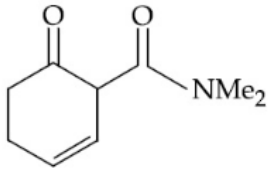
JEE Main – 2018 (CBT) Exam

Test Date: 15/04/2018
Test Time: 9:30 AM – 12:30 PM
Subject: JEE Main 2018 CBT EH

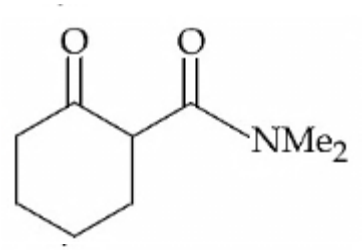
Chemistry

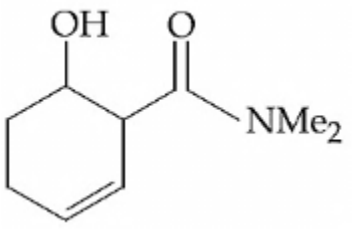
Q1:
The main reduction product of the following compound with NaBH4 in methanol is:

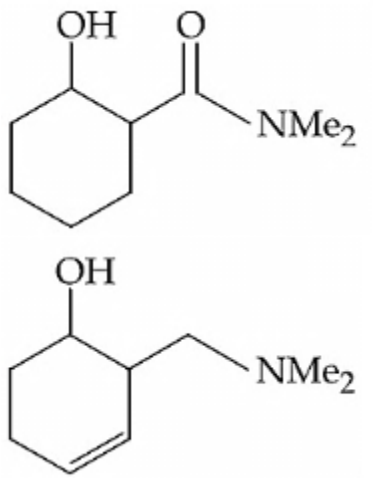


Options

1.

2. 

3. 

4. 

Q2:
A white sodium salt dissolves readily in water to give a solution which is neutral to litmus. When silver nitrate solution is added to the aforementioned solution, a white precipitate is obtained which does not dissolve in dil. nitric acid. The anion is:

Options

1. Cl^-
2. S^2
3. SO_4^{2-}
4. CO_3^{2-}

Q3:
Which of the following statements about colloids is False?

Options

1. Freezing point of colloidal solution is lower than true solution at same concentration of a solute.
2. When silver nitrate solution is added to potassium iodide solution, a negatively charged colloidal solution is formed.
3. Colloidal particles can pass through ordinary filter paper.
4. When excess of electrolyte is added to colloidal solution, colloidal particle will be precipitated.

Q4:
A sample of $NaClO_3$ is converted by heat to NaCl with a loss of 0.16 g of oxygen. The residue is dissolved in water and precipitated as AgCl. The mass of AgCl (in g) obtained will be: (Given: Molar mass of AgCl= 143.5 g mol^{-1})

Options

1. 0.35
2. 0.48
3. 0.54
4. 0.41

Q5:

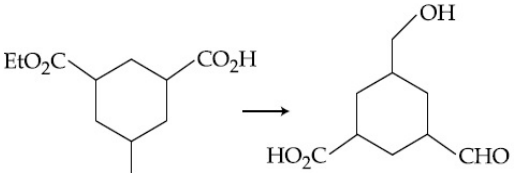
In which of the following reactions, an increase in the volume of the container will favour the formation of -products?

Options

1. $3O_2(g) \rightleftharpoons 2O_3(g)$
2. $2NO_2(g) \rightleftharpoons 2NO(g) + O_2(g)$
3. $4NH_3(g) + 5O_2(g) \rightleftharpoons 4NO(g) + 6H_2O(I)$
4. $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

Q6:

The reagent(s) required for the following conversion are:

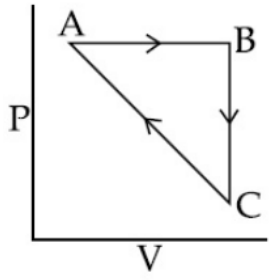


Options

1. (i)$LiAlH_4$ (ii) H_3O^+
2. (i) B_2H_6 (ii) $SnCl_2/HCl$ (iii) H_3O^+
3. (i)B_2H_6 (ii)DIBAL-H (iii)H_3O^+
4. (i)$NaBH_4$ (ii)Raney Ni/H_2 (iii)H_3O^+

Q7:

An ideal gas undergoes a cyclic process as shown in Figure.



$\Delta U_{BC} = -5\ \text{Kj mol}^{-1}, q_{AB} = 2\text{Kj mol}^{-1}$
$W_{AB} = -5\text{Kj mol}^{-1}, W_{CA} = 3\text{Kj mol}^{-1}$
Heat absorbed by the system during process CA is:

Options

1. -18Kj mol^{-1}
2. -5 kj mol^{-1}
3. +5 KJ mol^{-1}
4. 18 KJ mol^{-1}

Q8:

In graphite and diamond, the percentage of p-characters of the hybrid orbitals in hybridisation are respectively:

Options

1. 67 and 75
2. 33 and 25
3. 50 and 75
4. 33 and 75

Q9:

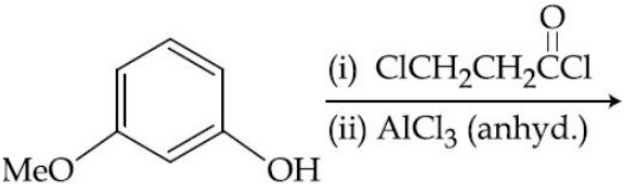
The correct combination is:

Options

1. $[NiCl_4]^2$ - paramagnetic ; $[Ni(CO)_4]$ — tetrahedral
2. $[NiCl_4]^{2-}$ — square-planar ; $[Ni(CN)_4]^{2-}$ paramagnetic
3. $[NiCl_4]^{2-}$ — diamagnetic ; $[Ni(CO)_4]$ —square-planar
4. $[Ni(CO)_4]^{2-}$ — tetrahedral; $[Ni(CN)_4$ — paramagnetic

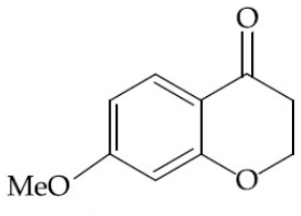
Q10:

The major product of the following reaction is:



Options

1.



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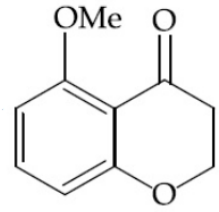

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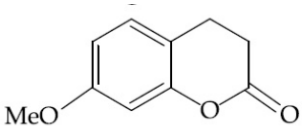

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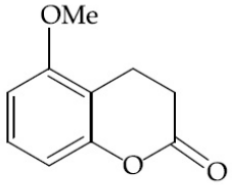


Q11:

When an electric current is passed through acidified water, 112 mL of hydrogen gas at N.T.P. was collected at the cathode in 965 seconds. The current passed, in ampere, is:

Options

1. 0.1
2. 0.5
3. 1.0
4. 2.0

Q12:
Which of the following is a Lewis acid?
Options
1. $B(CH_3)_3$
2. PH_3
3. NaH
4. NF_3

Q13:
The correct match between and List-II is:

List - I	List - II
(A) Coloured impurity	(P) Steam distillation
(B) Mixture of O-nitrophenol and p-nitrophenol	(Q) Fractional distillation
(C) Crude Naphtha	(R) Charcoal treatment
(D) Mixture of	(S) Distillation under reduced pressure

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

Q14:
Xenon hexafluoride on partial hydrolysis produces compounds 'X' and 'Y'. Compounds 'X' and 'Y' and the oxidation state of Xe are respectively:
Options
1. $XeOF_4$ (+ 6) and XeO_2F_2 (+6)
2. $XeOF_4$ (+ 6) and XeO_3 (+6)
3. XeO_2F_2 (+ 6) and XeO_2 (+4)
4. XeO_2(+ 4) and XeO_3 (+6)

Q15:
N_2O_5 decomposes to NO_2 and O_2 and follows first order kinetics. After 50 minutes, the pressure inside the vessel increases from 50 mmHg to 87.5 mmHg. The pressure of the gaseous mixture after 100 minute at constant temperature will be:
Options
1. 106.25 mmHg
2. 116.25 mmHg
3. 136.25 mmHg
4. 175.0 mmHg

Q16:

For Na^{+}, mg^{2+}, F^{-} and O^{2-}; the correct order of increasing ionic radii is:

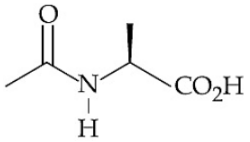
Options

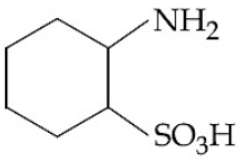
1. $Na + < Mg^{2+} < F- < O^{2-}$
2. $Mg^{2} < N^{a+} < F^{-} < O^{2-}$
3. $Mg^{2} + < O^{2} - < Na^{+} < F^{-}$
4. $O^{2-} < F^{-} < Na^{+} < Mg^{2+}$

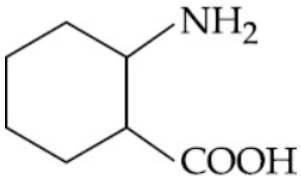
Q17:

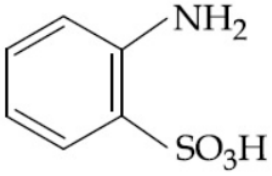
Which of the following will not exist in zwitter ionic form at pH =7?

Options

1. 

2. 

3. 

4. 

Q18:

The IUPAC name of the following compound is:

Options

1. 4, 4-diethyl-3-methylbut-2-ene
2. 4-ethyl-3-methylhex-2-ene
3. 3-ethyl-4-methylhex-4-ene
4. 4-methyl-3-ethylhex-4-ene

Q19:
The minimum volume of water required to dissolve 0.1 g lead (II) chloride to get a saturated solution (K_{sp} of $PbCl_2$ = 3.2 x 10^{-8}; atomic mass of Pb= 207 u) is:
Options
1. 018 L
2. 0.36 L
3. 17.98 L
4. 1.798 L

Q20:
Ejection of the photoelectron from metal in the photoelectric effect experiment can be stopped by applying 0.5 V when the radiation of 250 nm is used. The work function of the metal is:
Options
1. 4.5 eV
2. 4 eV
3. 5.5 eV
4. 5 eV

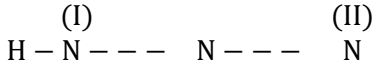
Q21:
Which of the following arrangements shows the schematic alignment of magnetic moments of antiferromagnetic substance?
Options
1.

2.

3.

4.


Q22:



In hydrogen azide (above) the bond orders of bonds (I) and (II) are:

(I) (II)

Options

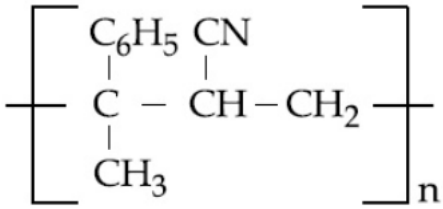
1. <2 <2
2. <2 >2
3. >2 >2
4. >2 <2

Q23:

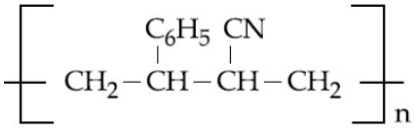
The copolymer formed by addition polymerization of styrene and acrylonitrile in the presence of peroxide is:

Options

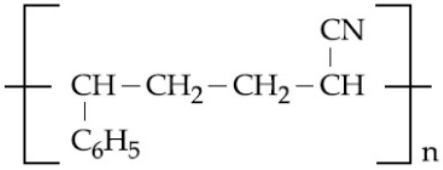
1.



2.



3.



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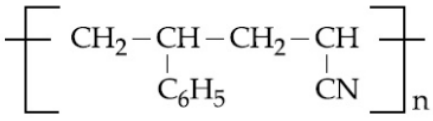
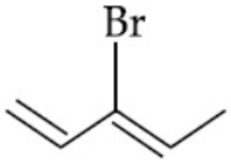
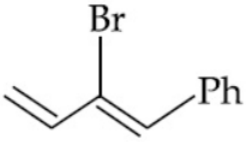
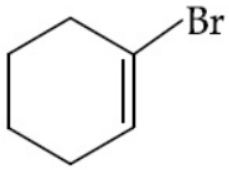


Q24:
Which of the following will most readily give the dehydrohalogenation product?
Options
1.


2.


3.


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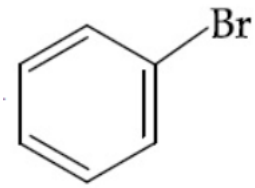


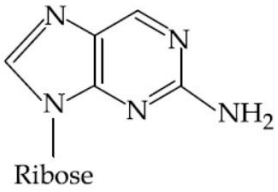
Q25:
In the molecular orbital diagram for the molecular ion, N_2^+, the number of electrons in the σ_{2p} molecular orbital is:
Options
1. 1
2. 3
3. 0
4. 2

Q26:

Which of the following is the correct structure of Adenosine?

Options

1.



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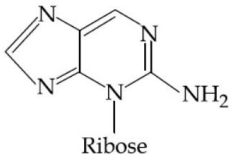

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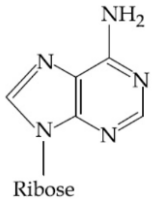

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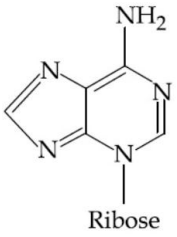


Q27:

Identify the pair in which the geometry of the species is T-shape and square-pyramidal, respectively:

Options

1. IO_3^- and $IO_2F_2^-$
2. $XeOF_2$ and $XeOF_4$
3. ClF_3 and IO_4^-
4. ICl_2^- and ICl_5

Q28:

The decreasing order of bond angles in BF_3, NH_3, PF_3 and I_3^- is:

Options

1. $BF_3 > NH_3 > PF_3 > I_3^-$
2. $I_3^- BF_3 > NH_3 > PF_3$
3. $I_3 > NH_3 > PF_3 > BF_3$
4. $BF_3 > I_3 > PF_3 > NH_3$

Q29:

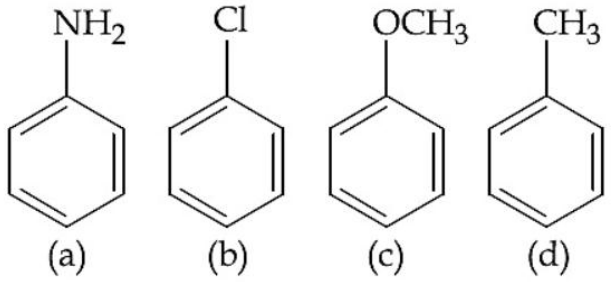
For which of the following reactions, ΔH is equal to ΔU?

Options

1. $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
2. $2NO_2(g) \rightarrow N_2O_4(g)$
3. $2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$
4. $2HI(g) \rightarrow H_2(g) + I_2(g)$

Q30:

The increasing order of nitration of the following compounds is:



Options

1. (a) < (b) < (d) < (c)
2. (a) < (b) < (c) < (d)
3. (b) < (a) < (c) < (d)
4. (b) < (a) < (d) < (c)

Chemistry Solutions

Sol 1: (2)
$NaBh_4$ selectively reduce ketone.

Sol 2: (1)
$$Nacl + AgNO_3 \rightarrow Agcl + NaNO_3$$

(white ppt)

$\downarrow$

Insoluble in dil HNO_3

So, Cl^- is answer.

Sol 3: (1)

Sol 4: (2)

$$NaclO_3 \rightarrow Nacl + AgNO_3 \rightarrow Agcl$$

$$2\ NaclO_3 \rightarrow 2\ Nacl + 3O_2$$

$\frac{0.16}{32}$ mole

$\text{Nacl} = \frac{2}{3} \times \frac{0.16}{32} \times 143.5$

$= 0.48\ \text{g}$

Sol 5: (2)

With increase in the volume, pressure will decrease and so no. of mole
So reaction will proceed in the forward direction when there is increase moles so option is (2)

Sol 6: (3)

DIABAL – H → selectively reduce enter to aldehyde

Sol 7: (3)

$A \rightarrow B$	$B \rightarrow C$
$q_{AB} + U_{AB} = \Delta U_{AB}$	$q_{BC} + U_{BC} = \Delta U_{BC}$
$2 + (5) = \Delta U_{AB}$	$q_{BC} + O(V = 0) = \Delta U_{BC}$
$-3 = \Delta U_{AB}$	$q_{BC} = -5\text{KJ}$

$C \rightarrow A$

$q_{CA} + W_{CA} = U_{CA}$	$\Delta U_{CA} + U_{AB} + \Delta U_{BC} = 0$
$q_{CA} + 3 = U_{CA}$	$\Delta U_{CA} = -(\Delta U_{AB} + \Delta U_{BC})$
	$= -(-3 - 5)$

$D_{CA}^{U} = 8$

$q_{CA} = 8 - 3$

$q_{CA} = +5$

Sol 8: (1)

graphite → sp^2 → % S → 33 % , % p = 67 %

diamond → Sp^3 → % S → 25 %, % p = 75 %

Sol 9: (1)

(1) $[Ni\ (Cl)_4]^2 \rightarrow\ d^8(Ni)^{2+}$

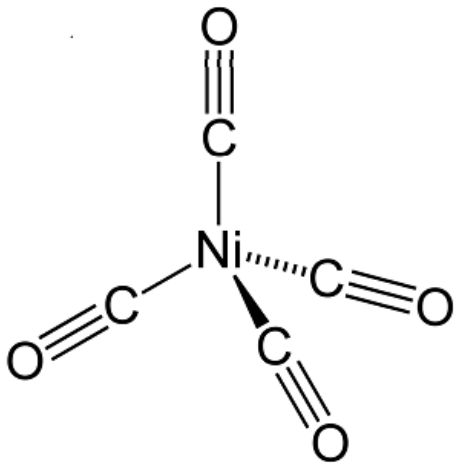
Cl^- is weak

1↓	1↓	1↓	1	1

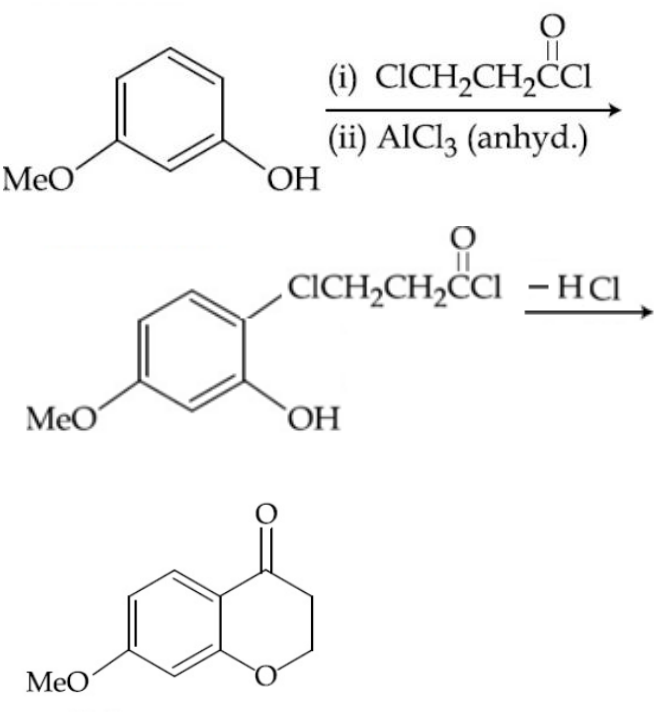
Field ligand → So due to unpraised $\bar{e}$, $(Ni(Cl)_4)^{2-}$ is paramagnetic

(2)

$Ni(CO)_4 \rightarrow$ Tetrachedral



Sol 10: (1)



Sol 11: (3)

at NTP 1 mol = 22. 4 l

$112 \text{ ml } H_2 \Rightarrow \frac{112}{1000 \times 22.4}$

$\Rightarrow \frac{1}{200} \text{ mol of } H_2$

$H_2O \rightarrow H_2 + \frac{1}{2} O_2$

$2H^- + 2e^- \rightarrow H_2$

1 mol of H_2 required 2 mole $\bar{e}$

1/200 mol of H_2 require 2/200 = 1/100 mol of $\bar{e}$

$\frac{1}{100} \text{ mol of } \bar{e} = \frac{1}{100} \times 6.022 \times 10^{23} \bar{e} \times 1.6 \times 10^{-19}$

Sol 12: (1)

Lewis acid → which has vacant orbital,

So $B(CH_3)_3$

Sol 13: (1)

O – P ⇒ diff in B.pt ⇒ Steam distillation

Coloured impurity → Chromatography

Sol 14: (1)

$XeF_6 + H_2O \rightarrow XeOF_4 + 2HF$

$XeF_6 + 2H_2O \rightarrow XeO_2F_2 + 4HF$

Sol 15: (1)

$2N_2O_5 \rightarrow 4NO_2 + O_2$

$p \quad - \quad -$

$p - 2x \quad 4x \quad x$

$pt = p - 2x + 4x + x$

$pt = p + 3x$

$K = \frac{2.303}{t} \log \frac{p}{p - 2x}$

at $t = 0$, $pt = p = 50$ mmHg

at $t = 50$ mm, $pt = 87.5$ mmHg

$p + 3x = 87.5$

$p = 87.5 - 3x$

$50 = 87.5 - 3x$

$12.5 = x$

$$\text{So, k} = \frac{2.303}{50}\log\frac{50}{25}$$

$$\text{K} = \frac{2.303}{50}\log 2$$

$$\text{p} - 2\text{x} = 50 - 2(12.5) = 25$$

$$\text{at } \text{t} = 100, \qquad \text{K} = \frac{2.303}{100}\log\frac{50}{\text{p} - 2\text{y}}$$

Since K will remain same

$$\frac{2.303}{100}\log\frac{50}{\text{p} - 2\text{y}} = \frac{2.303}{50}\log 2$$

$$\log\frac{50}{P^{-2}y} = 2\log 2$$

$$\frac{50}{50 - 2y} = 4$$

$$50 = 50 \times 4 - 8y$$

$$50 = 200 - 8y$$

$$8y = 150$$

$$y = \ 18.75$$

$$Pt \ = p + 3y$$

$$= 50 + 3\ (18.73) = 106.25\ \text{mmHg}$$

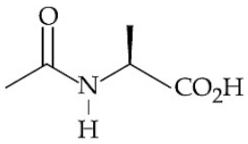
Sol 16: (2)

Axiom are greater in eye then colour, So, correct option (2)

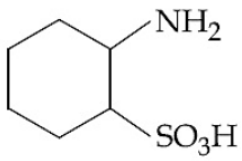
(2) $\text{Mg}^{2+} < \text{Na}^{+} < \text{F}^{-} < \text{O}^{2-}$

Sol 17: (4)

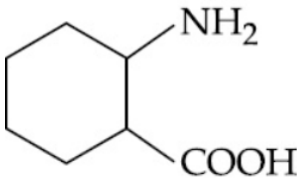
(1)



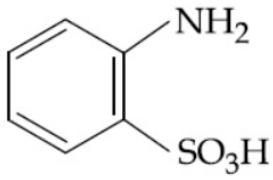
(2)



(3)



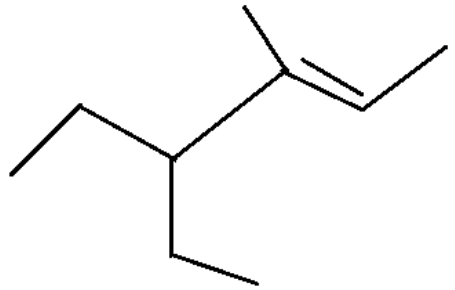
(4)



This question says as which one will not form zwiter ion (4) will be right answer.

Sol 18: (2)

Basic Nomenclature.



Sol 19: (1)

Ksp of $PbCl_2$ is 3.2×10^{-8}

$PbCl_2$ is 3.2×10^{-8}

$Pbcl_2(s) \rightleftharpoons Pb^{2+}(aq) + 2Cl^{-}(aq)$

$t = 0 \qquad 1 \qquad 0 \qquad 0.$

At equilibrium $1 - S \quad S \qquad 2S.$

$K_{sp} = [S]\,[2S]^2$

$3.2 \times 10^{-8} = 4s^3$

$S^3 = 0.8 \times 10^{-8}$

$S^3 = 8 \times 10^{-9}$

$S = 2 \times 10^{-3}$

Solubility $= \dfrac{W}{V}$

$\therefore$ Solubility of $PbCl_2$ in $gL^{-1} = 2 \times 10^{-3} \times 278$

$= 556 \times 10^{-3} gL^{-1}$

$0.556\ \mathrm{gL^{-1}}$

$$\frac{0.556}{0.1} = \frac{1}{x}$$

$$x = \frac{0.1}{0.556}$$

$$= 0.18\mathrm{L}$$

Sol 20: (1)

$$F = \frac{hc}{\lambda}$$

$$= \frac{6.626 \times 10^{-34} \times 3 \times 10^{-8}}{250 \times 10^{-9}}$$

$$= \frac{18.878 \times 10^{-26}}{250 \times 10^{-9}}$$

$$= \frac{0.0755 \times 10^{-17}}{1.6 \times 10^{-19}}$$

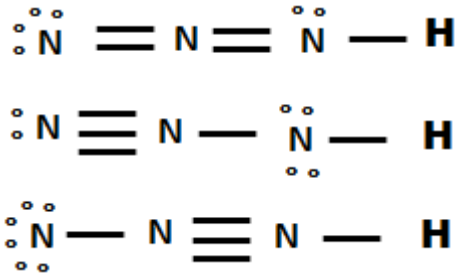
$$= 4.375\ \mathrm{eV}$$

Sol 21: (4)

Basic knowledge of Antiferromagnetic

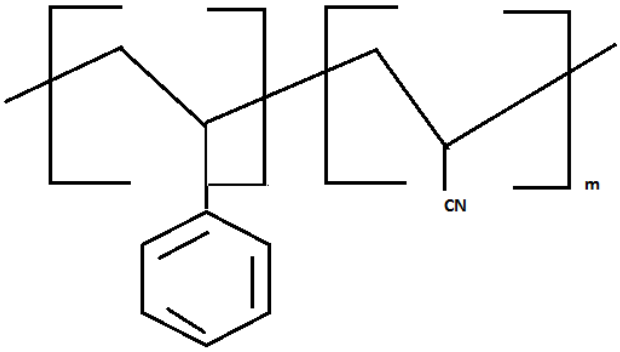
Sol 22: (2)

Hydrogen azide: HN_3



Both works correct

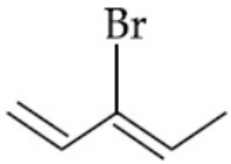
Sol 23: (4)

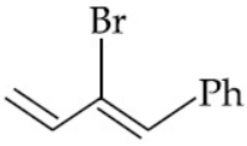


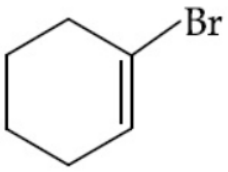
$(C_6H_8)_n - (C_3H_3N)_m$

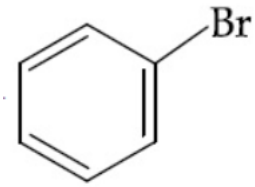
Sol 24: (3)

Most probable is C_6H_5 Br



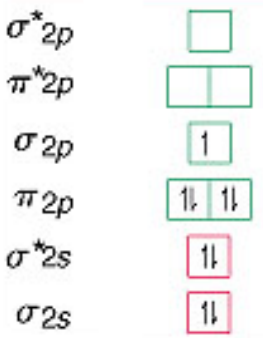




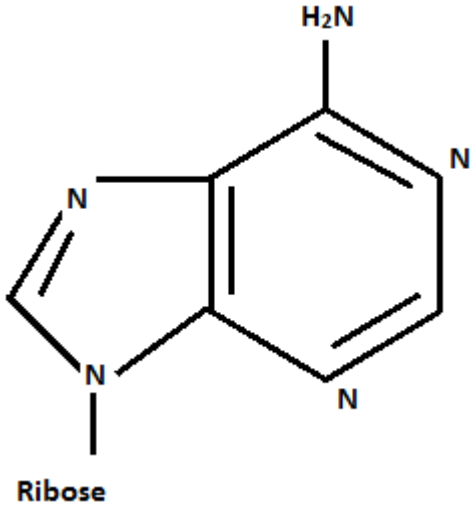


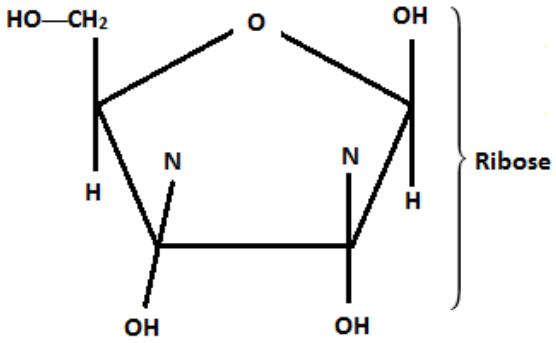
Sol 25: (1)

$\mathbf{N_2^+}$: $\mathbf{9e^-}$

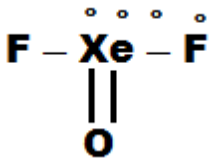


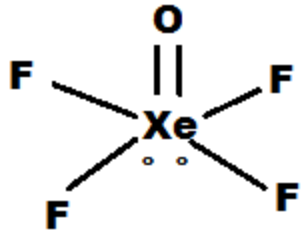
Sol 26: (3)



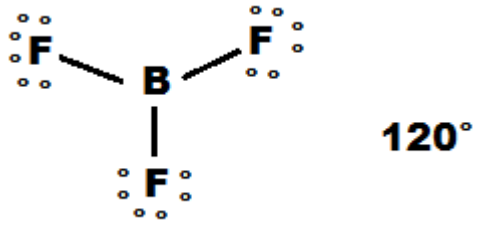


Sol 27: (2)

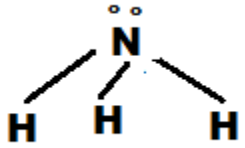




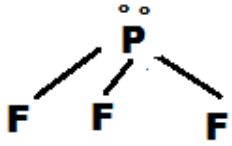
Sol 28: (2)



120°



107.8°



97.8°

$\mathbf{I_3^-}$: **180°**

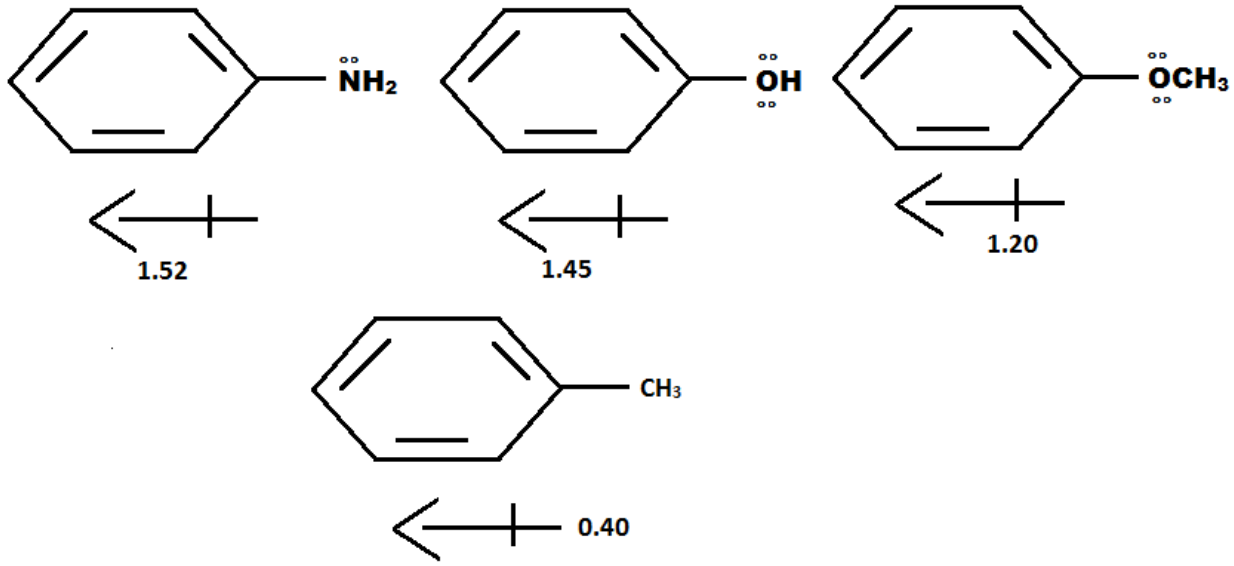
Sol 29: (4)

$\Delta H = \Delta U + \Delta ngRT.$

[If $\Delta ng = 0$ then $\Delta H = \Delta U$]

Sol 30: (3)

Activating Substituents:



JEE Main: 2018 (Online CBT)

Answer Key (15/04/2018)

Chemistry

Q. No.	Answer	Q. No.	Answer	Q. No.	Answer
1	2	**11**	3	**21**	4
2	1	**12**	1	**22**	2
3	1	**13**	1	**23**	4
4	2	**14**	1	**24**	3
5	2	**15**	1	**25**	1
6	3	**16**	2	**26**	3
7	3	**17**	4	**27**	2
8	1	**18**	2	**28**	2
9	1	**19**	1	**29**	4
10	1	**20**	1	**30**	3