Resonance®
Educating for better tomorrow

JEE (MAIN) 2025

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-2

DATE & DAY: 29th January 2025 & Wednesday

PAPER-1

Duration: 3 Hrs.
Time: 03:00 PM – 06:00 PM

SUBJECT: CHEMISTRY

REGISTERED & CORPORATE OFFICE (CIN: U80302RJ2007PLC024029):
CG Tower, A-46 & 52, IPIA, Near City Mall, Jhalawar Road, Kota (Rajasthan) - 324005
0744-2777777 | 75800 10345 | contact@resonance.ac.in | www.resonance.ac.in | Follow Us: @Resonance.Edu | @Resonance_Edu

PART : CHEMISTRY

1. $A(g) + 3B(g) \rightleftharpoons C(g) + D(g)$

Pressure made 2 times keeping T =constant.

Select correct statements.

(a) Concentration of all species will increase.

(b) Eq. will shift in forward direction.

(c) No shift in equilibrium occurs because of all concentrations remaining same.

(d) Concentration of products increases while that of reactants decreases.

(1) (a) and (b) (2) (b) and (d) (3) (a) and (c) (4) None of these

Ans. **(1)**

Sol. $P\uparrow$ - Eq. shifts towards lesser no. of gaseous moles.

- Forward shift.

Conc. of all species increases, to keep eq. constant value same.

2. Electron jumping down from n =4 upto ground state in a H-like sample produces ____ lines:

(1) 6 (2) 3 (3) 12 (4) 10

Ans. **(1)**

Sol. $\frac{\Delta n(\Delta n+1)}{2} = \frac{3\times 4}{2} = 6$ lines.

3. **Statement-I :** It is not possible to measure simultaneously accurately the position and momentum of electron or similar moving small particle.

Statement-II : Due to Heisenberg principle, electron cannot be found within nucleus.

(1) Both Statement I and statement II are true

(2) Both statement I and statement II are false

(3) Statement I is true but statement II is false

(4) Statement I is false but statement II is true

Ans. **(1)**

Sol. If we take $\Delta x = 10^{-15}$ m ($r_{nucleus}$), then for electron by using

$(m\Delta v)(\Delta x) = \frac{h}{4\pi}$

$\Delta v = \frac{6.62\times 10^{-4}}{4\times 3.14\times 9.1\times 10^{-31}\times 10^{-5}} = 5.77\times 10^{10}\ ms^{-1}$

Velocity higher than velocity of light is not possible.

4. Which of the following gives predominantly O_2 on electrolysis among the following ?

(a) aq. $AgNO_3$ solution (Pt electrodes) (b) aq. $AgNO_3$ solution (Ag electrodes)

(c) conc. H_2SO_4 solution (Pt electrodes) (d) dil. H_2SO_4 solution (Pt electrodes)

(1) (a) and (b) (2) (b) and (c) (3) (a), (b) and (c) (4) (a) and (d)

Ans. **(4)**

Sol. (a) Anode (O) $2H_2O \rightarrow O_2 + 4H^+ + 4e^-$

In NO_3^-, N is in highest oxidation state +5.

(b) Anode (O) (i) $2H_2O \rightarrow O_2 + 4H^+ + 4e^-$; $E^\circ_{OP} = -1.23$ V

(ii) $Ag(s) \rightarrow Ag^+ + 4e^-$; $E^\circ_{OP} = -0.8$ V

E°_{OP} of Ag(s) is more.

So, (ii) reaction is favourable.

(c) Anode (O) $2HSO_4^- \rightarrow S_2O_8^{2-}(aq) + 2H^+(aq) + 2e^-$

(d) Anode (O) $2H_2O \rightarrow O_2 + 4H^+ + 4e^-$

5. 0.41 g of $BaSO_4$ is obtained from 0.2 g of organic compound in carlouse method % of S in organic compound =?

Ans. **(28)**

Sol. % of S in organic compound $= \frac{0.41}{233} \times \frac{32}{0.2} \times 100 \approx 28\%$

6. Smallest among Li, Na, Mg, B Al will form oxide with molecular formula

(1) AO (2) AO_2 (3) A_2O_3 (4) A_2O

Ans. **(3)**

Sol. Smallest is B, which will form B_2O_3

7. NO_2^- has _____ non-bonded electrons :

(1) 12 (2) 10 (3) 8 (4) 14

Ans. **(1)**

Sol. 

8. A Drug expires at 50% consumption. Originally it's 16 mg/mL is present which becomes 4mg/mL after 12 months. At what time will it not be suitable anymore, if it follows first order kinetics ?

(1) 3 month (2) 6 month (3) 9 month (4) 12 month

Ans. **(2)**

Sol. $t_{75\%} = 2 \times t_{1/2}$ or $12 = 2 \times t_{1/2}$

[For first order kinetics]

$\Rightarrow t_{1/2} = 6$ month

9. Given following complexes

(I)	(II)
$[Fe(H_2O)_4(OH)_2]$	$[Fe(H_2O)_5(OH)_2]$

The value of spin only magnetic moment for these complexes is :

(1) 4.89 BM, 5.91 BM (2) 5.91 BM, 4.89 BM

(3) 4.89 BM, 4.89 BM (4) 5.91 BM, 5.91 BM

Ans. **(1)**

Sol. I is complex of Fe^{+2} with weak field ligand, therefore unpaired $e^- s = 4$

$\sqrt{4\ (4+2)} = 4.89$ BM

II is complex of Fe^{+2} with weak field ligand, therefore unpaired $e^- s = 5$

$\sqrt{5\ (5+2)} = 5.89$ BM

10. Among the following, add the spin only magnetic moment of yellow coloured complex.

Give your answer to nearest integer after rounding off.

(I) $K_4[Fe(CN)_6]$ (II) $K_3[Fe(CN)_6]$

(III) $K_3[Co(NO_2)_6]$ (IV) $Zn_3[Fe(CN)_6]$

(V) $Cu_2[Fe(CN)_6]$

Ans. **(0)**

Sol. Colours of I to V complexes are respectively yellow, red, yellow, white and brown

$K_4[Fe(CN)_6]$, Fe^{+2}, SFL, CN = 6, $t_{2g}^{2\,2\,2}$, $eg^{0\,0}$

no. of unpaired e^- = 0

$K_3[Co(NO_2)_6]$; SFL, Co^{+3}, CN = 6, $t_{2g}^{2\,2\,2}$; $eg^{0\,0}$

no. of unpaired e^- = 0

$\therefore$ sum of spin magnetic moments = 0.

11. Considers the following reactions and select the correct relation

(a) C diamond $\rightarrow$ C graphite + x KJ

(b) C diamond + $O_2 \rightarrow CO_2$ + y KJ

(c) C diamond + $O_2 \rightarrow CO_2$ + z KJ

(1) x = y − z (2) y = x − z (3) y = x + z (4) x = y + z

Ans. **(1)**

Sol. $\Delta H_a = -x$; $\Delta H_b = -x$; $\Delta H_c = -z$

(a) = (b) – (c)

$x = y - z$

12. Match

(1) Invertor	(p) Hydrogen fuel cell
(2) Transistor	(q) Lead storage battery
(3) Apollo programme	(r) Zinc – carbon cell
(4) Hearing aids	(s) Mercury cell

(1) 1 – q ; 2 – r ; 3 – p; 4 – s (2) 1 – q ; 2 – r ; 3 – s; 4 – p

(3) 1 – r ; 2 – q ; 3 – p; 4 – s (4) 1 – r ; 2 – q ; 3 – r; 4 – p

Ans. **(1)**

Sol. Watch Video Solution

13. **Assertion :** Adding NaCl to ice cream at 0°C stops melting

Reason : Adding NaCl to ice cream causes depression in freezing point.

(1) Assertion true, Reason true, correct explanation

(2) Assertion true, Reason true, incorrect explanation

(3) Assertion true, Reason false

(4) Assertion false, Reason true

Ans. **(4)**

Sol. Adding NaCl to ice does not stops melting. Due to depression in freezing point, ice cream will melt at a lower temperature.

14. Which of the following form stable carbocation?

(1) Ph_3C-Br (2) $C_6H_5-CH_2-Br$ (3) $C_6H_5-\underset{\underset{Br}{|}}{CH}-CH_3$ (4) $CH_2-CH_2-CH_2-Br$

Ans. **(1)**

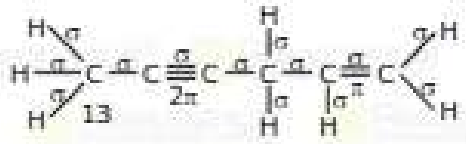
Sol. Watch Video Solution

15. Number of σ & π bonds in hex-1-en-4-yne

(1) 13, 3 (2) 14, 3 (3) 3, 14 (4) 14, 13

Ans. **(1)**

Sol.

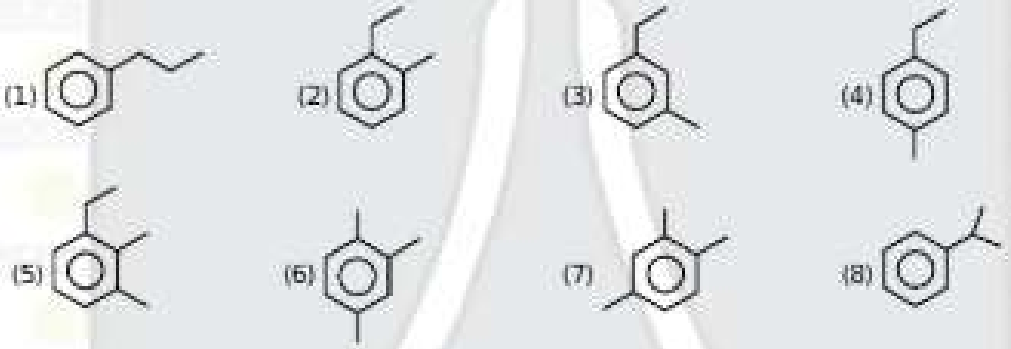


16. The number of benzenoid structural isomers having molecular formula C_8H_{10} which do not give Baeyer's reagent test.

(1) 0 (2) 11 (3) 8 (4) 4

Ans. **(1)**

Sol. (DOU = 4)



17. Which of the following is an essential amino acid.

(A) Lycine (B) Valine (C) Threonine (D) Glycine

(1) ABD (2) BCD (3) ABC (4) ACD

Ans. **(3)**

Sol. Watch Video Solution

18. Which of the following will give phenol to react with HBr

Ans. **(1)**

Sol. Watch Video Solution

19. **Statement- I :** m-Xylene react with $HNO_3 + H_2SO_4$ and further oxidise gives 4-nitro benzene 1, 3-dicarboxylic acid as a major product.

Statement- II : $-CH_3$ is ortho/para directing and $-NO_2$ is meta directing.

(1) Both Statement I and statement II are true (2) Both statement I and statement II are false

(3) Statement I is true but statement II is false (4) Statement I is false but statement II is true

Ans. **(1)**

Sol. Watch Video Solution

20. **Statement I :** Partition chromatography has thin layer of liquid as medium

Statement II : Paper chromatography has paper as medium.

(1) Both Statement I and statement II are true (2) Both statement I and statement II are false

(3) Statement I is true but statement II is false (4) Statement I is false but statement II is true

Ans. **(1)**

Sol. Watch Video Solution

21. 7.3 g benzalacetone is synthesized from 10.6 g of benzaldehyde using acetone as other reactant. Percentage yield of benzalacetone.

(1) 70% (2) 30% (3) 50% (4) 45%

Ans. **(3)**

Sol.

Molar mass of benzaldehyde =106 g mol^{-1}

Molar mass of benzalacetone =146 g mol^{-1}

$$\text{Mole of benzaldehyde} = \frac{10.6}{106} = 0.1$$

0.1 mol benzaldehyde =0.1 mol of benzalacetone

$\therefore$ Theroratical yield = 0.1 × 146 g =14.6 g

$$\% \text{ yield} = \frac{\text{Actual yield}}{\text{Theoratical yield}} \times 100 = \frac{7.3}{14.6} \times 100 = 50\%$$