JEE-Main-28-01-2025 (Memory Based)
[MORNING SHIFT]
Chemistry

Question: The product A and B in the following reactions, respectively

$(A) \leftarrow^{AgNO_2} CH_3CH_2CH_2Br \rightarrow^{AgCN} B$

Options:

(a) CH_3 - CH_2 - CH_2 - ONO, CH_3 - CH_2 - CH_2 - CN

(b) CH_3 - CH_2 - CH_2 - NO_2, CH_3 - CH_2 - CH_2 - NC

(c) CH_3 - CH_2 → + CH_2 - NO_2, CH_3 - CH_2 - CH_2CN

(d) CH_3 - CH_2 - CH_2 - ONO, CH_3 - CH_2 - CH_2 - NC

Answer: (b)

Question: The molecules having square pyramidal geometry are

Options:

(a) SbF_3 & PCl_5

(b) BrF_5 & $XeOF_4$

(c) BrF_5 & PCl_5

(d) SbF_5 & XeF_4

Answer: (b)

Question: The incorrect decreasing order of atomic radii is,

Options:

(a) Si > P > Cl > F

(b) Mg > Al > C > O

(c) Al > B > N > F

(d) Be > Mg > Al > Si

Answer: (d)

Question: Consider the following element in ln TI, Al, and Pb. The most stable oxidation states of elements with highest and lowest first ionisation enthalpies, respectively are

Options:

(a) +4 and +1

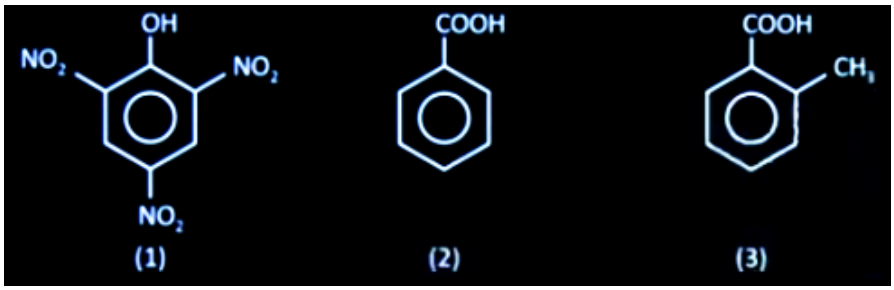
(b) +2 and +3

(c) +4 and +3

(d) +1 and +4

Answer: (d)

Question: What is the rate of reaction CO_2(g) with aq. $NaHCO_3$ among the following?

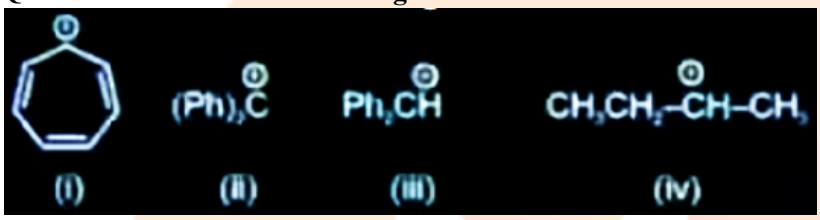


Options:

(a) (1) > (2) > (3)
(b) (3) > (2) > (1)
(c) (1) > (3) > (2)
(d) (2) > (3) > (1)

Answer: (c)

Question: Consider the following carbocations



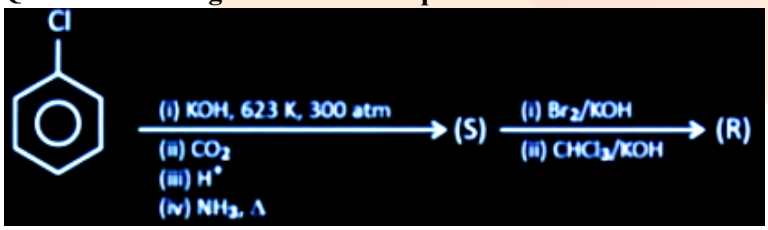
The correct increasing order of stability of these carbocations is:

Options:

(a) i < ii < iii < iv
(b) iv < iii < ii < i
(c) ii < iii < iv < i
(d) iv < iii < i < ii

Answer: (b)

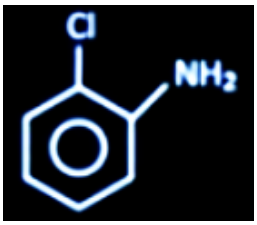
Question: In the given reaction sequence:

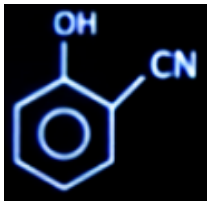


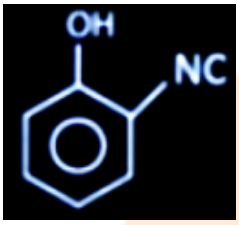
What is (R)

Options:

(a) 

(b) 

(c) 

(d) 

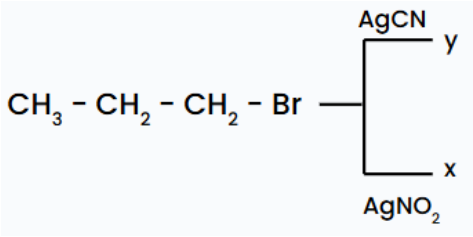
Answer: (d)

Question: Which of the following set of quantum numbers have same energy?
(a) n = 2, I = 2, m = + 1
(b) n = 2, I = 1, m = - 1
(c) n = 3, I = 2, m = 0
(d) n = 3, I = 2, m = 1
Options:
(a) a, b
(b) b, c
(c) c, d
(d) a, c
Answer: (c)

Question: Which has the same no. of unpaired e^- as no of lone pairs in ClF_3?
Options:
(a) V^{2+} , Ni^{2+}
(b) V^{3+}, Cu^{2+}
(c) Cu^{2+}, Ni^{2+}
(d) Ni^{2+}, V^{3+}
Answer: (d)

Question: Which will give a positive test in both acetone and acetaldehyde?
Options:
(a) 2, 4 DNP
(b) Tollen's Reagent
(c) Fehling's solution
(d) Schiff's base test
Answer: (a)

Question: Consider the following reaction



The major product x and y respectively are
Options:
(a) $CH_3CH_2CH_2ONO$ & $CH_3CH_2CH_2CN$
(b) $CH_3CH_2CH_2NO_2$ & $CH_3CH_2CH_2CN$
(c) $CH_3CH_2CH_2NO_2$ & $CH_3CH_2CH_2NC$
(d) $CH_3CH_2CH_2ONO$ & $CH_3CH_2CH_2CN$
Answer: (c)

Question: Match the following column and choose the correct option.

	Column-I		**Column-II**
A	**$H_2O_2 \rightarrow H_2O + O_2$**	**P**	**Combustion reaction**
B	**NaH 2♠ Na + H_2**	**Q**	**Disproportionation**
C	**$CH_4 + O_2 \rightarrow CO_2 + H_2O_2$**	**R**	**Decomposition reaction**
D	**$Fe + CuSO_4 \rightarrow FeSO_4 + Cu$**	**S**	**Displacement reaction**

Options:
(a) A-Q, B-P, C-R, D-S
(b) A-R, B-Q, C-S, D-P
(c) A-Q, B-R, C-P, D-S
(d) A-R, B-Q, C-P, D-S
Answer: (c)

Question: Mass % of C, H, Cl in an organic compound is given below. Find its empirical mass

Cl = 65 %
H = 1.8 %
C = 32.8%

Options:
(a) $C_3H_2Cl_2$
(b) C_3H_2Cl
(c) C_3HCl_2
(d) CH_2Cl_2
Answer: (a)

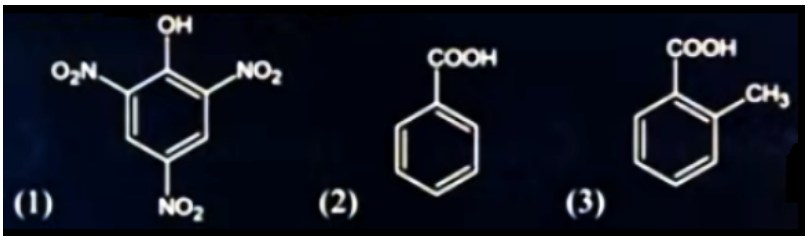
Question: A weak acid HA has degree of dissociation *x*. Which options gives the correct expression of (pH - pK_a)
Options:
(a) 0
(b) (log(1 + 2x))
(c) $log\left(\frac{x}{1-x}\right)$
(d) $log\left(\frac{1-x}{x}\right)$
Answer: (c)

Question: Both acetaldehyde and acetone (individually) undergo which of the following reactions,
(A) iodoform Reaction
(B) Cannizzaro Reaction
(C) Aldol condensation.
(D) Tollen's test
(E) Clemmensen Reduction
Options:
(a) A, C & E only
(b) A, D & E only
(c) A, B, C, D & E
(d) A & C only
Answer: (a)

Question: What is the freezing point of depression constant of a solvent 50g of which contain 1g of non-volatile solute (M.W: 256g/mol) and depression in freezing point is 0.4K
Options:
(a) 0.372K Kg mol^{-1}
(b) 4.213 K kg mol^{-1}
(c) 1.86K Kg mol^{-1}
(d) 5.12K Kg mol^{-1}
Answer: (d)

Question: Ice and water are placed in a closed container at a pressure at 1 atm and temperature 273.15K.
If the pressure of the container increases 2 times and the temperature is kept constant, than identify the correct observation from the following
Options:
(a) The amount of ice decreases
(b) Volume of system increases
(c) Liquid phase disappear completely
(d) Solid phase (ice) disappear completely
Answer: (d)

Question: What is the rate of reaction for releasing CO_2(g) with sq. $NaHCO_3$ among following?



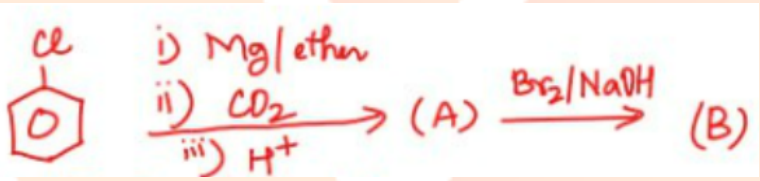
Options:
(a) (1) > (2) > (3)
(b) (3) > (2) > (1)
(c) (1) > (3) > (2)
(d) (2) > (3) > (1)
Answer: (c)

Question: 70% by mass solution of HNO_3 is taken having density 1.41 gm/ml. Calculate molarity (Rounded of to nearest integer)

Answer: (16)

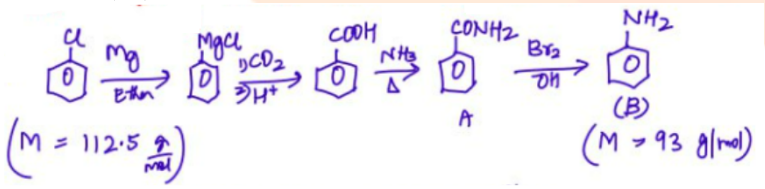
Question: $\Delta_f H$ of H(g) is 218 kJ/mol, $\Delta_f H$ of O(g) is 249.2kJ/mol, $\Delta_f H$ of H_2O is -241.8 kJ/mol. What is the value of Bond Energy of O - H bond in H_2O in kJ/mol?

Answer: (463.5)



Question:
11.25 mg iv) NH_3/Δ
The mass of B is $x \times 10^{-1}$ mg. Find x.

Answer: (93)



112.5g chlorobenzene → 93 g aniline
11.25 mg chlorobenzene $\rightarrow \frac{93g}{10^{11.25}g} \times 11.25$
= 9.3 mg = 93×10^{-1} mg