JEE-Main-25-07-2022-Shift-2 (Memory Based)

Chemistry

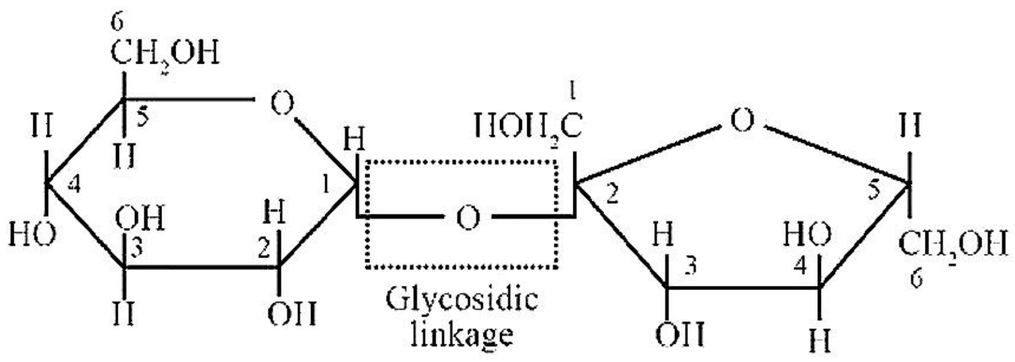
Question: Which of the following is herbicides?
Options:
(a) DDT
(b) Aldrin
(c) Sodium arsenite
(d) Dieldrin
Answer: (c)
Solution: Sodium arsenite is a herbicide

Question: Micelle formation is
Options:
(a) Exothermic, $\Delta S > 0$
(b) Endothermic, $\Delta S < 0$
(c) Exothermic, $\Delta S < 0$
(d) Endothermic, $\Delta S > 0$
Answer: (d)
Solution: $\Delta S > 0$ for micelle formation and the process is endothermic at low temperature.

Question: Glycosidic linkage between alpha glucose and beta fructose is present in
Options:
(a) lactose
(b) Sucrose
(c) Maltose
(d) None of these
Answer: (b)
Solution: Sucrose: One of the Common disaccharides is sucrose which on hydrolysis gives equimolar mixture of D-(+)-glucose and D-(-) fructose.

$$\underset{\text{Sucrose}}{C_{12}H_{22}O_{11}} + H_2O \rightarrow \underset{\text{D-(-)-Glucose}}{C_6H_{12}O_6} + \underset{\text{D-(-)-Fructose}}{C_6H_{12}O_6}$$

These two monosaccharides are held together by a glycosidic linkage between C1 of α-D-glucose and C2 of β-D-fructose. Since the reducing groups of glucose and fructose are involved in glycosidic bond formation, sucrose is a non reducing sugar.



α-D-Glucose β-D-Fructose

Sucrose

Question: What is the correct order of density for group 2 elements?
Options:
(a) Bc > Mg > Ca > Sr
(b) Ca > Mg > Be > Sr
(c) Mg < Ca < Sr < Be
(d) Ca < Mg < Bc < Sr
Answer: (d)
Solution: The size of alkali metals increases down the group, and volume also shows an increase. Since volume is inversely proportional to the density, there is an increase in the volume, which is lesser than increasing mass in the case of Sr and Ba. So as moving down the group, density decreases first and then increases.

Question: What is the hybridization of Xe in the following compounds XeO_3, XeF_6, XeO_2F_2
Options:
(a) XeO_3–sp^3, XeF_6–sp^3d^3, XeO_2F_2–sp^3d
(b) XeO_3–sp^3d, XeF_6–sp^3, XeO_2F_2–sp^3d^3
(c) XeO_3–sp^3d^2, XeF_6–sp^3, XeO_2F_2–sp^3
(d) XeO_3–sp^3d, XeF_6–sp^3d^2, XeO_2F_2–sp^3d
Answer: (a)
Solution: Hybridization of Xe in
$XeO_3 \Rightarrow sp^3$
$XeF_6 \Rightarrow sp^3d^3$
$XeO_2F_2 \Rightarrow sp^3d$

Question: 99.9 % pure dihydrogen can be prepared by
Options:
(a) Reaction of methane with steam
(b) Mixing natural hydrocarbons of high molecular weight
(c) Electrolysis of water
(d) Reaction of salts like hydride with water
Answer: (c)
Solution: Highly pure hydrogen can be obtained by electrolysis of water.
It is the decomposition of water into O_2 & H_2 gas by passing electric current.
At anode, $6H_2O(l) \rightarrow O_2(g) + 4H_3O^+ + 4e$
cathode, $4e^- + 4H_2O(l) \rightarrow 2H_2(g) + 4OH^-(ag)$

Overall $\rightarrow 2H_2O(l) \rightarrow 2H_2(g) + O_2(g)$

Question: The first ionization energy order B, Be, C, O, N among is _____
Options:
(a) B < Be < C < O < N
(b) B < Be < C < N < O
(c) Be < B < C < N < O
(d) Be < B < C < O < N
Answer: (a)
Solution: The ionisation energy increases across a period as atomic size decrease
Therefore, correct order is B < Be < C < O < N

Question: Drugs which do not bind to its active site is called
Options:
(a) Allosteric site
(b) Non active site
(c) Both (a) and (b)
(d) None of the above
Answer: (a)
Solution: Some drugs do not bind to enzyme's active site.
These bind to a different site of enzyme called allosteric site

Question: Match the following.

Column-I (polymer)	Column-II (Uses)
(A) Nylon 6	(i) non sticking Utensils
(B) HDP	(ii) Buckets
(C) LDP	(iii) Brush Bristles
(D) Teflon	(iv) Toys

Options:
(a) A → (i); B → (iii); C → (iv); D → (ii)
(b) A → (iii); B → (ii); C → (iv); D → (i)
(c) A → (ii); B → (i); C → (iv); D → (iii)
(d) A → (iv); B → (iii); C → (ii); D → (i)
Answer: (b)
Solution:
(A) Nylon 6 ⇒ (iii) Brush Bristles
(B) HDP ⇒ (ii) Buckets
(C) LDP ⇒ (iv) Toys
(D) Teflon ⇒ (i) non sticking Utensils

Question: Statement-I: Pig iron can be obtained from cast Iron.
Statement-II: Cast iron has least carbon content
Options:
(a) Both Statement I and Statement II are correct.
(b) Both Statement I and Statement II are incorrect.
(c) Statement I is correct, but Statement II is incorrect.

(d) Statement I is incorrect, but Statement II is correct.

Answer: (b)

Solution: Cast iron is made from pig iron

Wrought iron has least carbon content

Both S-I and S-II are false

Question: $CH_3 - CH_2 - CN \xrightarrow{CH_3MgBr} A \xrightarrow{H_3O^+} B \xrightarrow{Zn,Hg/HCl} C$

What is C?

Options:

(a) $CH_3CH_2CH_3$

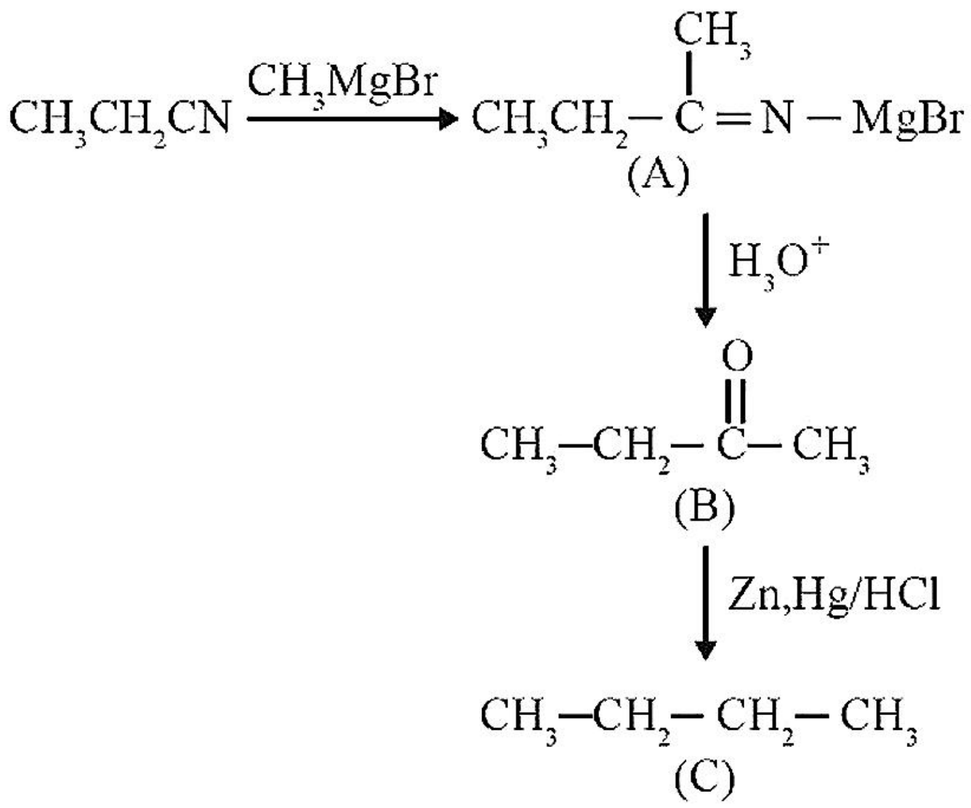
(b) $CH_3CH_2CH_2OH$

(c) $CH_3CH_2CH_2CH_3$

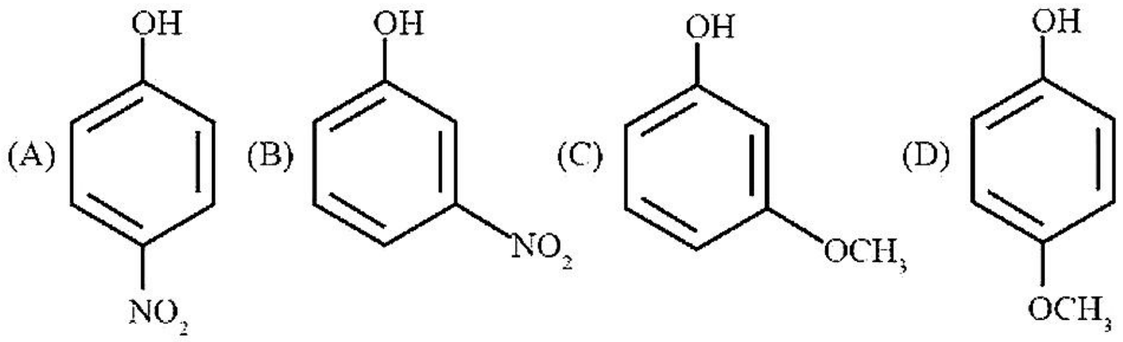
(d) $CH_3CH_2COCH_3$

Answer: (c)

Solution:



Question: Which of the following is correct decreasing order of acidity?



Options:

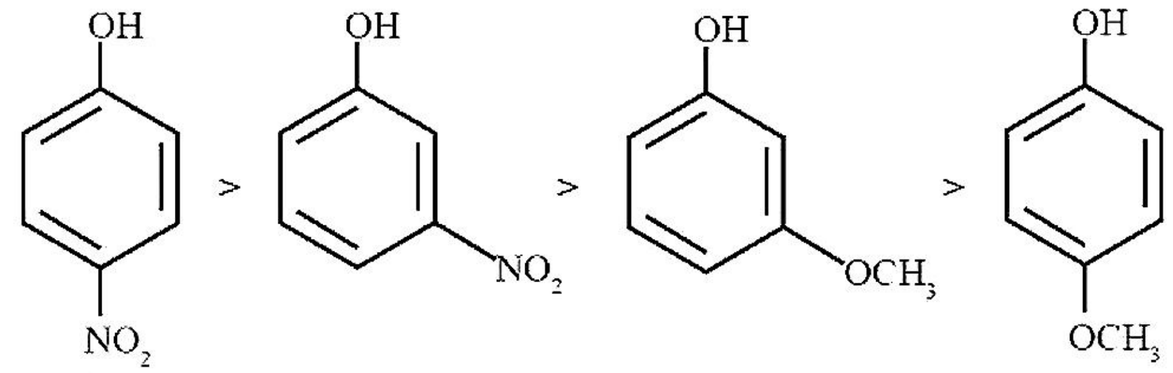
(a) A > B > C > D

(b) B > C > A > D

(c) C > A > B > D

(d) D > A > B > C

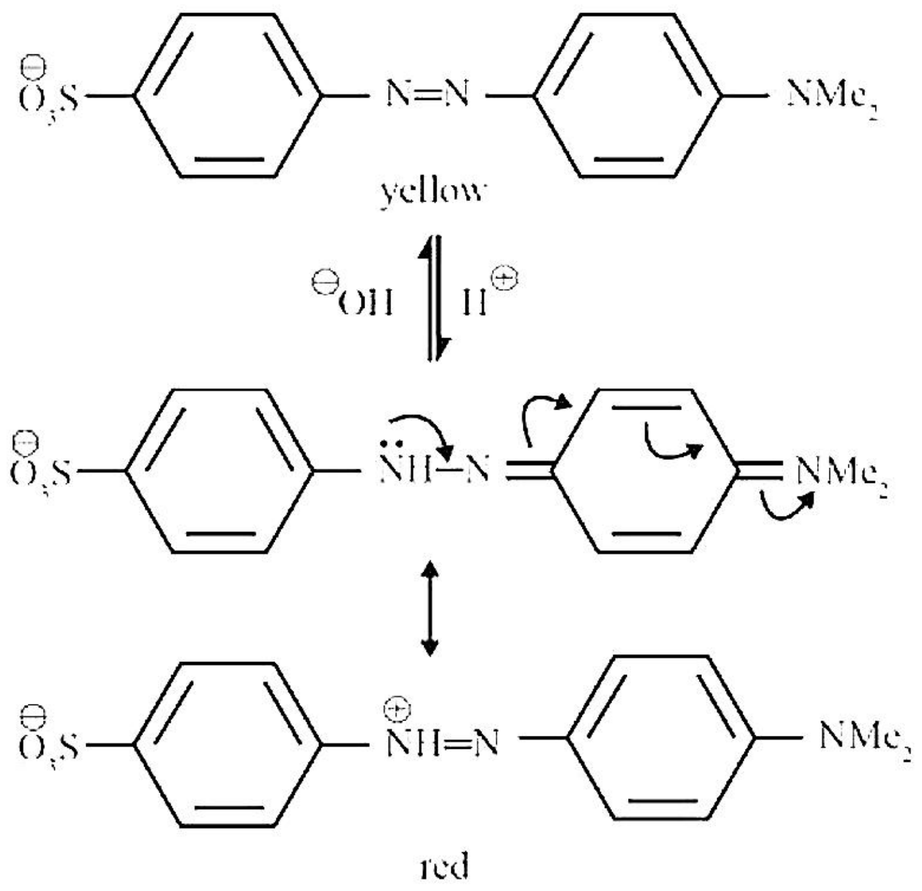
Answer: (a)
Solution:



(A) (B) (C) (D)

A shows –I effect, –m effect
B shows –I effect due to $–NO_2$ group
C shows –I effect due to $–OCH_3$ group
D shows +m effect and –I but +m effect is dominating here
∴ Order is A > B > C > D

Question: Methyl orange structure at end point?
Options:
(a) Quinoid form
(b) Benzenoid form
(c) Both (a) and (b)
(d) None of these
Answer: (a)
Solution:



Question: Mn^{3+}/Mn^{2-}, Fe^{3-}/Fe^{2+}, Cr^{3+}/Cr^{2+}, Co^{3+}/Co^{2-}.
Find the magnetic moment in M^{21} which has negative $E_{red.}$
Answer: 4.90

Solution:

$E^{o}_{Mn^{3+}/Mn^{2+}} = +1.57$

$E^{o}_{Fe^{3+}/Fe^{2+}} = +0.77$

$E^{o}_{Co^{3+}/Co^{2+}} = +1.97$

$E^{o}_{Cr^{3+}/Cr^{2+}} = -0.41$

Magnetic moment of $Cr^{2+} = \sqrt{4(4+2)} = 4.9$ BM

Question: XeO_3, XeF_6, XeO_2F_2 sum of lone pair of central atom is ___

Answer: 3.00

Solution:

$XeO_3 \Rightarrow$ 1 lone pair

$XeF_6 \Rightarrow$1 lone pair

$XeO_2F_2 \Rightarrow$ 1 lone pair

Sum = 1 + 1 + 1 = 3 lone pair

Question: Total number of spectral line emitted when electrons jumps from n = 5 to ground state?

Answer: 10.00

Solution: If the electron jumps from $n_2 = 5$ to $n_1 = 1$

Then following transition possible

$5 \rightarrow 4, 5 \rightarrow 3, 5 \rightarrow 2, 5 \rightarrow 1$

$4 \rightarrow 3, 4 \rightarrow 2, 4 \rightarrow 1$

$3 \rightarrow 3, 3 \rightarrow 1$

$2 \rightarrow 1$

Hence, 10 transitions are possible

Question: Total number of acidic oxides among is/are ___

N_2O, CO, N_2O_5, CO_2, P_2O_5

Answer: 3.00

Solution:

CO, N_2O are neutral oxide

N_2O_5, CO_2, P_2O_5 are acidic oxides