CHEMISTRY
11 Jan. 2019 [Session : 2.30 AM to 5.30 PM]
JEE MAIN PAPER ONLINE

1. The correct match between Item I and Item II is :

Item I	Item II
(A) Ester test	(P) (Tyr)
(B) Carbyl amine test	(Q) (Asp)
(C) Phthalein test	(R) (Ser)
	(S) (Lys)

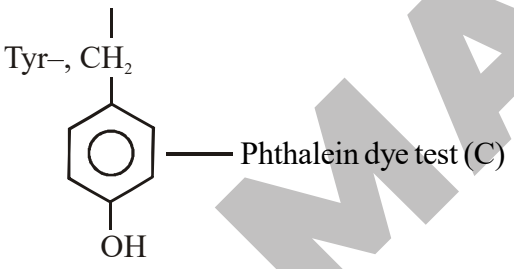
मद-I तथा मद-II के बीच सही सुमेल है :

मद-I	मद-II
(A) ऐस्टर परीक्षण	(P) (Tyr)
(B) कार्बिल एमीन परीक्षण	(Q) (Asp)
(C) थैलिन परीक्षण	(R) (Ser)
	(S) (Lys)

(1) A-R, B-Q, C-P
(2) A-R, B-S, C-Q
(3) A-Q, B-S, C-P
(4) A-Q, B-S, C-R

A. 3

Sol. (P)

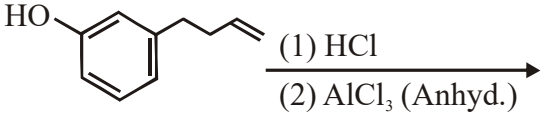


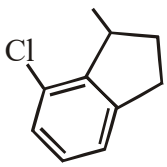
(Q) AsP – –CH_2–COOH – Ester test (A)
(R) Ser – –CH_2–OH – Ester test (A)
(S) Lys – –$(CH_2)_4$ –NH_2 – Carbylamine test (B)

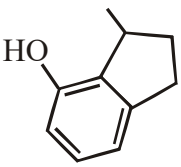
Question ID : 4165299537

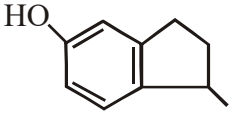
Option 1 ID : 41652937608
Option 2 ID : 41652937609
Option 3 ID : 41652937607
Option 4 ID : 41652937606

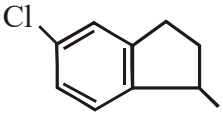
2. The major product of the following reaction is :
निम्न अभिक्रिया का मुख्य उत्पाद है :



(1) 

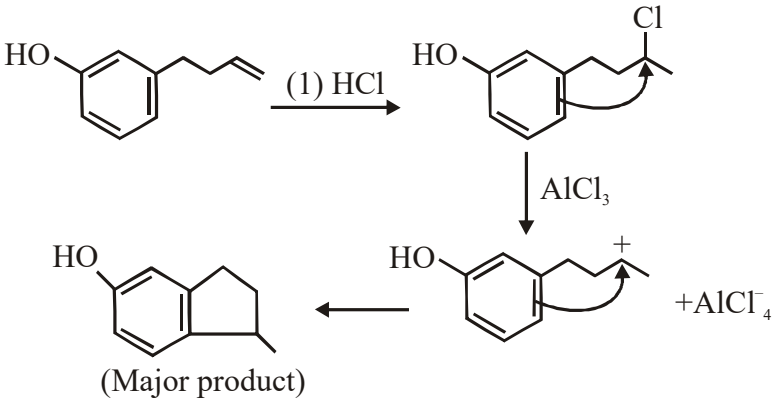
(2) 

(3) 

(4) 

A. 3

Sol



(Major product)

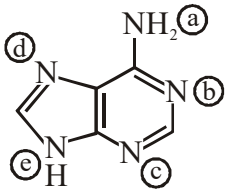
Para attack will form major product because at ortho position steric crowding is applicable.

Question ID : 4165299542

Option 1 ID : 41652937627 Option 2 ID : 41652937626

Option 3 ID : 41652937628 Option 4 ID : 41652937629

3. In the following compound,
निम्न योगिक में



the favourable site/s for protonation is /are :
प्रोटनीकरण के लिए अनुकूल स्थल है, हैं :

(1) (b), (c) and (d) (2) (a) and (d)

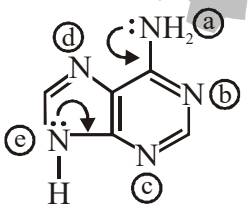
(3) (a) and (e) (4) (a)

(1) (b), (c) तथा (d) (2) (a) तथा (d)

(3) (a) तथा (e) (4) (a)

A. 1

Sol. The lone pair which is participating in resonanace and aromaticity will not be a favourable site for protonation.



lone pair of N atom at b, c and d is not the part of aromaticity and is not participating in resonance.

Question ID : 4165299539

Option 1 ID : 41652937616 Option 2 ID : 41652937617

Option 3 ID : 41652937615 Option 4 ID : 41652937614

4. Taj mahal is being slowly disfigured and discoloured. This is primarily due to :

(1) Global warming (2) Water pollution

(3) Acid rain (4) Soil pollution

ताजमहल धीरे–धीरे विरूप तथा बेरंग होता जा रहा है। यह मुख्य रूप में इस कारण से है :

(1) ग्लोबल वार्मिंग (2) जल प्रदूषण

(3) अम्ल वृष्टि (4) मृदा प्रदूषण

A. 3

Sol. Taj Mahal is being slowly disfugured and discoloured due to Acid Rain.

Question ID : 4165299554

Option 1 ID : 41652937675 Option 2 ID : 41652937677

Option 3 ID : 41652937676 Option 4 ID : 41652937674

5. Given the equilibrium constant :
K_C of the reaction :
$Cu(s) + 2Ag^+(aq) \rightarrow Cu^{2+}(aq) + 2Ag(s)$ is :
10×10^{15}, calculate the E^{θ}_{cell} of this reaction at 298 K

$$\left[2.303\frac{RT}{F}\text{at } 298\,K = 0.059V\right]$$

$Cu(s) + 2Ag^+(aq) \rightarrow Cu^{2+}(aq) + 2Ag(s)$
अभिक्रिया का दिया गया साम्य स्थिरांक, K_C,
10×10^{15} है। 298K पर इस अभिक्रिया के E^{θ}_{cell} की गणना कीजिए।

$$\left[2.303\frac{RT}{F}\text{at } 298\,K = 0.059V\right]$$

(1) 0.4736 mV (2) 0.04736 V (3) 0.04736 mV (4) 0.4736 V

A. 4

Sol. $$E^0_{cell} = \frac{0.059}{n}\log K_C$$
$$= \frac{0.059}{2}\log 10^{16}$$
$$= 0.472\ V$$

Question ID : 4165299563

Option 1 ID : 41652937713 Option 2 ID : 41652937710

Option 3 ID : 41652937712 **Option 4 ID : 41652937711**

6. This reaction that does not define calcination is :
अभिक्रिया जो निस्तापन को परिभाषित नहीं करती है, है :

(1) $2Cu_2S + 3O_2 \xrightarrow{\Delta} 2Cu_2O + 2SO_2$

(2) $Fe_2O_3 \,.\, XH_2O \xrightarrow{\Delta} Fe_2O_3 + XH_2O$

(3) $CaCO_3 \,.\, MgCO_3 \xrightarrow{\Delta} CaO + MgO + 2CO_2$

(4) $ZnCO_3 \xrightarrow{\Delta} ZnO + CO_2$

A. 1

Sol. Calcination involves heating in absence of air.

$\therefore$ $2Cu_2S + 3O_2 \xrightarrow{\Delta} 2Cu_2O + 2SO_2$

This is not calcination rather it is roasting (heating in a regular supply of air)

Question ID : 4165299547

Option 1 ID : 41652937649 Option 2 ID : 41652937646

Option 3 ID : 41652937648 Option 4 ID : 41652937647

7. The reaction,

$MgO(s) + C(s) \longrightarrow Mg(s) + CO(g)$, for which $\Delta_r H^\circ = +491.1\ kJ\ mol^{-1}$ and $\Delta_r S^\circ = 198.0 JK^{-1}\ mol^{-1}$, is not feasible at 298 K. Temperature above which reaction will be feasible is :

अभिक्रिया $MgO(s) + C(s) \longrightarrow Mg(s) + CO(g)$ जिसका $\Delta_r H^\circ = +491.1\ kJ\ mol^{-1}$ तथा $\Delta_r S^\circ = 198.0 JK^{-1}\ mol^{-1}$ है, 298 K पर सम्भव नहीं है। वह ताप जिसके ऊपर अभिक्रिया सम्भव होगी, है :

(1) 2380.5 K (2) 2040.5K (3) 1890.0 K (4) 2480.3 K

A. 4

Sol. $MgO(s) + C(s) \longrightarrow Mg(s) + CO(g)$

For reaction to be spontaneous

$\Delta_r H^o - T\Delta_r S^o < O$

$$\Rightarrow \quad T > \frac{\Delta_r H^o}{\Delta_r S^o}$$

$$T > \frac{491.1 \times 1000}{198}$$

$T > 2480.3$ K

Question ID : 4165299560

Option 1 ID : 41652937700 Option 2 ID : 41652937698

Option 3 ID : 41652937701 **Option 4 ID : 41652937699**

8. The standard reaction Gibbs energy for a chemical reaction at an absolute temperature T is given by :

$\Delta_r G^\circ = A - BT$

Where A and B are non-zero constants. Which of the following is TRUE about this reaction ?

(1) Exothermic if $A > 0$ and $B < 0$ (2) Endothermic if $A > 0$

(3) Endothermic if $A < 0$ and $B > 0$ (4) Exothermic if $B < 0$

परम ताप T पर एक रासायनिक अभिक्रिया के लिए मानक अभिक्रिया गिब्ज ऊर्जा निम्न के द्वारा अभिव्यक्त की जाती है :

$\Delta_r G^\circ = A - BT$

जहाँ A तथा B शून्य न होने वाले स्थिरांक हैं। इस अभिक्रिया के लिए निम्न में से कौन–सा सत्य है?

(1) ऊष्माशोषी यदि $A > 0$ तथा $B < 0$ (2) ऊष्माशोषी यदि $A > 0$

(3) ऊष्माशोषी यदि $A < 0$ तथा $B > 0$ (4) ऊष्माक्षेपी यदि $B < 0$

A. 2

Sol. $\Delta_r G^o = A - BT$

A and B are non-zero constant

$\because \quad \Delta G^o = \Delta H^o - T\Delta S^o = A - BT$

$\therefore$ Reaction will be endothermic if $A > 0$.

Question ID : 4165299559

Option 1 ID : 41652937697 **Option 2 ID : 41652937694**

Option 3 ID : 41652937696 Option 4 ID : 41652937695

9. The correct match between Item I and Item II is :

Item I	Item II
(A) Allosteric site	(P) Molecule binding to the active site of enzyme
(B) Competitive inhibitor	(Q) Molecule crucial for communication in the body
(C) Receptor	(R) Molecule binding to a site other than the active site of enzyme
(D) Poison	(S) Molecule binding to the enzyme covalently

मद-I तथा मद-II के बीच सही सुमेल है :

मद-I	मद-II
(A) एलोस्टेरिक प्रभार	(P) एन्जाइम के सक्रिय भाग से अणु का बंधन
(B) प्रतिस्पर्धी निरोधक	(Q) शरीर में संकटकालीन संसूचक अणु
(C) ग्राही	(R) एन्जाइम के सक्रिय भाग के अलावा अणु का बंधन
(D) विष	(S) अणु जो एन्जाइम से सहसंयोजक रूप से आबंधित है

(1) A–P, B–R, C–S, D–Q (2) A–R, B–P, C–S, D–Q

(3) A–P, B–R, C–Q, D–S (4) A–R, B–P, C–Q, D–S

A. 4

Sol. Allosteric effect : Molecule bind to a site other than the active site of enzyme

Competitive inhibitor : Molecule bind to the active site

Receptor : Molecule crucial for communication in the body.

Poison : Molecule binding to the enzyme covalently

Question ID : 4165299545

Option 1 ID : 41652937639 Option 2 ID : 41652937641

Option 3 ID : 41652937638 **Option 4 ID : 41652937640**

10. The relative stability of +1 oxidation state of group 13 elements follows the order

ग्रुप 13 तत्वों की +1 ऑक्सीकरण अवस्था का आपेक्षिक स्थायित्व इस क्रम में है :

(1) Ga < A*l* < In <T*l* (2) T*l* < In < Ga < A*l* (3) A*l* < Ga < T*l* < In (4) A*l* < Ga < In < T*l*

A. 4

Sol. Due to inert pair effect, as we move down the group-13 elements, stability of +1 oxidation state increases.

∴ Correct order of stability is

Al < Ga < In < TI

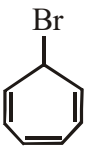
Question ID : 4165299550

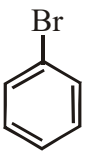
Option 1 ID : 41652937660 Option 2 ID : 41652937659

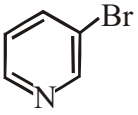
Option 3 ID : 41652937661 **Option 4 ID : 41652937658**

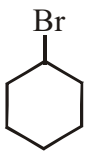
11. Which of the following compounds will produce a precipitate with $AgNO_3$:

$AgNO_3$ के साथ निम्न यौगिकों में से कौन सा अवक्षेप देगा :

(1) 

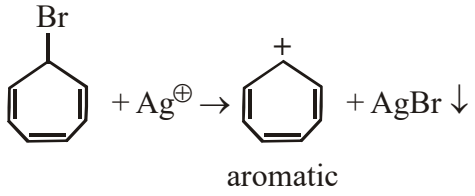
(2) 

(3) 

(4) 

A. 1

Sol.



Question ID : 4165299544

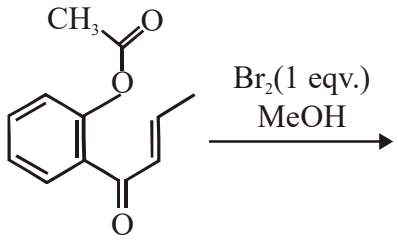
Option 1 ID : 41652937637

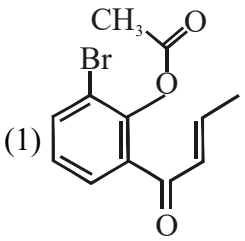
Option 2 ID : 41652937634

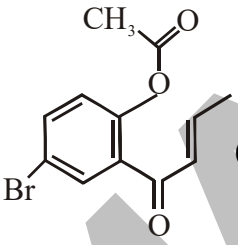
Option 3 ID : 41652937636

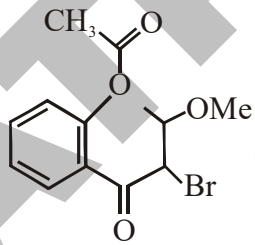
Option 4 ID : 41652937635

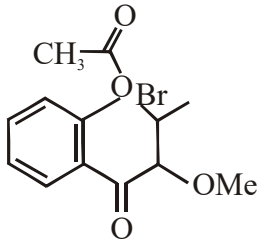
12. The major product obtained in the following conversion is :
निम्न रूपान्तरण में प्राप्त होने वाला मुख्य उत्पाद है :



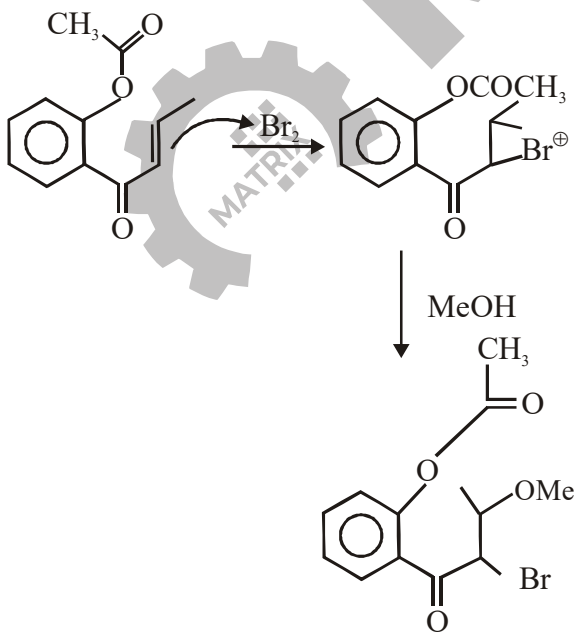
(1) 

(2) 

(3) 

(4) 

A. 3

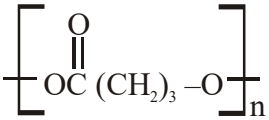
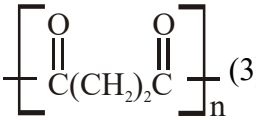
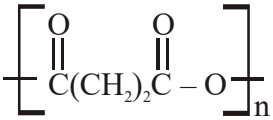
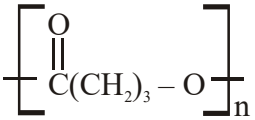
Sol. 

Question ID : 4165299543

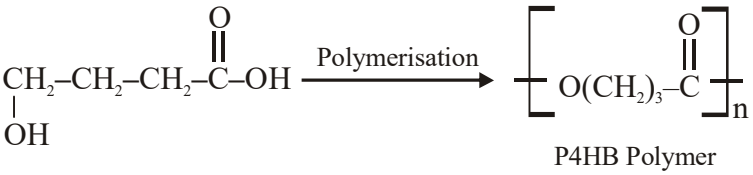
Option 1 ID : 41652937630 Option 2 ID : 41652937631

Option 3 ID : 41652937632 Option 4 ID : 41652937633

13. The homopolymer formed from 4-hydroxy butanoic acid is :
4-हाइड्राक्सी ब्यूटेनोइक अयन से बनने वाला समबहुलक है :

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

A. 4

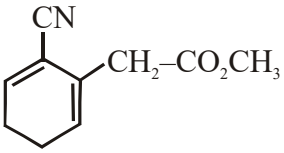
Sol. 

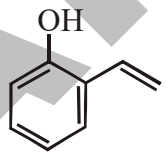
Question ID : 4165299538

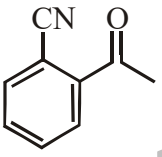
Option 1 ID : 41652937610 Option 2 ID : 41652937611

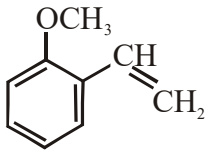
Option 3 ID : 41652937612 **Option 4 ID : 41652937613**

14. Which of the following compounds reacts with ethylmagnesium bromide and also decolourizes bromine water soolution :
निम्नलिखित में से कौन–सा यौगिक एथिल मैग्नीशियम ब्रोमाइड से अभिक्रिया करता है तथा ब्रोमीन जल को रंगहीन भी करता है?

(1) 

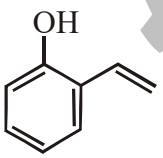
(2) 

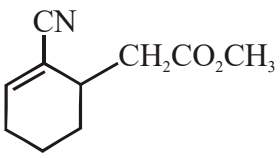
(3) 

(4) 

A. 2

Sol. Phenol or unsaturated hydrocarbon (alkene or alkyne) decolourised bromine water solution.
C_2H_5MgBr will react with carbonyl carbon or acidic hydrogen.

 reacts with C_2H_5 MgBr and also decolourized bromine water solution

 will also give positive bromine water test and give substitution product with EtMgBr

Question ID : 4165299536

Option 1 ID : 41652937603 **Option 2 ID : 41652937602**

Option 3 ID : 41652937604 Option 4 ID : 41652937605

15. The hydride that is NOT electron deficient is :
हाइड्राइड जो इलेक्ट्रॉन–न्यून नहीं है, वह है :

(1) SiH_4 (2) GaH_3 (3) AlH_3 (4) B_2H_6

A. 1

Sol SiH_4 – Electron precise hydride

GaH_3 – Electron deficient hydride

B_2H_6 – Electron deficient hydride

AlH_3 – Electron deficient hydride

Question ID : 4165299548

Option 1 ID : 41652937650 Option 2 ID : 41652937653

Option 3 ID : 41652937651 Option 4 ID : 41652937652

16. Among the colloids cheese (C), Milk (M), Smoke (S) the correct combination of the dispersed phase and dispersion medium, respectively is :

(1) C : liquid in solid ; M : liquid in solid ; S : solid in gas

(2) C : solid in liquid ; M : solid in liquid ; S : solid in gas

(3) C : liquid in solid ; M : liquid in liquid ; S : solid in gas

(4) C : solid in liquid ; M : liquid in liquid ; S : gas in solid

कोलाइडों, जैसे पनीर (C), दूध (M), तथा धूआं (S) के विषय में परिक्षिप्त प्रावस्था तथा परिक्षेपण माध्यम का सही मेल क्रमशः होगा।

(1) C : द्रव में ठोस; M : द्रव में ठोस; S : गैस में ठोस

(2) C : ठोस में द्रव; M : ठोस में द्रव ; S : गैस में ठोस

(3) C : द्रव में ठोस; M : द्रव में द्रव; S : गैस में ठोस

(4) C : ठोस में द्रव; M : द्रव में द्रव; S : गैस में ठोस

A. 3

Sol.

		Dispersed phase	Dispersion medium
(C)	Cheese	liquid	solid
(M)	Milk	liquid	liquid
(S)	Smoke	solid	gas

Question ID : 4165299565

Option 1 ID : 41652937720 Option 2 ID : 41652937719

Option 3 ID : 41652937721 Option 4 ID : 41652937718

17. 25 ml of the given HCl solution requires 30 mL of 0.1 M sodium carbonate solution. What is the volume of this HCl solution required to titrate 30 mL of 0.2 M aqueous NaOH solution :

25 ml HCl विलयन के लिये 0.1 M सोडियम कार्बोनेट विलयन का 30 mL आवश्यक होता है, 0.2 M जलीय NaOH के विलयन को अनुमापित करने के लिये इस HCl विलयन के कितने आयतन की आवश्यकता होगी ?

(1) 25 mL (2) 75 mL (3) 50 mL (4) 12.5 mL

A. 1

Sol. 25 mL of HCl solution required 30 mL of 0.1 M Na_2CO_3 solution

$\therefore \quad 25 \times M \times 1 = 30 \times 0.1 \times 2$

$\Rightarrow \quad M = \frac{6}{25} = 0.24 \text{ M}$

Now, HCl solution is titrated with NaOH solution.

$\therefore \quad V \times 0.24 \times 1 = 30 \times 0.2 \times 1$

$\Rightarrow \quad V = 25 \text{ mL}$

Question ID : 4165299556

Option 1 ID : 41652937682 Option 2 ID : 41652937684

Option 3 ID : 41652937683 Option 4 ID : 41652937685

Status : Answered

18. $\underline{A} \xrightarrow{4KOH,O_2} 2\underline{B} + 2H_2O$

(Green)

$3\underline{B} \xrightarrow{4HCl} 2\underline{C} + MnO_2 + 2H_2O$

(Purple)

$2\underline{C} \xrightarrow{H_2O,KI} 2\underline{A} + 2KOH + \underline{D}$

In the above sequence of reactions, A and D, respetively, are :

(1) KIO_3 and MnO_2 (2) KI and $KMnO_4$ (3) MnO_2 and KIO_3 (4) KI and K_2MnO_4

$\underline{A} \xrightarrow{4KOH,O_2} 2\underline{B} + 2H_2O$

(हवा)

$3\underline{B} \xrightarrow{4HCl} 2\underline{C} + MnO_2 + 2H_2O$

(बैगनी)

$2\underline{C} \xrightarrow{H_2O,KI} 2\underline{A} + 2KOH + \underline{D}$

अभिक्रियाओं के उपरोक्त क्रम में, A तथा D क्रमशः है –

(1) KIO_3 तथा MnO_2 (2) KI तथा $KMnO_4$ (3) MnO_2 तथा KIO_3 (4) KI तथा K_2MnO_4

A. 3

Sol. $\underset{(A)}{2MnO_2} + 4KOH + O_2 \longrightarrow \underset{\substack{(Green)\\(B)}}{2K_2MnO_4} + 2H_2O$

$K_2MnO_4 + 4HCl \longrightarrow \underset{\substack{(Purple)\\(C)}}{2KMnO_4} + MnO_2 + 2H_2O$

$2KMnO_4 + H_2O + Kl \longrightarrow 2MnO_2 + 2KOH + \underset{(D)}{KIO_3}$

A – MnO_2

D – KIO_3

Question ID : 4165299551

Option 1 ID : 41652937664 Option 2 ID : 41652937665

Option 3 ID : 41652937663 Option 4 ID : 41652937662

19. The radius of the largest sphere which fits properly at the centre of the edge of a body centred cubic unit cell is : (Edge length is represented by 'a')

काय केन्द्रित घन एकल सेल के कोर के केन्द्र में बैठने वाले (फिट होने वाले) सबसे बड़े गोले की त्रिज्या होगी (कोर लम्बाई को 'a' द्वारा व्यक्त किया गया है)

(1) 0.067 a (2) 0.134 a (3) 0.027 a (4) 0.047 a

A. 1

Sol. For BCC

$\sqrt{3}\,a = 4R$

$\Rightarrow \quad R = \frac{\sqrt{3}\,a}{4}$

$\therefore$ Empty space at edge = a – 2R

$= a - \frac{\sqrt{3}\,a}{2}$

= diameter of sphere

$\therefore \quad r_{sphere} = \frac{a - \frac{\sqrt{3}}{2}a}{2} = \left(\frac{2-\sqrt{3}}{4}\right)a$

= 0.067 a

Question ID : 4165299557

Option 1 ID : 41652937687 Option 2 ID : 41652937686

Option 3 ID : 41652937688 Option 4 ID : 41652937689

20. The correct option with respect to the Pauling electronegativity values of the elements is :
तत्वों के पाउलिंग विद्युत ऋणात्मकता मान का सही विकल्प है –

(1) Ga < Ge (2) Te > Se (3) P > S (4) Si < Al

A. 1

Sol. Correct order of electronegativity is

Si > Al

S > P

Se > Te

Ge > Ga

Question ID : 4165299546

Option 1 ID : 41652937645 Option 2 ID : 41652937642

Option 3 ID : 41652937643 Option 4 ID : 41652937644

21. The de Broglie wavelength (λ) associated with a photoelectron varies with the frequency (v) of the incident radiation as, [v_0 is threshold frequency]
प्रकाशिक इलेक्ट्रॉन से सम्बन्धित डि–ब्रॉग्ली तरंगदैर्ध्य (λ) आपतित विकिरण की आवृति (v) के साथ इस प्रकार परिवर्तित होती है, [v_0 = देहली आवृति]

(1) $\lambda \propto \frac{1}{(v - v_0)^{\frac{1}{4}}}$ (2) $\lambda \propto \frac{1}{(v - v_0)^{\frac{3}{2}}}$ (3) $\lambda \propto \frac{1}{(v - v_0)^{\frac{1}{2}}}$ (4) $\lambda \propto \frac{1}{(v - v_0)}$

A. 3

Sol. Accordin to de-Broglie wavelength equation

$\lambda = \frac{h}{mv} \quad \Rightarrow \quad \lambda \propto \frac{1}{v}$

From photoelectric effect.

$h\nu - h\nu_0 = \frac{1}{2}mv^2$

$v \propto (v - v_0)^{1/2}$

$$\therefore \quad \lambda \propto \frac{1}{(v - v_0)^{1/2}}$$

Question ID : 4165299558

Option 1 ID : 41652937692 | Option 2 ID : 41652937693

Option 3 ID : 41652937690 | Option 4 ID : 41652937691

22. For the equilibrium,

$2H_2O \rightleftharpoons H_3O^{\oplus} + OH^-$, the value of ΔG° at 298 K is approximately :

$2H_2O \rightleftharpoons H_3O^{\oplus} + OH^-$ साम्य के लिए, 298 K पर ΔG° का मान लगभग है –

(1) –100 kJ mol^{-1} (2) 100 kJ mol^{-1} (3) 80 kJ mol^{-1} (4) –80 kJ mol^{-1}

A. 3

Sol. $\Delta G = \Delta G^o + RT \ln Q$

At equilibrium

$\Delta G = 0$ and $Q = K_{eq}$

$\Rightarrow \quad \Delta G^o = -2.303\ RT \log K_w$

$= \quad -2.303 \times 8.314 \times 298 \log 10^{-14}$

$\simeq 80$ kJ / mol

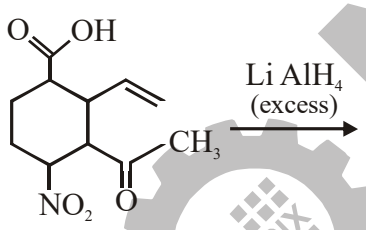
Question ID : 4165299562

Option 1 ID : 41652937706 | Option 2 ID : 41652937709

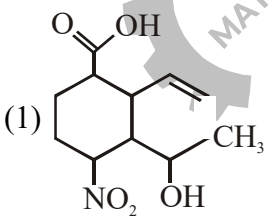
Option 3 ID : 41652937708 | Option 4 ID : 41652937707

23. The major product obtained in the following reaction is :

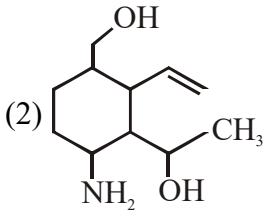
निम्न अभिक्रिया में प्राप्त मुख्य उत्पाद है।



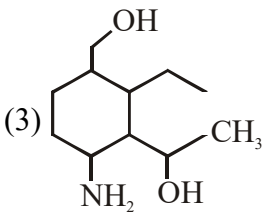
(1)



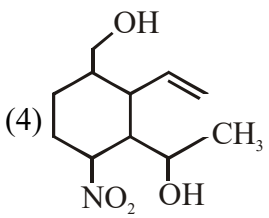
(2)



(3)

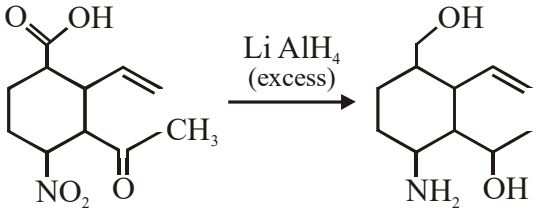


(4)



A. 2

Sol.



Question ID : 4165299541

Option 1 ID : 41652937623 **Option 2 ID : 41652937625**

Option 3 ID : 41652937624 Option 4 ID : 41652937622

24. The coordination number of Th in $K_4[Th(C_2O_4)_4(OH_2)_2]$ is : $\left(C_2O_4^{2-} = \text{Oxalato}\right)$

$K_4[Th(C_2O_4)_4(OH_2)_2]$ में Th की समन्वय संख्या है $\left(C_2O_4^{2-} = \text{Oxalato}\right)$

(1) 8 (2) 10 (3) 6 (4) 14

A. 2

Sol. $K_4[Th(C_2O_4)_4(OH_2)_2]$

$C_2O_4^{2-}$ is bidentate ligand and H_2O is monodentate ligand.

$\therefore$ Co-ordination no. of Th = $2 \times 4 + 2 = 10$

Question ID : 4165299553

Option 1 ID : 41652937671 **Option 2 ID : 41652937672**

Option 3 ID : 41652937670 Option 4 ID : 41652937673

25. K_2HgI_4 is 40% ionised in aqueous solution. The value of its van't Hoff factor (i) is :

K_2HgI_4 जलीय विलयन में 40% आयनित है। इसके वान्टहॉफ गुणांक (i) का मान होगा –

(1) 1.8 (2) 2.0 (3) 2.2 (4) 1.6

A. 1

Sol. $K_2HgI_4 \rightleftharpoons 2K^+ + [HgI_4]^{2-}$

$n = 3$

$\because \quad \alpha = \dfrac{i-1}{n-1}$

$0.4 = \dfrac{i-1}{3-1}$

$i = 1.8$

Question ID : 4165299561

Option 1 ID : 41652937703 Option 2 ID : 41652937704

Option 3 ID : 41652937705 Option 4 ID : 41652937702

26. The number of bridging CO ligand (s) and Co-Co bond(s) in $Co_2(CO)_8$, respectively are :

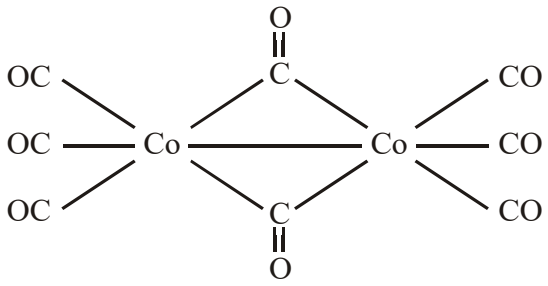
(1) 2 and 1 (2) 0 and 2 (3) 2 and 0 (4) 4 and 0

$Co_2(CO)_8$ में सेतु बंधन CO लिगेन्ड तथा Co-Co आबन्ध/आबन्धों की संख्या क्रमशः है –

(1) 2 तथा 1 (2) 0 तथा 2 (3) 2 तथा 0 (4) 4 तथा 0

A. 1

Sol.



Question ID : 4165299552

Option 1 ID : 41652937668 Option 2 ID : 41652937666

Option 3 ID : 41652937667 Option 4 ID : 41652937669

27. The higher concentration of which gas in air can cause stiffness of flower buds :
हवा में किसकी उच्च सान्द्रता फूल की कलियों में सख्तपन ला सकती है ?

(1) CO (2) SO_2 (3) CO_2 (4) NO_2

A. 2

Sol. High concentration of SO_2 leads to stiffness of flower buds.

Question ID : 4165299555

Option 1 ID : 41652937681 **Option 2 ID : 41652937678**

Option 3 ID : 41652937679 Option 4 ID : 41652937680

28. Match the following items in column I with the corresponding items in column II.

Column I	Column II
(i) $Na_2CO_3 . 10H_2O$	(A) Portland cement ingredient
(ii) $Mg(HCO_3)_2$	(B) Castner-Kellner process
(iii) NaOH	(C) Solvay process
(iv) $Ca_3Al_2O_6$	(D) Temporary Hardness

कॉलम I में दिये गये निम्न मदों को उनके संगत कॉलम II में दिये गये मदों से सुमेलित कीजिए।

Column I	Column II
(i) $Na_2CO_3 . 10H_2O$	(A) पोर्टलैंड सीमेंट का संघटक
(ii) $Mg(HCO_3)_2$	(B) कैस्टनर केलनर प्रक्रम
(iii) NaOH	(C) साल्वे प्रक्रम
(iv) $Ca_3Al_2O_6$	(D) अस्थायी कठोरता

(1) i – D, ii – A, iii – B, iv – C (2) i – C, ii – D, iii – B, iv – A

(3) i – C, ii – B, iii – D, iv – A (4) i – B, ii – C, iii – A, iv – D

A. 2

Sol. (i) $Na_2CO_3.10H_2O$ is prepared by Solvay process

(ii) $Mg(HCO_3)_2$ is the reason of temporary hardness

(iii) NaOH is prepared by Castner-Kellener process

(iv) $Ca_3Al_2O_6$ is the ingredient of Portland cement

Question ID : 4165299549

Option 1 ID : 41652937657 **Option 2 ID : 41652937656**

Option 3 ID : 41652937655 Option 4 ID : 41652937654

29. A compound 'X' on treatement with Br_2/NaOH, provided C_3H_9N, which gives positive carbylamine test. Compound 'X' is :

एक यौगिक 'X' को $Br_2/NaOH$ के साथ अभिकृत करने पर C_3H_9N दिया जो धनात्मक कार्बिलएमीन जाँच देता है। यौगिक 'X' की संरचना है –

(1) $CH_3CH_2CH_2CONH_2$ (2) $CH_3CON(CH_3)_2$

(3) $CH_3CH_2COCH_2NH_2$ (4) $CH_3COCH_2NHCH_3$

A. 1

Sol. C_3H_9N gives carbylamine test.

$\therefore$ C_3H_9N is primary aliphatic amine.

$$X + Br_2 + NaOH \longrightarrow \underset{\text{(Primary amine)}}{C_3H_9N}$$

$\therefore$ X is acid amide having formula

$$CH_3–CH_2–CH_2–\overset{\overset{O}{\|}}{C}–NH_2$$

Question ID : 4165299540

Option 1 ID : 41652937619 Option 2 ID : 41652937620

Option 3 ID : 41652937618 Option 4 ID : 41652937621

30. The reaction $2X \longrightarrow B$ is a zeroth order reaction. If the initial concentration of X is 0.2 M, the half-life is 6h. When the initial concentration of X is 0.5 M, the time required to reach its final concentration of 0.2 M will be अभिक्रिया $2X \longrightarrow B$ एक शून्य कोटि की अभिक्रिया है। 0.2 M की प्रारम्भिक सान्द्रता के लिए, अर्द्धआयु 6h है। यदि X की प्रारम्भिक सान्द्रता 0.5 M हो, तो 0.2 M की अंतिम सान्द्रता पहुचने में लगने वाला समय होगा –

(1) 18.0 h (2) 9.0 h (3) 12.0 h (4) 7.2 h

A. 1

Sol. For the reaction $2X \rightarrow B$, follow zeroth order

Rate equation is

$2\,Kt = [A]_0 - [A]$

For the half-life

$$2Kt = \frac{[A]_0}{2}$$

$$K = \frac{0.2}{2 \times 2 \times 6}$$

$$K = \frac{1}{120}\,M\,hr^{-1}$$

$\therefore$ time required to reach from 0.5 M to 0.2 M

$2\,Kt = [A]_0 - [A]$

$t = (0.5 - 0.2) \times 60$

$= 18$ hour

Question ID : 4165299564

Option 1 ID : 41652937715 Option 2 ID : 41652937716

Option 3 ID : 41652937717 Option 4 ID : 41652937714