Q1 2021 (01 Sep Shift 2)

The potassium ferrocyanide solution gives a Prussian blue colour, when added to :

(1) $CoCl_3$

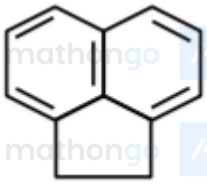
(2) $FeCl_2$

(3) $CoCl_2$

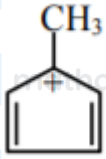
(4) $FeCl_3$

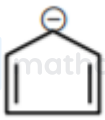
Q2 2021 (01 Sep Shift 2)

Which one of the following compounds is aromatic in nature ?

(1) 

(2) 

(3) 

(4) 

Q3 2021 (31 Aug Shift 2)

The transformation occurring in Duma's method is given below :

$$C_2H_7N + \left(2x + \frac{y}{2}\right) CuO \rightarrow xCO_2 + \frac{y}{2}H_2O + \frac{z}{2}N_2 + \left(2x + \frac{y}{2}\right) Cu$$

The value of y is ____. (Integer answer)

Q4 2021 (31 Aug Shift 2)

Match List−I with List−II :

	List-I (Metal Ion)		List-II (Group in Qualitative analysis)
(a)	Mn^{2+}	(i)	Group - III
(b)	As^{3+}	(ii)	Group - IIA
(c)	Cu^{2+}	(iii)	Group - IV
(d)	Al^{3+}	(iv)	Group - IIB

Choose the *most appropriate* answer from the options given below :

(1) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

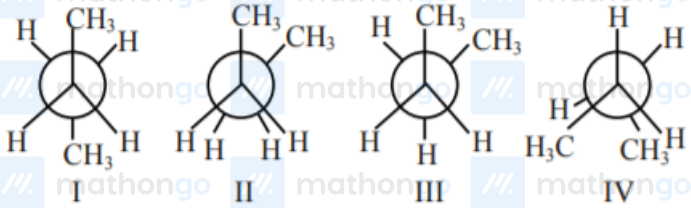
(2) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

(3) (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)

(4) (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

Q5 2021 (31 Aug Shift 2)

Arrange the following conformational isomers of n-butane in order of their increasing potential energy :



(1) II < III < IV < I

(2) I < IV < III < II

(3) II < IV < III < I

(4) I < III < IV < II

Q6 2021 (31 Aug Shift 1)

Given below are two statements : one is labelled as

Assertion $(\mathbf{A})$ and the other is labelled as *Reason* $(\mathbf{R})$:

Assertion $(\mathbf{A})$: A simple distillation can be used to separate a mixture of propanol and propanone.

Reason (**R**) : Two liquids with a difference of more than 20°C in their boiling points can be separated by simple distillations.

In the light of the above statements, choose the *most appropriate* answer from the options given below :

(1) (**A**) is false but (**R**) is true.

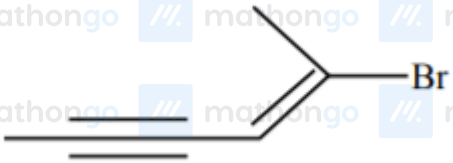
(2) Both(**A**) and (**R**) are correct but (**R**) is not the correct explanation of (**A**).

(3) (**A**) is true but (**R**) is false.

(4) Both (**A**) and (**R**) are correct and (**R**) is the correct explanation of (**A**).

Q7 2021 (31 Aug Shift 1)

Choose the *correct* name for compound given below:



(1) (4E)-5-Bromo-hex-4-en-2-yne

(2) (2E)-2-Bromo-hex-4-yn-2-ene

(3) (2E)-2-Bromo-hex-2-en-4-yne

(4) (4E)-5-Bromo-hex-2-en-4-yne

Q8 2021 (27 Aug Shift 1)

The number of moles of CuO, that will be utilized in Dumas method for estimation nitrogen in a sample of 57.5 g of N, N-dimethylaminopentane is ____ $\times 10^{-2}$. (Nearest integer)

Q9 2021 (27 Aug Shift 1)

In Carius method for estimation of halogens, 0.2 g of an organic compound gave 0.188 g of AgBr.

The percentage of bromine in the compound is

____.(Nearest integer)

[Atomic mass : Ag = 108, Br = 80]

Q10 2021 (26 Aug Shift 2)

A chloro compound " **A** ".

(i) forms aldehydes on ozonolysis followed by the hydrolysis.

(ii) when vaporized completely 1.53 g of A, gives 448 mL of vapour at STP.

The number of carbon atoms in a molecule of compound **A** is ____.

Q11 2021 (26 Aug Shift 2)

In the sulphur estimation, 0.471 g of an organic compound gave 1.44 g of barium sulphate. The percentage of sulphur in the compound is ____ %.

(Nearest integer)

(Atomic Mass of Ba = 137u)

Q12 2021 (26 Aug Shift 2)

The number of stereoisomers possible for 1,2 dimethyl cyclopropane is:

(1) One

(2) Four

(3) Two

(4) Three

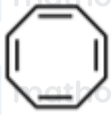
Q13 2021 (26 Aug Shift 2)

Which one of the following compounds is not aromatic ?

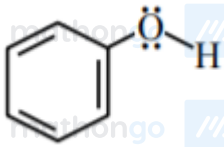
(1) 

(2) 

(3)



(4)



Answer Key

Q1 (4) **Q2** (4) **Q3** (7) **Q4** (2)

Q5 (4) **Q6** (4) **Q7** (3) **Q8** (1125)

Q9 (40) **Q10** (3) **Q11** (42) **Q12** (4)

Q13 (3)

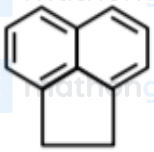
Q1 (4)

$FeCl_3 + K_4[Fe(CN)_6] \rightarrow Fe_4[Fe(CN)_6]_3$

Prussian blue

Q2 (4)

(1) (Acenaphthene)



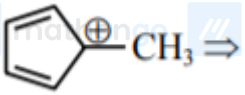
$\rightarrow 10\ \pi e^-$ in cyclic conjugation

$\rightarrow$ Aromatic

(2)

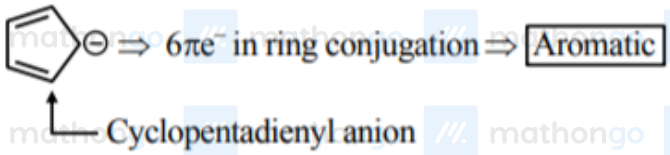
$4\pi e^-$ in ring conjugation $\Rightarrow$ Anti Aromatic

(3)



$4\pi e^-$ in ring conjugation $\Rightarrow$ Antiaromatic

(4)



$\Rightarrow 6\pi e^-$ in ring conjugation $\Rightarrow$ Aromatic

Cyclopentadienyl anion

Q3 (7)

$C_2H_7N + \left(2x + \frac{y}{2}\right) CuO \rightarrow xCO_2 + \frac{y}{2}H_2O + \frac{z}{2}N_2 + \left(2x + \frac{y}{2}\right) Cu$

On balancing

$C_2H_7N + \frac{15}{2}CuO \rightarrow 2CO_2 + \frac{7}{2}H_2O + \frac{1}{2}N_2 + \frac{15}{2}Cu$

On comparing

$y = 7$

Q4 (2)

$Mn^{2+} \rightarrow$ III group

$As^{3+} \rightarrow$ II B group

$Cu^{2+} \rightarrow$ II A group

$Al^{3+} \rightarrow$ IV group

Q5 (4)

More stable less potential energy.

Stability order : $I > III > IV > II$

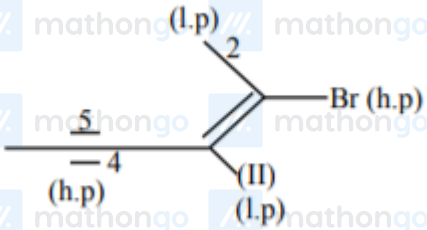
So

Potential energy: $II > IV > III > I$

Q6 (4)

Both assertion & reason are correct & (R) is the correct explanation of & (A)

Q7 (3)



h.p. $\Rightarrow$ higher priority

l.p. $\Rightarrow$ lower priority

$2E - 2$ - bromo hex -2 - en-4-yne

Q8 (1125)

Moles of N in N, N - dimethylaminopentane

$= \left(\frac{57.5}{115}\right) = 0.5$ mol

$\Rightarrow C_7H_{17}N + \frac{45}{2}CuO \rightarrow 7CO_2 + \frac{17}{2}H_2O + \frac{1}{2}N_2 + \frac{45}{2}Cu$

$$\frac{n_{Cuo \text{ reacted}}}{\left(\frac{45}{2}\right)} = \frac{n_{C_7H_{17}N \text{ reacted}}}{1}$$

$$\Rightarrow n_{cuO} \text{ reacted} = \left(\frac{45}{2}\right) \times 0.5 = 11.25$$

Q9 (40)

$$n_{AgBr} = \frac{0.188 \text{ g}}{188 \text{ g/mol}} = 10^{-3} \text{ mol}$$

$$\Rightarrow n_{Br} = n_{AgBr} = 0.001 \text{ mol}$$

$$\Rightarrow \text{mass}_{Br} = (0.001 \times 80)\text{gm} = 0.08\text{gm}$$

$$\Rightarrow \text{mass } \% = \frac{0.08 \times 100}{0.2} = 40\%$$

Q10 (3)

448ml of A $\Rightarrow$ 1.53gmA

22400ml of A $\Rightarrow \frac{1.53}{445} \times 22400$ gm A $= 7650$

$$\underset{\text{It has 3 carbon atoms}}{H_3CHC{-}CH{-}Cl} \xrightarrow[Zn\ /H_2O]{O_3} \underset{\text{Aldehyde}}{CH_3{-}CH{=}O}$$

& mm is $36 + 5 + 35.5 = 76.5$

Q11 (42)

Molecular mass of $BaSO_4 = 233$ g

$\because$ 233 $BaSO_4$ contain $\rightarrow$ 32 g sulphur

$\therefore$ 1.44 g $BaSO_4$ contain $\rightarrow \frac{32}{233} \times 1.44$ g sulphur

given : 0.471 g of organic compound

$$\% \text{ of S} = \frac{32 \times 1.44}{233 \times 0.471} \times 100 = 41.98\% \approx 42\%$$

OR

$$\underset{W_{OC}=0.471g}{\boxed{O.C.}} \longrightarrow \underset{1.44g}{BaSO_4}$$

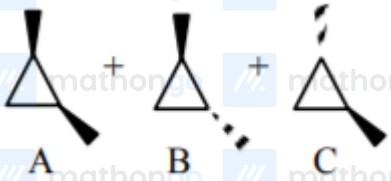
$$\Rightarrow n_s = n_{BaSO_4} = \frac{1.44}{233}$$

$\Rightarrow w_S = \frac{1.44}{233} \times 32\ g$

therefore $\%\ S = \frac{W_s}{W_{occ}} \times 100 = \frac{1.44 \times 32}{233 \times 0.471} \times 100$

$= \frac{46.08}{109.743} \times 100 = 41.98 \simeq 42$

Q12 (4)



Q13 (3)


: Non aromatic