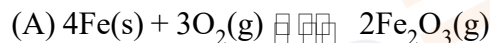


SECTION -3**PART-A****[SINGLE CORRECT CHOICE TYPE]**

Q.1 to Q.3 has four choices (A), (B), (C), (D) out of which **ONLY ONE** is correct.

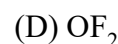
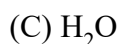
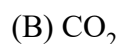
[3 Marks]

Q.1 For which of the following reaction $K_p = K_c$.



(D)

Q.2 Which of the following has linear shape?



(B)

Q.4 to Q.6 has four choices (A), (B), (C), (D) out of which **ONLY ONE** is correct.

[4 Marks]

Q.3 For a mixture of KCl and KNO_3 which of the following is possible percentage of K by mass

(A) 10 %

(B) 45 %

(C) 70 %

(D) 90 %

(B)

Q.4 For the following Equilibria :



where $P_{\text{H}_2\text{O}} \rightarrow$ Vapour pressure of $\text{H}_2\text{O}(g)$

By which of the following ways $P_{\text{H}_2\text{O}}$ can be changed

(A) By adding more $\text{H}_2\text{O}(l)$

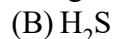
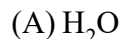
(B) By adding more $\text{H}_2\text{O}(g)$

(C) By changing temperature

(D) All of the above

(C)

Q.5 Which of the following has highest boiling point?



(A)

Q.6 Which of the following has the lowest electron affinity?



(A)

[PARAGRAPH TYPE]

Q.7 to Q.9 has four choices (A), (B), (C), (D) out of which **ONLY ONE** is correct.

[3 Marks]

Paragraph for Question no. 9 to 11

Heterogenous equilibria is established in a closed rigid vessel at 1000 K



Q.7 If initially $\text{S}_2(g)$ is taken at 11 atm with excess of $\text{C}(s)$ then pressure of $\text{S}_2(g)$ & $\text{CS}_2(g)$ at equilibrium will

(A)

be respectively.

- (A) 10 atm, 1 atm (B) 1 atm, 10 atm (C) 5 atm, 0.5 atm (D) 20 atm, 2 atm

Q.8 Reaction will move in forward direction if following change(s) is (are) made at equilibrium

- (A) Increase in temperature
(B) Addition of inert gas at constant pressure
(C) Removal of some $\text{CS}_2(\text{g})$ present at equilibrium
(D) Increase in total pressure

(A)

Q.9 Calculate volume of vessel if at equilibrium total moles of $\text{CS}_2(\text{g})$ and $\text{S}_2(\text{g})$ are 22.

[Take $R = 0.08 \text{ atm litre K}^{-1} \text{ mol}^{-1}$]

- (A) 40 litre (B) 80 litre (C) 16 litre (D) 160 litre

(D)

[MULTIPLE CORRECT CHOICE TYPE]

Q.10 to Q.15 has four choices (A), (B), (C), (D) out of which **ONE OR MORE** may be correct.

Q.10 Species having perfect tetrahedral geometry is / are :

- (A) CH_4 (B) SiCl_4 (C) BF_4^- (D) CCl_4

(ABCD)

Q.11 Which of the following statement(s) is/are **correct**.

(A) Boyle's temperature (T_b) and critical temperature (T_c) of a Vander Waal's gas are related as

$$T_c = \frac{8}{27} T_b$$

(B) Addition of a non reacting gas in a closed rigid container will not affect the partial pressure of gases already present.

(C) Critical volume is 12 times the actual volume occupied by 1 mole of gaseous molecules

(D) At very high pressure repulsive forces will dominate between gaseous molecules.

(ABCD)

Q.12 If z-axis be the internuclear axis, σ -bond would be formed by the overlap between:

- (A) s and p_z (B) p_z and p_z (C) p_y and p_y (D) d_{z^2} and d_{z^2}

(ABD)

Q.13 Select the **incorrect** statement(s):

(A) At critical condition a real gas follows Boyle's law.

(B) At room temperature equal mass of H_2 and O_2 will have same kinetic energy.

(C) 1 gm of each O_2 and N_2 at same T and P will have same volume.

(D) Ratio of rate of diffusion of O_2 to CH_4 in a mixture containing equal mass of O_2 and CH_4 is $\frac{1}{2\sqrt{2}}$.

(ABC)

Q.14 Which of the following is/are **correctly** matched?

(A) $F > O$ (Electronegativity)

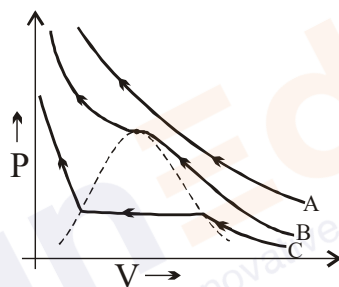
(B) $\text{Mg} > \text{Al}$ (I^{st} ionisation energy)

(C) $\text{HCl} > \text{HI}$ (Thermal stability)

(D) $\text{Diamond} > \text{Graphite}$ (Electrical conductance)

(ABC)

Q.15 P-V graph for liquification of three gasses are plotted at same temperature 300K as shown below.



Select the **correct** statement(s) regarding P-V graph

(A) Gas A has minimum critical temperature (B) Gas B can be liquified at 400K.

(C) Gas C can be liquified at 200 K. (D) Critical point of C is 300K.

(AC)

PART-B

[MATRIX TYPE]

Q.16 has **three** statements (A, B, C) given in **Column-I** and **four** statements (P, Q, R, S) given in **Column-II**. Any given statement in **Column-I** can have correct matching with one or more statement(s) given in **Column-II**. Marks given only if all matching are correct.

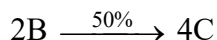
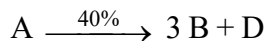
Q.16	Column I	Column II
(1)	A gas having $Z > 1$	(P) Attraction forces will dominate
(2)	A gas having $Z < 1$	(Q) Volume will be more than expected from ideal behaviour
(3)	At low pressure and high temperature	(R) Compressibility will be less than expected from ideal behaviour
		(S) Will behave ideally.
(A)	$1 \rightarrow QR, 2 \rightarrow P, 3 \rightarrow S$	(B) $1 \rightarrow S, 2 \rightarrow P, 3 \rightarrow QR$
(C)	$1 \rightarrow QS, 2 \rightarrow P, 3 \rightarrow R$	(D) $1 \rightarrow P, 2 \rightarrow P, 3 \rightarrow QR$

PART-D

[INTEGER TYPE]

Q.17 to Q.21 are "Integer Type" questions. (The answer to each of the questions are upto **4 digits**)

Q.17 In the following reactions if initially 100 moles of A were taken then calculate sum of moles of D and C after the reaction,



(0160)

Q.18 Find the total number of species having bent shape

I_3^- , NO_2^+ , H_2S , OCl_2 , XeF_2 , SO_2 , $NOCl$
(0004)

Q.19 Calculate the sum of molality and molarity of a pure liquid (Molar mass $M=50$) having density ($d = 2 \text{ gm/ml}$)
(0060)

Q.20 If the maximum number of P – O – P linkages, basicity and the maximum number of $p\pi-p\pi$ bonds in $H_3P_3O_9$ are x , y and z respectively, find the value of $(x + y + z)$.
[If your answer is $x=2 + y=5 + z=6$ write it as 0013.]
(0009)

Q.21 500 mole of H_2 gas (Vander Waal's gas) are taken at 500 atm in a 10 litre vessel at 100 K. Calculate the volume (in ml) occupied by molecules when that gas is liquefied. [$R = 0.08 \text{ atm litre mole}^{-1} \text{ K}^{-1}$]
(0500)

