






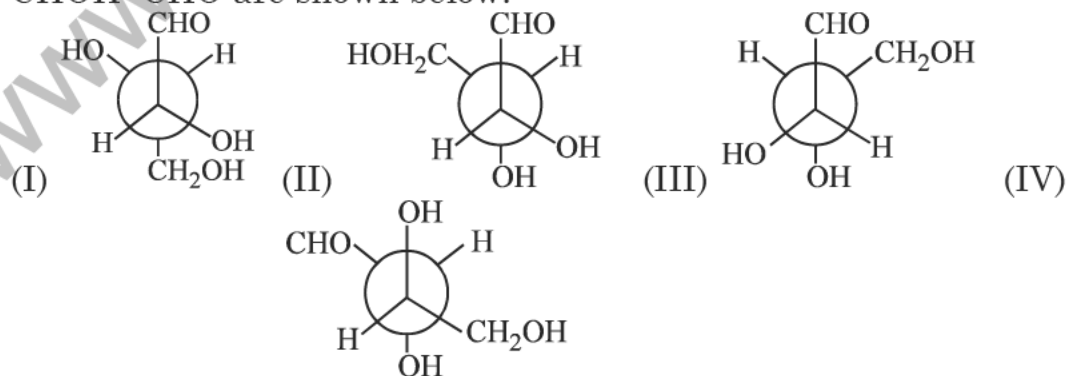


## JEE MAIN PRACTICE PAPER – 2

1. Arrange pH of the given compounds in decreasing order:  
 (1) Phenol (2) Ethyl alcohol  
 (3) Formic acid (4) Benzoic acid  
 (A)  $1 > 2 > 3 > 4$  (B)  $2 > 1 > 4 > 3$  (C)  $3 > 2 > 4 > 1$  (D)  $4 > 3 > 1 > 2$
2. The hydration energy of  $Mg^{2+}$  is  
 (A) more than that of  $Mg^{3+}$  ion (B) more than that of  $Na^+$  ion  
 (C) more than that of  $Al^{3+}$  ion (D) more than that of  $Be^{2+}$  ion
3. In each of the following pairs, former compound will have less enol content than later:
- |   |  |   |   |
|---|--|---|---|
| (A)  and<br>$CH_3COCH_3$ | (B)  and<br> | (C)  and<br> | (D) <br>and<br> |
|---|--|---|---|
4. Which of the following plots represents an ideal binary mixture?  
 (A) Plot of  $P_{total}$  v/s  $1/X_B$  is linear ( $X_B$  = mole fraction of 'B' in liquid phase).  
 (B) Plot of  $P_{total}$  v/s  $Y_A$  is linear ( $Y_B$  = mole fraction of 'A' in vapour phase)  
 (C) Plot of  $v$  v/s  $Y_A$  is linear  
 (D) Plot of  $v$  v/s  $Y_B$  is non linear
5. Arrange in order of decreasing reactivity in electrophilic addition  
 (I)  $Ph-CH=CH-COOH$  (II)  $p-NO_2-C_6H_4-CH=CH-COOH$   
 (III)  $p-MeO-C_6H_4-CH=CH-COOH$  (IV)  $p-Cl-C_6H_4-CH=CH-COOH$   
 (A)  $II > I > IV > III$  (B)  $III > IV > I > II$   
 (C)  $III > I > IV > II$  (D)  $II > IV > I > III$
6. Propene is treated with bromine in the presence of brine (aqueous NaCl). Choose the correct statement regarding the above reaction.  
 (A) Total two products are formed  
 (B) Total three products are formed.  
 (C) Total six products are formed  
 (D) Total eight products are formed.

7. How many litres of benzene would be produced when 2.28 gm of phenyl magnesium iodide is treated with 112 cc of ethyne at STP.  
 (A) 0.112 lt. (B) 0.228 lt (C) 0.056 lt. (D) 0.224 lt.
8. A compound XY crystallizes in BCC lattice with unit cell edge length of 480 pm. If the radius of  $Y^-$  is 225 pm, then the radius of  $X^+$  is  
 (A) 127.5 pm (B) 190.6 pm (C) 225 pm (D) 255 pm
9. True statements regarding  $S_N1$  reaction is/are  
 (A) Perfect racemisation is observed  
 (B) Only Walden inversion is observed  
 (C) Total retention of configuration is observed  
 (D) None of these
10. The reaction of an element A with water produces combustible gas B and an aqueous solution of C. When another substance D reacts with this solution C also produces the same gas B. D also produces the same gas even on reaction with dilute  $H_2SO_4$  at room temperature. Element A imparts golden yellow colour to Bunsen flame. Then, A, B, C and D may be identified as  
 (A) Na,  $H_2$ , NaOH and Zn (B) K,  $H_2$ , KOH and Zn  
 (C) K,  $H_2$ , NaOH and Zn (D) Ca,  $H_2$ ,  $CaCOH_2$  and Zn
11. Which of the following will give same product with HBr in presence & absence of peroxide  
 (I) ethene (II) 1-butene (III) 2-butene (IV) isobutene  
 (A) I and III (B) I and II (C) II and IV (D) IV and III
12. Four Newman projection formula of compound  $CH_2OH-CHOH-CHOH-CHO$  are shown below:

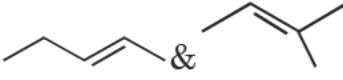

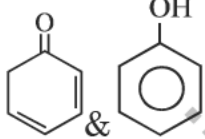
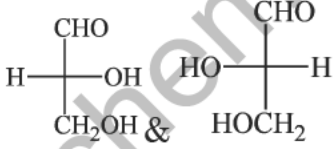


Which of the above represents erythro isomer?

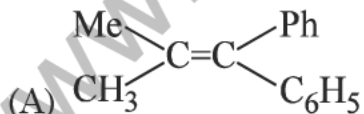
- (A) I and IV (B) I and II  
 (C) II and IV (D) I and III

13. Nodal planes of  $\pi$  bond(s) in  $\text{CH}_2=\text{C}=\text{C}=\text{CH}_2$  are located in  
 (A) All are in molecular plane  
 (B) Two in molecular plane and one in a plane perpendicular to molecular plane which contains C–C  $\pi$ -bond  
 (C) One in molecular plane and two in plane perpendicular to molecular plane which contains C–C  $\pi$ -bond  
 (D) Two in molecular plane and one in a plane perpendicular to molecular plane which bisects C–C  $\pi$ -bond at right angle.

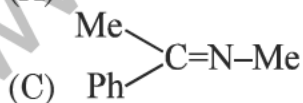
14. Which of the following statement are incorrect?

(A)	 are chain isomer
(B)	 are position isomers
(C)	 are tautomers
(D)	 (diastereomer)

15. Which of the following double bond will not exhibit geometrical isomerism.



(B) 2-Butene



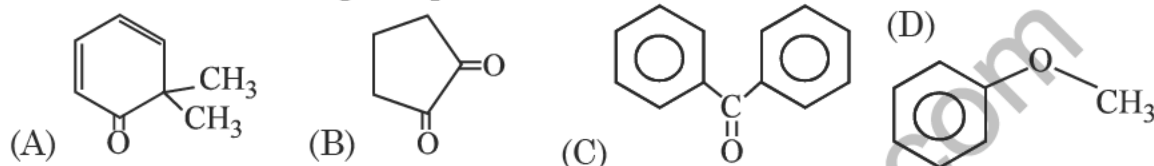
(D)  $\text{MeN}=\text{N}-\text{Me}$

16. The vapour pressure of a solution of a non-volatile electrolyte B in a solvent A is 95% of the vapour pressure of the solvent at the same temperature. If the molecular weight of the solvent is 0.3 times the molecular weight of solute, the weight ratio of the solvent and solute are

- (A) 0.15                      (B) 6.0                      (C) 0.2                      (D) 4.0

17. At a given temperature, total vapour pressure in Torr of a mixture of volatile components A and B is given by  $P_{\text{Total}} = 120 - 75 X_B$ ; Hence, vapour pressure of pure A and B respectively (in Torr) are  
 (A) 120, 75                      (B) 120, 195                      (C) 120, 45                      (D) 75, 45

18. Which of the following compounds can exhibit tautomerism:



19. The lowering of vapour pressure in a saturated aq. solution of salt AB is found to be 0.108 torr. If vapour pressure of pure solvent at the same temperature is 300 torr. Find the solubility product of salt AB  
 (A)  $10^{-8}$                       (B)  $10^{-6}$                       (C)  $10^{-4}$                       (D)  $10^{-5}$

20. For an ideal binary liquid solution with  $>$ , which relation between  $X_A$  (mole fraction of A in liquid phase) and  $Y_A$  (mole fraction of A in vapour phase) is correct?



21. At  $100^\circ\text{C}$ , benzene & toluene have vapour pressure of 1375 & 558 Torr respectively. Assuming these two form an ideal binary solution, calculate the composition of the solution that boils at 1 atm &  $100^\circ\text{C}$ . What is the composition (mole fraction) of vapour issuing at these conditions?  
 (A) 0.10                      (B) 0.25                      (C) 0.70                      (D) 0.45

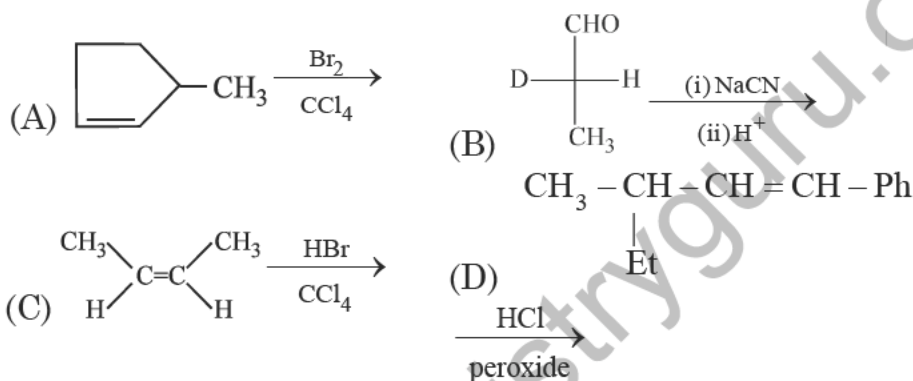
22. Calculate the boiling point of a solution containing 0.61g of benzoic acid in 50g of carbon disulphide assuming 84% dimerization of the acid. The boiling point and  $K_b$  of  $\text{CS}_2$  are  $46.2^\circ\text{C}$  and  $2.3 \text{ K kg mol}^{-1}$ , respectively.  
 (A)  $46.5^\circ\text{C}$                       (B)  $46.9^\circ\text{C}$                       (C)  $45.2^\circ\text{C}$                       (D)  $46.3^\circ\text{C}$

23.  $Y \xleftarrow{\Delta, 205^\circ\text{C}} \text{CaSO}_4 \cdot 2\text{H}_2\text{O} \xrightarrow{\Delta, 120^\circ\text{C}} X$ . X and Y are respectively  
 (A) plaster of paris, dead burnt plaster

- (B) barium chloride, plaster of paris  
 (C) calcium oxide and plaster of paris  
 (D) plaster of paris, mixture of gases

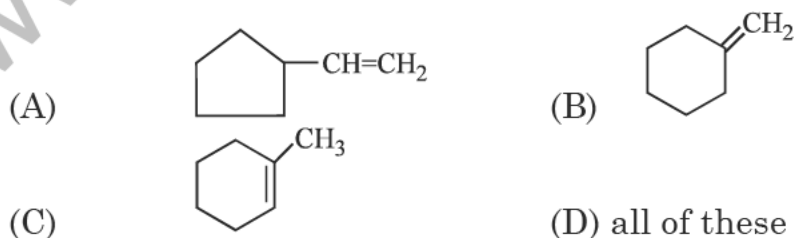
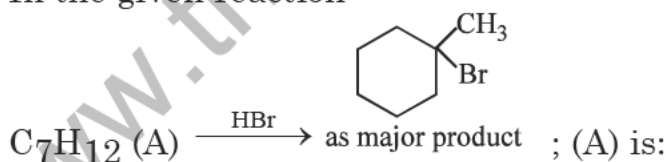
24. The interstitial compound  $\text{LiAg}$  crystallizes in a body centred cubic lattice in which the coordination number of silver is eight. The crystal class is  
 (A) Simple cubic (B) Body centred cubic  
 (C) Face centred cubic (D) None

25. Which of the following reaction product is not a Diastereomer?



26. A rare earth metal sulphide, which is soluble in boiling water. It affords a white precipitate with a sulphide of a transition metal called 'lithopone' - a white pigment. Metal M is  
 (A) Ca (B) Mg (C) Ba (D) Sr

27. In the given reaction



28. The hydroxide of a alkaline earth metal, which has the lowest value of solubility product ( $K_{sp}$ ) at normal temperature ( $25^\circ\text{C}$ ) is

- (A)  $\text{Ca(OH)}_2$     (B)  $\text{Mg(OH)}_2$     (C)  $\text{Sr(OH)}_2$     (D)  $\text{Be(OH)}_2$
29. Set the following in increasing order of  $pK_b$  in aqueous medium  
(i)  $\text{CH}_3\text{NH}_2$     (ii)  $(\text{CH}_3)_2\text{NH}$     (iii)  $(\text{CH}_3)_3\text{N}$     (iv)  $\text{NH}_3$   
(A)  $\text{II} < \text{I} < \text{III} < \text{IV}$                       (B)  $\text{I} < \text{II} < \text{III} < \text{IV}$   
(C)  $\text{III} < \text{IV} < \text{II} < \text{I}$                       (D)  $\text{IV} < \text{I} < \text{II} < \text{III}$
30. Which of the property of alkali metals is not listed correctly?  
(A) the least electronegative metal : Cs  
(B) a natural radioactive metal : Fr  
(C) the alkali metal with lowest density : K  
(D) the heaviest alkali metal : Cs

## MARK YOUR ANSWERS

1	11	21
2	12	22
3	13	23
4	14	24
5	15	25
6	16	26
7	17	27
8	18	28
9	19	29
10	20	30

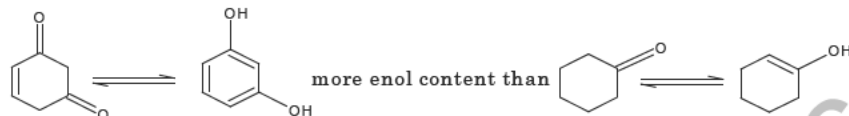
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JEE MAIN PRACTICE PAPER – 2 SOLUTIONS

1. (C) Formic acid and benzoic acid are more acidic due to  $-\text{COOH}$  group presence. Phenol is more acidic than ethyl alcohol due to conjugation/resonance stabilization of phenoxide ion.

2. (B)

3. (D)



4. (C)

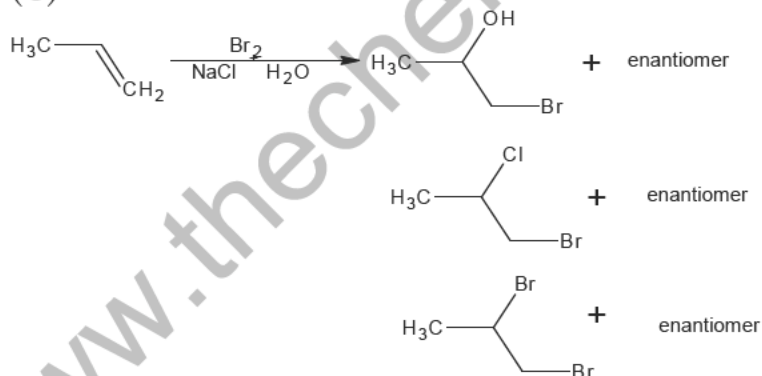
$P_{\text{total}} = P_A^0 X_A + P_B^0 X_B$ , so plot between  $P_{\text{total}}$  vs  $1/X_B$  can't be linear.

$Y_A = \frac{P_A}{P_{\text{total}}} \Rightarrow P_{\text{total}} = \frac{P_A}{Y_A}$ ;  $P_{\text{total}}$  vs  $Y_A$  is not linear. A non-linear graph

between  $P_{\text{total}}$  vs  $Y_B$  can represent an ideal binary mixture.

5. (C)  $-\text{OCH}_3$  is +R group,  $-\text{NO}_2$  is strong  $-\text{R}$  group,  $-\text{Cl}$  is +R group but its  $-\text{I}$  power is dominating hence it is weak deactivating group.

6. (C)



7. (D)



Moles of  $\text{C}_6\text{H}_5\text{MgI} = 2.28/228 = 0.01$ ; moles of  $\text{C}_2\text{H}_2 = 112/22400 = 0.005$

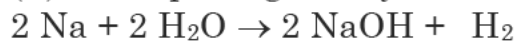
Moles of benzene = 0.01; Volume of benzene at STP = 0.224

8. (B) for BCC,  $2(X^+ + Y^-) = \sqrt{3} \times 480 \Rightarrow X^+ = 190 \text{ pm}$

9. (D)



10. (A) Na imparts golden yellow flame



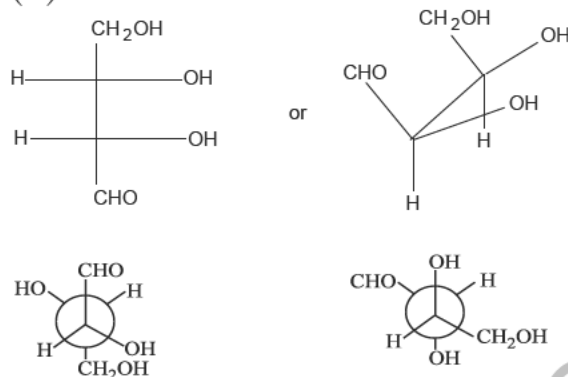
A C B



D C

11. (A) ethene is symmetric alkene therefore same product is formed with HBr in presence or in absence of peroxide.

12. (A)



13. (B) see the structures of allenes.

14. (D) these are enantiomers.

15. (A)

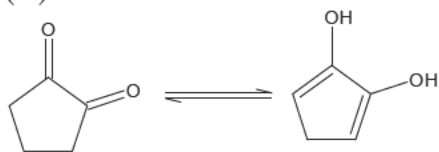
16. (B)  $X_A = 0.95$ ;  $X_B = 0.05$  A for solvent, B for solute.

$$\frac{W_B}{M_B} = 0.05; \frac{W_B}{W_A} \times \frac{M_A}{M_B} = 0.05; \frac{W_B}{W_A} \times \frac{0.3M_B}{M_B} = 0.05$$

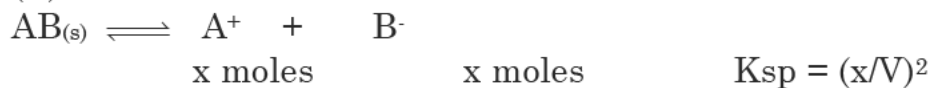
Hence  $\frac{W_A}{W_B} = 6$

17. (C)  $P_{\text{total}} = 120 - 75 X_B$ ; when  $X_B = 0$ :  $P_A^{\circ} = 120$  torr  
when  $X_B = 1$ :  $P_B^{\circ} = 45$  torr

18. (B)



19. (C)



relative lowering in vapour pressure =  $0.108 / 300 = X_B$

for  $n_{\text{water}} = 1$ ;  $n_B = 3.6 \times 10^{-4}$ ;

18 gm  $H_2O = 18$  ml water contains  $3.6 \times 10^{-4}$  moles of solutes

$2x = 3.6 \times 10^{-4}$ ;  $x = 1.8 \times 10^{-4}$ ;

$[A^+] = [B^-] = \frac{1.8 \times 10^{-4}}{18 \times 10^{-3}} = 0.01M$ ;  $K_{sp} = 10^{-4}$

20. (C)

$$1 + \frac{Y_A}{Y_B} > \frac{X_A}{X_B} + 1; \quad \frac{Y_A + Y_B}{Y_B} > \frac{X_A + X_B}{X_B} \quad X_B > Y_B, \text{ For less volatile solute.}$$

21. (D)

$P_A^\circ = 1375$  torr;  $P_B^\circ = 558$  torr

$P_A^\circ X_A + P_B^\circ X_B = P_{\text{total}}$ ;  $X_A + X_B = 1$ ; Solving,  $X_A = 0.247$

$$Y_A = \frac{P_A}{P_{\text{TOTAL}}} = \frac{1375 X_A}{760} = 0.447$$

22. (D)

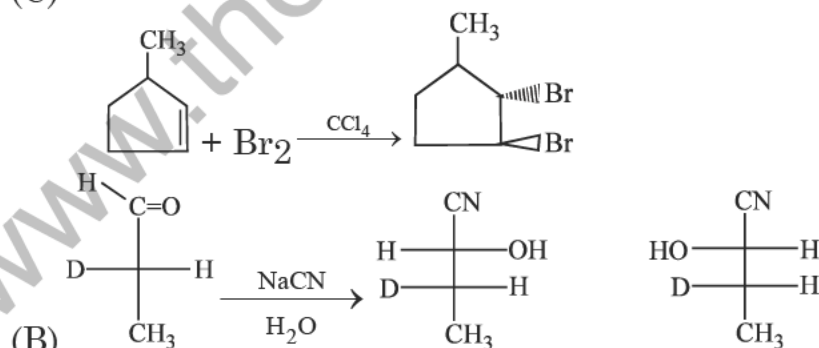
$$\Delta T_B = i K_b \frac{W_B \times 1000}{M_B \times W_A} = 0.58 \times 2.3 \times \frac{0.61 \times 1000}{122 \times 50} = 0.13$$

Boiling point =  $46.2 + 0.13 = 46.33^\circ C$

23. (A)

24. (B) Li at Body centre lattice and Ag at corner of cube or vice versa.

25. (C)



(B)

(D) HCl does not show peroxide effect

26. (C)  $BaCl_2$  insoluble in cold water but soluble in hot water.

27. (D)

28. (B) Among given hydroxide,  $Mg(OH)_2$  is least soluble.

29. (A)  $pK_a$   $CH_3NH_2 = 10.64$  ;  $(CH_3)_2NH = 10.77$  ;  $(CH_3)_3N = 9.8$  ;  
 $NH_3 = 9.25$
30. (C) Li is lightest.

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