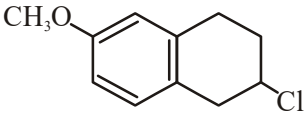
6. The major product of the following reaction is :

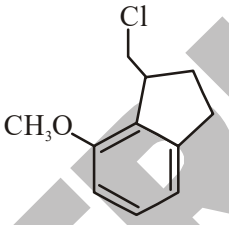
निम्न अभिक्रिया का मुख्य उत्पाद है –



(1) 

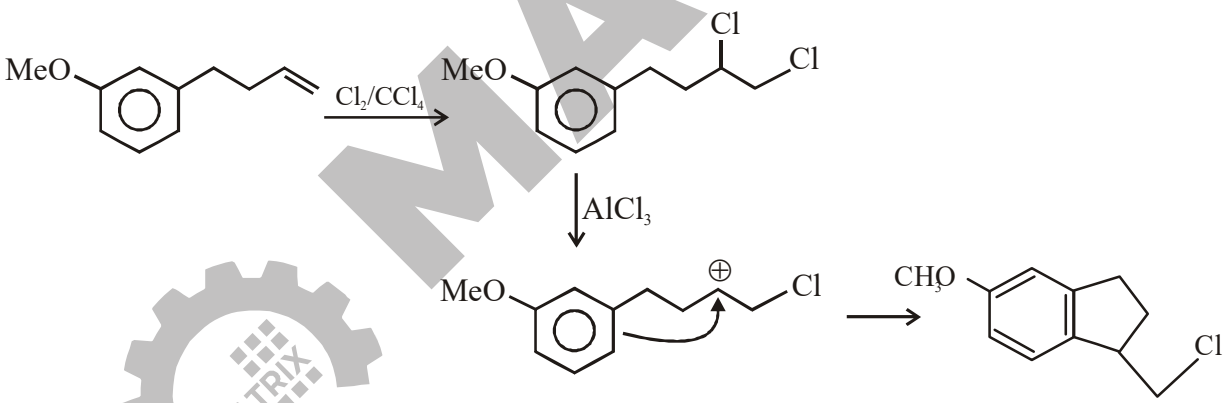
(2) 

(3) 

(4) 

A. 1

Sol.



uestion ID : 4165299722

ption 1 ID : 41652938347 ption 2 ID : 41652938348

ption 3 ID : 41652938349 ption 4 ID : 41652938346

. iven

as		H_4	O_2	O_2
ritical	3	90	04	30

emperature / K

n the basis of data given above, predict which of the following gases shows least adsorption on a definite mount of charcoal ?

दया गया है

गैस	H_2	CH_4	CO_2	SO_2
क्रांतिक ताप/K	33	190	304	630

ऊपर दिये गये आँकड़ों के आधार पर प्रागुक्ति कीजिए कि निम्न में से कौन सी गैस चारकोल की एक निश्चित मात्रा पर न्यूनतम अधिशोषण प्रदर्शित करेगी ?

(1) H_2 (2) CH_4 (3) SO_2 (4) CO_2

A. 1

Sol. More easily liquefiable a gas is (i.e. having higher critical temperature), the more readily it will be adsorbed.

∴ Least adsorption is shown by H_2 (least critical temperature)

Question ID : 4165299745

Option 1 ID : 41652938441 Option 2 ID : 41652938440

Option 3 ID : 41652938438 Option 4 ID : 41652938439

8. In the following reaction

$$\text{Aldehyde} + \text{Alcohol} \xrightarrow{HCl} \text{Acetal}$$

Aldehyde	Alcohol
HCHO	^{t}Bu"OH
CH_3CHO	MeOH

The best combination is :

(1) CH_3CHO and MeOH (2) CH_3CHO and ^{t}BuOH

(3) HCHO and MeOH (4) HCHO and ^{t}BuOH

निम्न अभिक्रिया में

$$\text{ऐल्डिहाइड} + \text{ऐल्कोहॉल} \xrightarrow{HCl} \text{ऐसिटल}$$

ऐल्डिहाइड	ऐल्कोहॉल
HCHO	^{t}Bu"OH
CH_3CHO	MeOH

सर्वोतम संयोजन है –

(1) CH_3CHO तथा MeOH (2) CH_3CHO तथा ^{t}BuOH

(3) HCHO तथा MeOH (4) HCHO तथा ^{t}BuOH

A. 3

Sol. $\text{Aldehyde} + \text{Alcohol} \xrightarrow{HCl} \text{Acetal}$

↑ more reactive aldehyde

↑ less steric alcohol

∴ Best combination is HCHO and MeOH

Question ID : 4165299717

Option 1 ID : 41652938329 Option 2 ID : 41652938328

Option 3 ID : 41652938326 Option 4 ID : 41652938327

9. What is the work function of the metal if the light of wavelength 4000Å generates photoelectrons of velocity 6×10^5 ms^{-1} from it ?

(Mass of electron = 9×10^{-31} kg, Velocity of light = 3×10^8 ms^{-1}, Planck's constant = 6.626×10^{-34} Js,

Charge of electron = 1.6×10^{-19} JeV^{-1})

धातु का कार्यफलन क्या होगा, यदि 4000Å तरंगदैर्ध्य का प्रकाश इससे 6×10^{5} ms^{-1} वेग के फोटोइलेक्ट्रानों को उत्पन्न करता है ? (इलेक्ट्रॉन की संहति = 9×10^{-31} kg, प्रकाश का वेग = 3×10^{8} ms^{-1}, प्लैंक स्थिरांक = 6.626×10^{-34} Js, तथा इलेक्ट्रॉन का आवेश = 1.6×10^{-19} JeV^{-1})

(1) 4.0 eV (2) 0.9 eV (3) 3.1 eV (4) 2.1 eV

A. 4

Sol. $E_{photon} = \frac{12400}{4000} = 3.1eV$

$$KE_{e^-} = \frac{1}{2}mv^2 = \frac{1}{2}\times9\times10^{-31}\times36\times10^{10}\,J$$
$$= 1.62\times10^{-19}\,J$$
$$\simeq 2.1eV$$

Question ID : 4165299738

Option 1 ID : 41652938410 Option 2 ID : 41652938412

Option 3 ID : 41652938413 Option 4 ID : 41652938411

10. Among the following compounds most basic amino acid is :

(1) Histidine (2) Lysine (3) Asparagine (4) Serine

निम्न यौगिकों में से सबसे ज्यादा क्षारीय ऐमीनों अम्ल है –

(1) हिस्टीडीन (2) लाइसीन (3) ऐस्पेराजीन (4) सेरीन

A. 2

Sol. Lysine is the most basic among the given amino acids.

Question ID : 4165299723

Option 1 ID : 41652938350 Option 2 ID : 41652938352

Option 3 ID : 41652938353 Option 4 ID : 41652938351

11. $Mn_2(CO)_{10}$ is an organometallic compound due to the presence of :

(1) Mn - O bond (2) Mn - Mn bond (3) C - O bond (4) Mn - C bond

जिसकी उपस्थिति के कारण $Mn_2(CO)_{10}$ एक कार्बधात्विक यौगिक है, वह है –

(1) Mn - O आबन्ध (2) Mn - Mn आबन्ध (3) C - O आबन्ध (4) Mn - C आबन्ध

A. 4

Sol. It is organometallic compound due to presence of Mn – C bond.

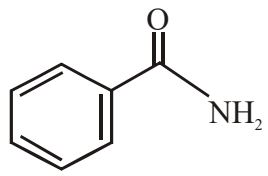
Question ID : 4165299733

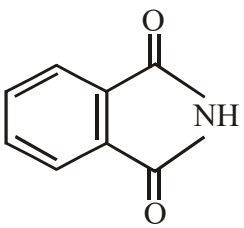
Option 1 ID : 41652938393 Option 2 ID : 41652938391

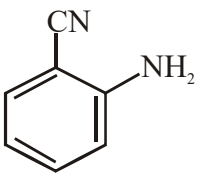
Option 3 ID : 41652938392 Option 4 ID : 41652938390

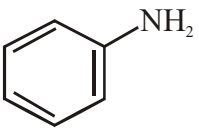
12. The increasing order of reactivity of the following compounds towards reaction with alkyl halides directly is :

निम्न यौगिकों की ऐल्किल हैलाइड के साथ सीधी अभिक्रिया की अभिक्रियाशीलता का बढ़ता क्रम है –

(A) 

(B) 

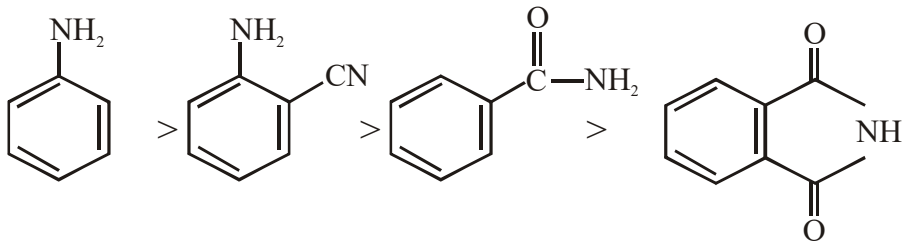
(C) 

(D) 

(1) A < C < D < B (2) B < A < D < C (3) A < B < C < D (4) B < A < C < D

A. 4

Sol. Reactivity of compound (nucleophiles) with alkyl halides will depends upon the availability of lone pair of electrons on nitrogen (amines or acid amides)



Question ID : 4165299718

Option 1 ID : 41652938332 Option 2 ID : 41652938330

Option 3 ID : 41652938331 Option 4 ID : 41652938333

13. Decomposition of X exhibits a rate constant of 0.05 µg /year. How many years are required for the decomposition of 5 µg of X into 2.5 µg :

X का विघटन 0.05 µg /वर्ष का दर नियतांक प्रदर्शित करता है। X के 5 µg को विघटित होकर 2.5 µg होने में कितने वर्ष लगेंगे?

(1) 20 (2) 40 (3) 25 (4) 50

A. 4

Sol. Rate constant of decomposition of X = 0.5 µg/year From unit of rate constant, it is clear that the decomposition follows zero order kinetics.

For zero order kinetics,

$[X] = [X]_0 - kt$

$\Rightarrow \quad t = \frac{5 - 2.5}{0.05}$

$= \frac{2.5}{0.05} = 50 \text{ years}$

Question ID : 4165299744

Option 1 ID : 41652938434 Option 2 ID : 41652938437

Option 3 ID : 41652938436 Option 4 ID : 41652938435

14. The metal d-orbitals that are directly facing the ligands in $K_3[Co(CN)_6]$ are :

(1) d_{xy} and $d_{x^2-y^2}$ (2) d_{xy}, d_{xz} and d_{yz} (3) $d_{x^2-y^2}$ and d_{z^2} (4) d_{xz}, d_{yz} and d_{z^2}

धातु के d-कक्षक जो $K_3[Co(CN)_6]$ में लिगन्ड के सीधे सामने पड़ते हैं, है –

(1) d_{xy} तथा $d_{x^2-y^2}$ (2) d_{xy}, d_{xz} तथा d_{yz} (3) $d_{x^2-y^2}$ तथा d_{z^2} (4) d_{xz}, d_{yz} तथा d_{z^2}

A. 3

Sol. $K_3[Co(CN)_6]$

During splitting in octahederal co-ordination entities, $d_{x^2-y^2}$ and d_{z^2} orbitals point towards the direction of ligands (i.e. they experience more repulsion and their energy is raised)

Question ID : 4165299732

Option 1 ID : 41652938386 Option 2 ID : 41652938387

Option 3 ID : 41652938389 Option 4 ID : 41652938388

15. Poly-β-hydroxybutyrate-co-β-hydroxyvalerate(PHBV) is a copolymer of :

(1) 3-hydroxybutanoic acid and 3-hydroxypentanoic acid

(2) 2-hydroxybutanoic acid and 3-hydroxypentanoic acid

(3) 3-hydroxybutanoic acid and 2-hydroxypentanoic acid

(4) 3-hydroxybutanoic acid and 4-hydroxypentanoic acid

पॉली-β-हाइड्रॉक्सीब्यूटीरेट-co-β-हाइड्रॉक्सीवैलिरेट (PHBV) जिसका सह बहुलक है, वे है –

(1) 3-हाइड्रॉक्सीब्यूटेनोइक एसिड तथा 3-हाइड्रॉक्सीपेन्टेनोइक एसिड

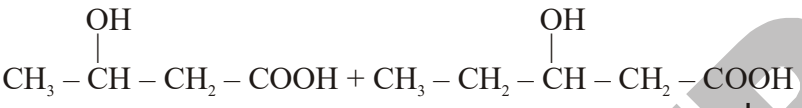
(2) 2-हाइड्रॉक्सीब्यूटेनोइक एसिड तथा 3-हाइड्रॉक्सीपेन्टेनोइक एसिड

(3) 3-हाइड्रॉक्सीब्यूटेनोइक एसिड तथा 2-हाइड्रॉक्सीपेन्टेनोइक एसिड

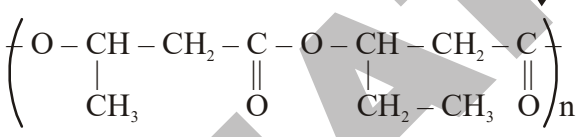
(4) 3-हाइड्रॉक्सीब्यूटेनोइक एसिड तथा 4-हाइड्रॉक्सीपेन्टेनोइक एसिड

A. 1

Sol.



3-Hydroxybutanoic acid 3-Hydroxybutanoic acid



PHBV

∴ Monomers of PHBV are 3-Hydroxybutanoic acid and 3-Hydroxypentanoic acid.

Question ID : 4165299716

Option 1 ID : 41652938323 Option 2 ID : 41652938322

Option 3 ID : 41652938324 Option 4 ID : 41652938325

16. The correct order for acid strength of compounds :

$CH \equiv CH, CH_3 - C \equiv CH$ and $CH_2 = CH_2$

is as follows :

$CH \equiv CH, CH_3 - C \equiv CH$ तथा $CH_2 = CH_2$

यौगिकों के अम्लीय सामर्थ्य का सही क्रम है –

(1) $CH_3 - C \equiv CH > CH \equiv CH > CH_2 = CH_2$

(2) $CH \equiv CH > CH_2 = CH_2 > CH_3 - C \equiv CH$

(3) $CH_3 - C \equiv CH > CH_2 = CH_2 > HC \equiv CH$

(4) $HC \equiv CH > CH_3 - C \equiv CH > CH_2 = CH_2$

A. 4

Sol. Order of acidic strength is

$CH \equiv CH > CH_3 - C \equiv CH > CH_2 = CH_2$

sp hybridised carbon	sp hybridised carbon and + I	sp^2 hybridised carbon

(more electronegative) effect of $-CH_3$ (less electronegative

Question ID : 4165299724

Option 1 ID : 41652938355 Option 2 ID : 41652938357

Option 3 ID : 41652938356 Option 4 ID : 41652938354

17. In a chemical reaction, $A + 2B \underset{}{\overset{K}{\rightleftharpoons}} 2C + D$, the initial concentration of B was 1.5 times of the concentration of A, but the equilibrium concentrations of A and B were found to be equal. The equilibrium constant (K) for the aforesaid chemical reaction is :

एक रासायनिक अभिक्रिया, $A + 2B \underset{}{\overset{K}{\rightleftharpoons}} 2C + D$ में, B की प्रारम्भिक सान्द्रता A की सान्द्रता की 1.5 गुना थी लेकिन A तथा B की साम्य सान्द्रतायें बराबर पाई गई। उपरोक्त अभिक्रिया के लिए साम्य स्थिरांक (K) होगा –

(1) 16 (2) $\frac{1}{4}$ (3) 4 (4) 1

A. 3

Sol.

$$\begin{array}{lccccc} & A & + & 2B & \rightleftharpoons & 2C & + & D \\ t=0 & 2 & & 3 & & & & \\ t_{eq} & 2-x & & 3-2x & & 2x & & x \end{array}$$

Given, $3 - 2x = 2 - x$

$\Rightarrow x = 1$

$\therefore$ $[C] = 2, [D] = 1$

$[A] = 1, [B] = 1$

$\therefore$ $K_c = \frac{2^2 \cdot 1}{1^2 \cdot 1} = 4$

Question ID : 4165299742

Option 1 ID : 41652938429 Option 2 ID : 41652938426

Option 3 ID : 41652938427 Option 4 ID : 41652938428

18. The element with Z = 120 (not yet discovered) will be an/a :

(1) alkaline earth metal (2) transition metal

(3) inner-transition metal (4) alkali metal

वह तत्व जिसका Z = 120 है (जिसकी खोज अभी तक नहीं हुई है) होगा –

(1) क्षारीय मृदा धातु (2) संक्रमण धातु

(3) आंतर–संक्रमण धातु (4) क्षार धातु

A. 1

Sol. Element with Z = 120 will belong to alkaline earth metals.

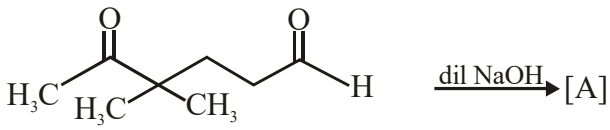
Question ID : 4165299726

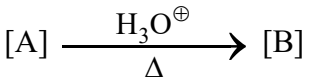
Option 1 ID : 41652938363 Option 2 ID : 41652938364

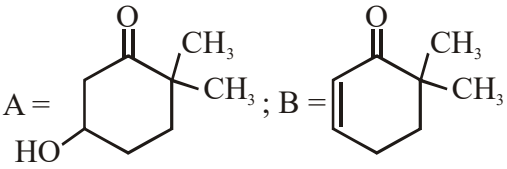
Option 3 ID : 41652938365 Option 4 ID : 41652938362

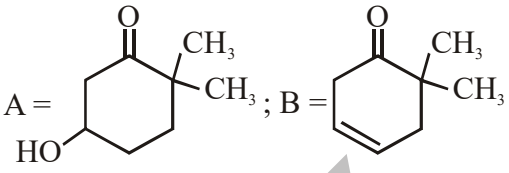
19. In the following reactions, products A and B are :

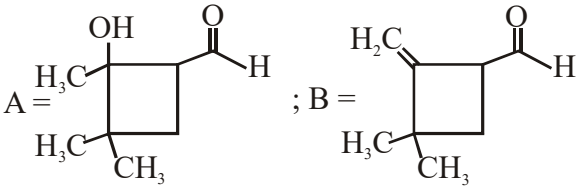
निम्न अभिक्रियाओं में उत्पाद A तथा B है।

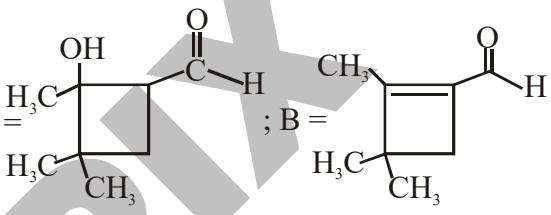




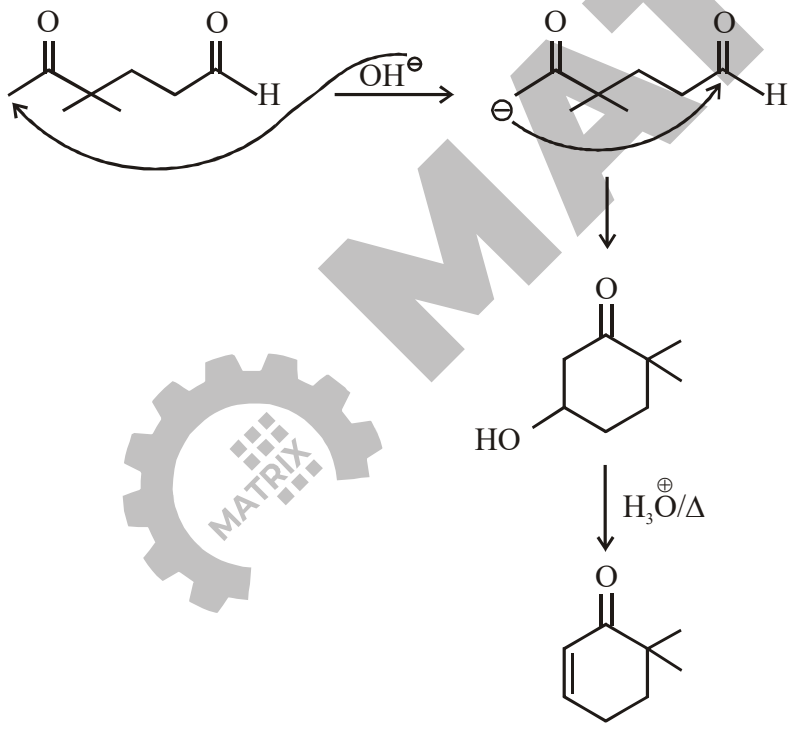
(1) 

(2) 

(3) 

(4) 

A. 1

Sol. 

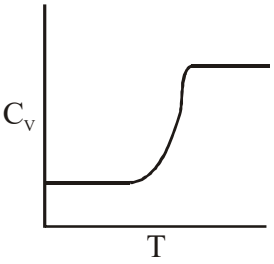
Question ID : 4165299720

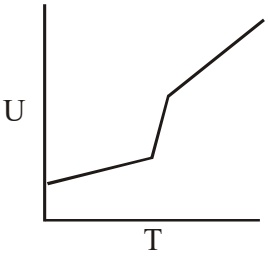
Option 1 ID : 41652938338 Option 2 ID : 41652938339

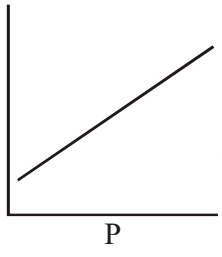
Option 3 ID : 41652938341 Option 4 ID : 41652938340

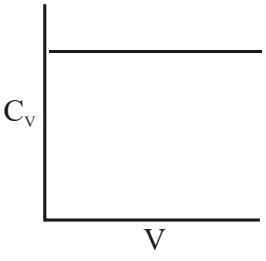
20. For a diatomic ideal gas in a closed system, which of the following plots does not correctly describe the relation between various thermodynamic quantities :

एक बंद निकाय में एक द्विपरमाणुक आदर्श गैस के लिए निम्न में से कौन सा एक प्लाट विभिन्न ऊष्मागतिक परिमाणों के मध्य सम्बन्धों को सही–सही नहीं बताता ?

(1) 

(2) 

(3) 

(4) 

A. 3

Sol. C_p and C_v for ideal gases are dependant on temperature only. So, C_p will not change with pressure.

Question ID : 4165299740

Option 1 ID : 41652938419 Option 2 ID : 41652938418

Option 3 ID : 41652938420 Option 4 ID : 41652938421

21. Iodine reacts with concentrated HNO_3 to yield Y along with other products. The oxidation state of iodine in Y, is :

आयोडीन सान्द्र HNO_3 के साथ अभिक्रिया करके अन्य उत्पादों के साथ Y पैदा करती हैं Y में आयोडीन की ऑक्सीकरण संख्या है–

(1) 3 (2) 1 (3) 7 (4) 5

A. 4

Sol. Conc. HNO_3 oxidises I_2 to iodic acid (HIO_3).

Question ID : 4165299730

Option 1 ID : 41652938379 Option 2 ID : 41652938378

Option 3 ID : 41652938381 Option 4 ID : 41652938380

22. Two solids dissociate as follows

$A(s) \rightleftharpoons B(g) + C(g)$; $K_{p_1} = x\ atm^2$

$D(s) \rightleftharpoons C(g) + E(g)$; $K_{p_2} = y\ atm^2$

The total pressure when both the solids dissociate simultaneously is :

दो ठोस निम्न प्रकार वियोजित होते है

$A(s) \rightleftharpoons B(g) + C(g)$; $K_{p_1} = x\ atm^2$

$D(s) \rightleftharpoons C(g) + E(g)$; $K_{p_2} = y\ atm^2$

जब दोनों ठोस एक ही साथ वियोजित हों तो कुल दाब होगा –

(1) $x^2 + y^2$ atm (2) $(x + y)$ atm (3) $2\left(\sqrt{x+y}\right)$ atm (4) $\sqrt{x+y}$ atm

A. 3

Sol. $A(S) \longrightarrow \underset{P_1}{B(g)} + \underset{P_1+P_2}{C(g)}$ $\quad K_{P_1} = P_1(P_1 + P_2) = x$

$D(S) \longrightarrow \underset{P_2+P_1}{C(g)} + \underset{P_2}{E(g)}$ $\quad K_{P_1} = P_1(P_1 + P_2) = y$

$\therefore \quad P_1(P_1 + P_2) + P_2(P_1 + P_2) = x + y$

$\Rightarrow \quad P_1(P_1 + P_2)^2 = x + y$

$\Rightarrow \quad P_1 + P_2 = \sqrt{x+y}$

$\therefore \quad$ Total pressure $= 2(P_1 + P_2) = 2\left(\sqrt{x+y}\right)$ atm at equilibrium

Question ID : 4165299739

Option 1 ID : 41652938417 Option 2 ID : 41652938415

Option 3 ID : 41652938416 Option 4 ID : 41652938414

23. In the Hall-Heroult process, aluminium is formed at the cathode. The cathode is made out of :

(1) Platinum (2) Pure aluminium (3) Copper (4) Carbon

हाल–हेराल्ट प्रक्रम में एलुमिनियम कैथोड पर बनता है। कैथोड जिसका बनता है, वह है –

(1) प्लेटिनम (2) शुद्ध एलुमिनियम (3) ताँबा (4) कार्बन

A. 4

Sol. In Hall-Heroult process, steel vessel with carbon lining acts as cathode.

Question ID : 4165299727

Option 1 ID : 41652938366 Option 2 ID : 41652938367

Option 3 ID : 41652938368 Option 4 ID : 41652938369

24. Water samples with BOD values of 4 ppm and 18 ppm, respectively, are :

(1) Highly polluted and Highly polluted

(2) Clean and Highly polluted

(3) Clean and Clean

(4) Highly polluted and Clean

4 ppm तथा 18 ppm BOD मान वाले जल के नमूने क्रमशः होंगे –

(1) अत्यधिक प्रदूषित तथा अत्यधिक प्रदूषित

(2) स्वच्छ तथा अत्यधिक प्रदूषित

(3) स्वच्छ तथा स्वच्छ

(4) अत्यधिक प्रदूषित तथा स्वच्छ

A. 2

Sol. Clean water have BOD value of less than 5 ppm whereas highly polluted water could BOD value of 17 ppm of more.

Question ID : 4165299734

Option 1 ID : 41652938397 Option 2 ID : 41652938396

Option 3 ID : 41652938394 Option 4 ID : 41652938395

25. The volume of gas A is twice than that of gas B. The compressibility factor of gas A is thrice than that of gas B at same temperature. The pressures of the gases for equal number of moles are :

गैस A का आयतन गैस B के आयतन का दो गुना है। एक ही ताप पर गैस A का संपीडयता गुणांक गैस B के संपीडयता गुणांक की तुलना में तीन गुना है। मोलों की समान संख्या के लिए गैसों का दाब होगा –

(1) $P_A = 3P_B$ (2) $2P_A = 3P_B$ (3) $P_A = 2P_B$ (4) $3P_A = 2P_B$

A. 2

Sol. $Z = \frac{PV_m}{RT}$

$\therefore \quad \frac{Z_A}{Z_B} = \frac{P_A V_A}{P_B V_B}$

$3 = \frac{P_A}{P_B} \times 2$

$2P_A = 3P_B$

Question ID : 4165299737

Option 1 ID : 41652938407 Option 2 ID : 41652938408

Option 3 ID : 41652938406 Option 4 ID : 41652938409

26. The hardness of a water sample (in terms of equivalents of $CaCO_3$) containing 10^{-3}M $CaSO_4$ is (molar mass of $CaSO_4$ = 136 g mol^{-1})

पानी के उस प्रतिदर्श की कठोरता ($CaCO_3$ के समतुल्य के सापेक्ष) जिसमें 10^{-3}M $CaSO_4$ है, होगी – ($CaSO_4$ का मोलर द्रव्यमान = 136 g mol^{-1})

(1) 100 ppm (2) 50 ppm (3) 10 ppm (4) 90 ppm

A. 1

Sol. 10^{-3} M $CaSO_4 \cong 10^{-3}$ M $CaCO_3$

$\Rightarrow$ 10^{-3} M $CaCO_3$ means 10^{-3} moles of $CaCO_3$ are present in 1L

ie 100 mg of $CaCO_3$ is present in 1L solution. Hardness of water = Number of milligram of $CaCO_3$ per litre of water.

$\therefore$ Hardness of water = 100 ppm

Question ID : 4165299728

Option 1 ID : 41652938371 Option 2 ID : 41652938373

Option 3 ID : 41652938372 Option 4 ID : 41652938370

27. The pair of metal ions that can give a spin only magnetic moment of 3.9 BM for the complex $[M(H_2O)_6]Cl_2$ is

(1) V^{2+} and Fe^{2+} (2) V^{2+} and Co^{2+} (3) Co^{2+} and Fe^{2+} (4) Cr^{2+} and Mn^{2+}

संकुल $[M(H_2O)_6]Cl_2$ के लिए धातु आयनों का युग्म जो 3.9 BM का एक स्पिन मात्र चुम्बकीय आघूर्ण देता है, होगा –

(1) V^{2+} तथा Fe^{2+} (2) V^{2+} तथा Co^{2+} (3) Co^{2+} तथा Fe^{2+} (4) Cr^{2+} तथा Mn^{2+}

A. 2

Sol. So, the central metal ion has 3 unpaired electrons.

$\therefore$ Configuration is either d^3 or d^7 as H_2O is a weak field ligand.

V^{2+} has d^3 configuration.

Co^{2+} has d^7 configuration.

Question ID : 4165299731

Option 1 ID : 41652938383 Option 2 ID : 41652938384

Option 3 ID : 41652938385 Option 4 ID : 41652938382

28. $CH_3CH_2-\underset{\underset{Ph}{|}}{\overset{\overset{OH}{|}}{C}}-CH_3$ cannot be prepared by :

$CH_3CH_2-\underset{\underset{Ph}{|}}{\overset{\overset{OH}{|}}{C}}-CH_3$ निम्न में से किसके द्वारा नहीं बनाया जा सकता है –

(1) $HCHO + PhCH(CH_3)CH_2MgX$ (2) $CH_3CH_2COCH_3 + PhMgX$

(3) $PhCOCH_3 + CH_3CH_2MgX$ (4) $PhCOCH_2CH_3 + CH_3MgX$

A. 1

Sol. 1 $Ph-\overset{\overset{O}{\|}}{C}-CH_2CH_3 \xrightarrow[2.H_3O^+]{1.\ CH_3MgX} Ph-\overset{\overset{OH}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_2-CH_3$

2 $CH_3CH_2-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow[2.H_3O^+]{1.\ PhMgX} CH_3CH_2-\overset{\overset{OH}{|}}{\underset{\underset{Ph}{|}}{C}}-CH_3$

3 $H-\overset{\overset{O}{\|}}{C}-H + PhCH(CH_3)CH_2MgX \xrightarrow{H_3\overset{\oplus}{O}} HOCH_2-CH_2-\underset{\underset{CH_3}{|}}{CH}-Ph$

4 $Ph-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow[2.H_3O^+]{1.\ CH_3CH_2MgX} Ph-\overset{\overset{OH}{|}}{\underset{\underset{CH_2CH_3}{|}}{C}}-CH_3$

Question ID : 4165299719

Option 1 ID : 41652938337 Option 2 ID : 41652938335

Option 3 ID : 41652938334 Option 4 ID : 41652938336

29. The standard electrode potential $E^{\ominus}$ and its temperature coefficient $\left(\frac{dE^{\ominus}}{dT}\right)$ for a cell are 2V and -5×10^{-4} VK^{-1} at 300 K respectively. The cell reaction is

$Zn(s) + Cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$

The standard reaction enthalpy $\left(\Delta_r H^{\ominus}\right)$ at 300 K in kJ mol^{-1} is

[Use R = 8 JK^{-1} mol^{-1} and F = 96,000C mol^{-1}]

एक सेल के लिए मानक इलेक्ट्रोड विभव $E^{\ominus}$ तथा उसका ताप गुणांक $\left(\frac{dE^{\ominus}}{dT}\right)$ 300 K पर क्रमशः 2V तथा -5×10^{-4} VK^{-1} हैं।

सेल अभिक्रिया है,

$Zn(s) + Cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$

300 K पर मानक अभिक्रिया एन्थैल्पी $\left(\Delta_r H^{\ominus}\right)$ kJ mol^{-1} में होगी –

[R = 8 JK^{-1} mol^{-1} तथा F = 96,000C mol^{-1}]

(1) –384.0 (2) 206.4 (3) –412.8 (4) 192.0

A. 3

Sol. $\Delta G^o = \Delta H^o - T\Delta S^o$

$\Delta H^o = \Delta G^o + T\Delta S^o$

$$\Delta H^o = -nFE^o + TnF\frac{dE}{dT}$$

$$\Delta H^o = -nF\left[E^o - T\frac{dE}{dT}\right]$$

$$\Delta H^o = -2 \times 96000\,[2 - 300\,(-5 \times 10^{-4})]$$

$$= -2 \times 96000\,(2 + 0.15)$$

$$= -412.8 \times 10^3 \text{ J/mol}$$

$$\Delta_r H^o = -412.8 \text{ kJ/mol}$$

Question ID : 4165299743

Option 1 ID : 41652938432 Option 2 ID : 41652938431

Option 3 ID : 41652938430 Option 4 ID : 41652938433

30. Freezing point of a 4% aqueous solution of X is equal to freezing point of 12% aqueous solution of Y. If molecular weight of X is A, then molecular weight of Y is :

X के 4% जलीय विलयन का हिमांक, Y के 12% जलीय विलयन के हिमांक के बराबर है। यदि X का अणुभार A है तो Y का अणुभार होगा –

(1) 3A (2) 4A (3) 2A (4) A

A. 1

Sol. $\frac{4}{M_x} = \frac{12}{M_y}$

$\Rightarrow \quad M_y = 3M_x$

$\therefore \quad M_y = 3A$

(Since density of solutions are not given therefore assuming molality to be equal to molarity and given % is % $\frac{W}{W}$)

Question ID : 4165299741

Option 1 ID : 41652938424 Option 2 ID : 41652938425

Option 3 ID : 41652938423 Option 4 ID : 41652938422