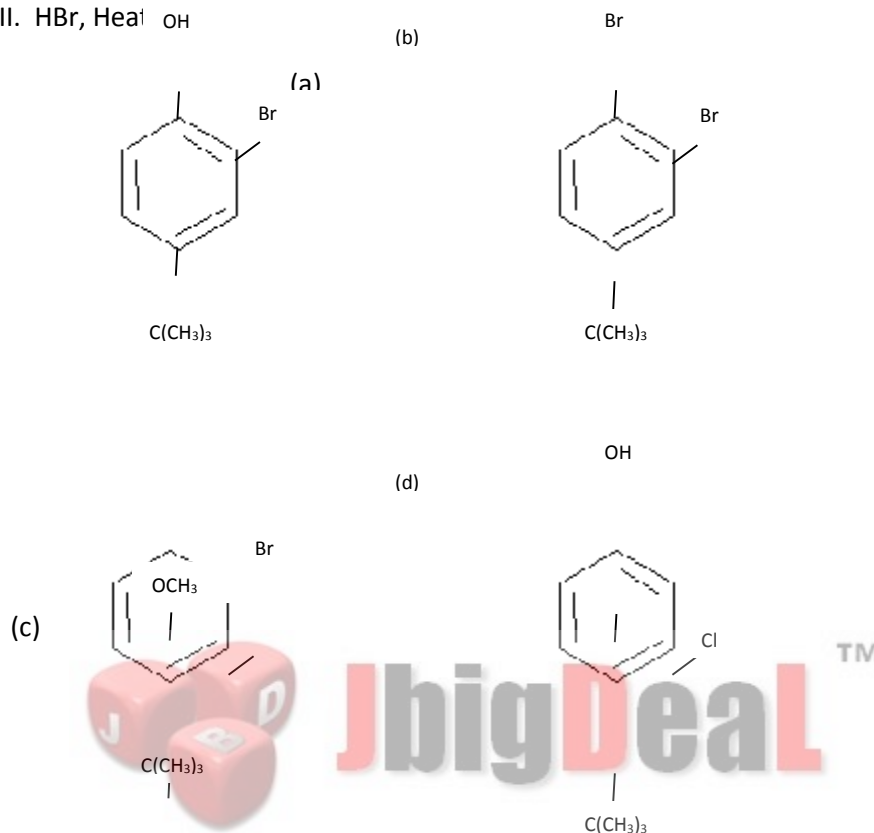


**VITEEE chemistry 2013**

1. Treating anisole with the following reagents, the major product obtained is I.  $(\text{CH}_3)_3\text{CCl}, \text{AlCl}_3$  II.  $\text{Cl}_2, \text{FeCl}_3$  III.  $\text{HBr}, \text{Heat}$  OH



2. Ketones  $[\text{R} - \text{C} - \text{R}']$  where,  $\text{R} = \text{R}' = \text{alkyl group}$  can be obtained in one step by

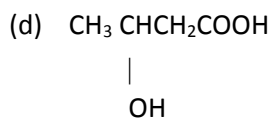
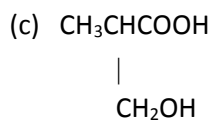
$$\begin{array}{c} \parallel \\ \text{O} \end{array}$$

Group can be obtained in one step by

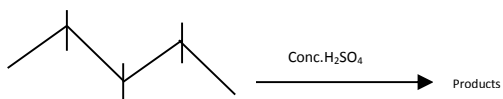
- (a) Hydrolysis of esters
- (b) Oxidation of primary alcohols
- (c) Oxidation of secondary alcohols
- (d) Reaction of acid halide with alcohols

3. An optically active compound 'X' has molecular formula  $\text{C}_4\text{H}_8\text{O}_3$ . It evolves  $\text{CO}_2$  with aqueous  $\text{NaHCO}_3$ . 'X' reacts with  $\text{LiAlH}_4$  to give an achiral compound. 'X' is

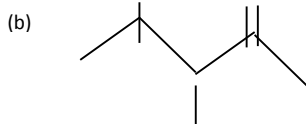
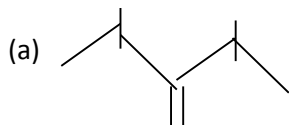
- (a)  $\text{CH}_3\text{CH}_2\text{C}(\text{H})(\text{COOH})_2$
- (b)  $\text{CH}_3\text{C}(\text{H})(\text{COOH})_2$



4.



Product is/are

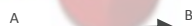


(c) Both (a) and (b)

(d) None is correct

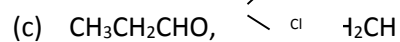
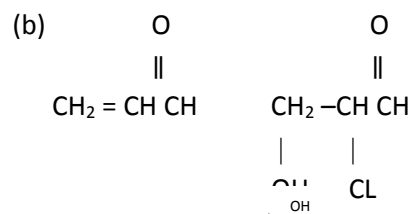
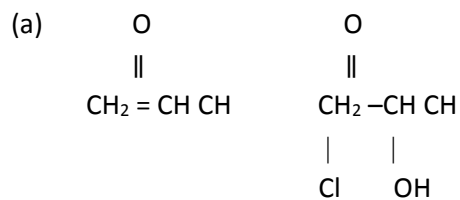
$\text{KHSO}_4$

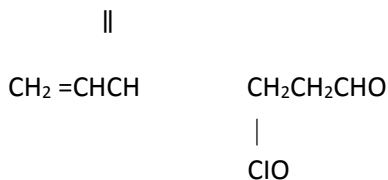
$\text{HClO}$



5. Glycerol

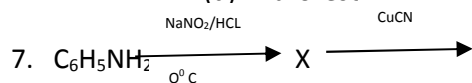
A and B respectively are





6. Phenol is heated with phthalic anhydride in the presence of conc.  $\text{H}_2\text{SO}_4$ . The product gives pink colour with alkali. The product is

- (a) phenolphthalein
- (b) Bakelite
- (c) salicylic acid
- (d) fluorescein



- (a)  $\text{C}_6\text{H}_5\text{-NH-CH}_3$
- (b)  $\text{C}_6\text{H}_5\text{-CH}_2\text{-NH}_2$
- (c)  $\text{C}_6\text{H}_5\text{-CH}_2\text{-COOH}$
- (d)  $\text{C}_6\text{H}_5\text{-COOH}$

8. B can be obtained from halide by van-Arkel method. This involves reaction

- (a)  $\text{2B} \xrightarrow[\text{filamen}]{\text{Red hot Wor Ta}} \text{2B} + 3\text{I}_2$
- (b)  $\text{2BCl}_3 + 3\text{H}_2 \xrightarrow[\text{filamen}]{\text{Red hot Wor Ta}} \text{2B} + 6\text{HCl}$
- (c) Both (a) and (b)
- (d) None of the above

9.  $\text{NH}_4\text{Cl(s)}$  is heated in a test tube. Vapours are brought in contact with red litmus paper, which changes it to blue and then to red. It is because of

- (a) formation of  $\text{NH}_4\text{OH}$  and  $\text{HCl}$
- (b) formation of  $\text{NH}_3$  and  $\text{HCl}$
- (c) greater diffusion of  $\text{NH}_3$  than  $\text{HCl}$
- (d) greater diffusion of  $\text{HCl}$  than  $\text{NH}_3$

10. Out of  $\text{H}_2\text{S}_2\text{O}_3$ ,  $\text{H}_2\text{S}_2\text{O}_4$ ,  $\text{H}_2\text{SO}_5$  and  $\text{H}_2\text{S}_2\text{O}_8$  peroxy acids are

- (a)  $\text{H}_2\text{S}_2\text{O}_3$ ,  $\text{H}_2\text{S}_2\text{O}_8$       (b)  $\text{H}_2\text{SO}_5$ ,  $\text{H}_2\text{S}_2\text{O}_8$   
 (c)  $\text{H}_2\text{S}_2\text{O}_4$ ,  $\text{H}_2\text{SO}_5$       (d)  $\text{H}_2\text{S}_2\text{O}_3$ ,  $\text{H}_2\text{S}_2\text{O}_4$

11. The density of solid argon is 1.65 g per cc at  $-233^\circ\text{C}$ . If the argon atom is assumed to be a sphere of radius  $1.54 \times 10^{-8}$  cm, what per cent of solid argon is apparently empty space? (Ar = 40)

- (a) 16.5%                      (b) 38%  
 (b) 50%                      (d) 62%

12. When 1 mole of  $\text{CO}_2(\text{g})$  occupying volume 10L at  $27^\circ\text{C}$  is expanded under adiabatic condition, temperature falls to 150 K. Hence, final volume is

- (a) 5 L    (b) 20 L    (c) 40 L    (d) 80 L

13. Acid hydrolysis of ester is first order reaction and rate constant is given by

$$K = \frac{2.303}{t} \log \frac{V_\infty - V_0}{V_\infty - V_t}$$

Where,  $V_0$ ,  $V_t$  and  $V_\infty$  are the volume of standard NaOH required to neutralize acid present at a given time, if ester is 50% neutralized then

- (a)  $V_\infty = V_t$   
 (b)  $V_\infty = (V_t - V_0)$   
 (c)  $V_\infty = 2V_t - V_0$   
 (d)  $V_\infty = 2V_t + V_0$

14. A near UV photon of 300 nm is absorbed by a gas and then re-emitted as two photons. One photon is red with wavelength of the second photon is

- (a) 1060 nm  
 (b) 496 nm  
 (c) 300 nm  
 (d) 215 nm

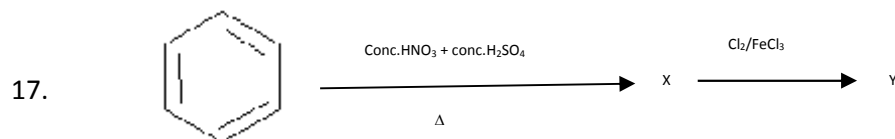
15. Which of these ions is expected to be coloured in aqueous solution?

I.  $\text{Fe}^{3+}$  II.  $\text{Ni}^{2+}$  III  $\text{Al}^{3+}$

- (a) I and II      (b) II and III  
 (c) I and III      (d) I, II and III

16. Select the correct statement(s).

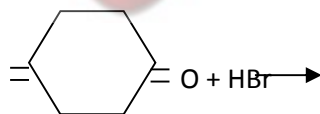
- (a)  $\text{LiAlH}_4$  reduces methyl cyanide to methyl amine
- (b) Alkane nitrile has electrophilic as well as nucleophilic centres
- (c) separation is a reversible reaction
- (d) Alkaline hydrolysis of methasne nitrile forms methanoic acids

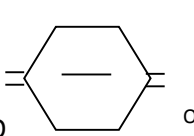
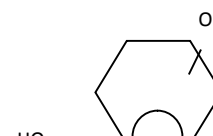
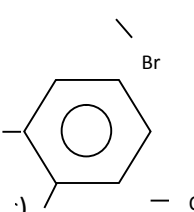
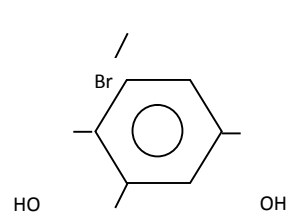


The product Y is

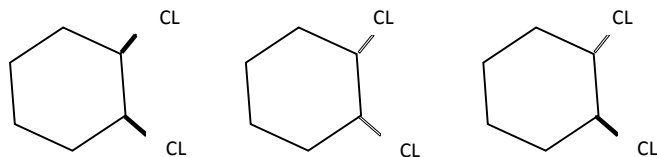
- (a) P-chloro nitrobenzene
- (b) O-chloro nitrobenzene
- (c) M-chloro nitrobenzene
- (d) O,p-dichloro nitrobenzene

18. End product of the following reaction is



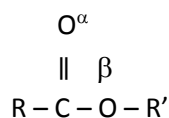
- (a)  (b) 
- (c)  (d) 

19. Following compounds are respectively ... geometrical isomers



- |     | P     | Q     | R     |
|-----|-------|-------|-------|
| (a) | Cis   | cis   | trans |
| (b) | Cis   | trans | trans |
| (c) | Trans | cis   | cis   |
| (d) | Cis   | trans | cis   |

20. Which is more basic oxygen in an ester



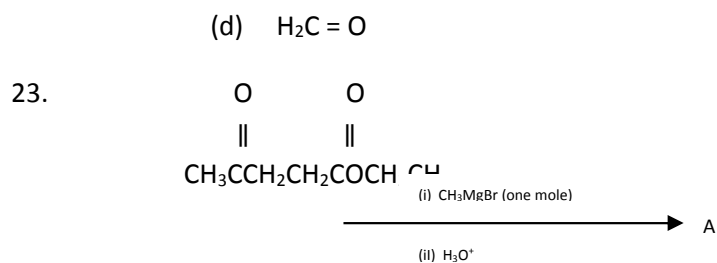
- (a) Carbonyl oxygen,  $\alpha$   
 (b) Carbonyl oxygen,  $\beta$   
 (c) Equally basic  
 (d) Both are acidic oxygen

21. In a Claisen condensation reaction (when an ester is treated with a strong base)

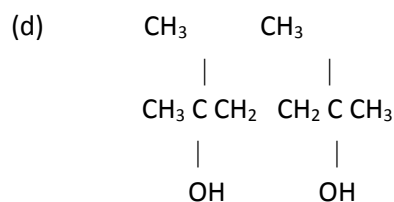
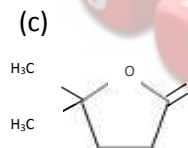
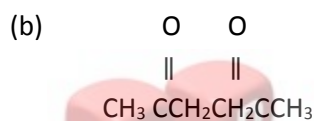
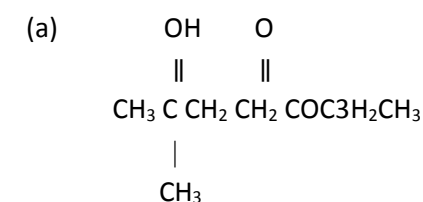
- (a) a proton is removed from the  $\alpha$ -carbon to form a resonance stabilised carbanion of the ester  
 (b) carbanion acts as a nucleophile in a nucleophilic acyl substitution reaction with another ester molecule  
 (c) a new C-C bond is formed  
 (d) All of the above statements are correct

22. An organic compound B is formed by the reaction of ethyl magnesium iodide with a substance A, followed by treatment with dilute aqueous acid. Compound B does not react with PCC or PDC in dichloromethane. Which of the following is a possible compound for A?

- (a)  $\text{CH}_2 = \text{CH}_2$   
 (b)  $\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3\text{CH}_2\text{CCH}_3 \end{array}$   
 (c)  $\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3\text{CH} \end{array}$



A formed in this reaction is



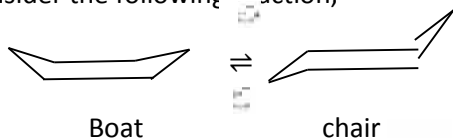
24. For the cell reaction  $2\text{Ce}^{4+} + \text{Co} \rightarrow 2\text{Ce}^{3+} + \text{Co}^{3+}$ ;  $E^\circ_{\text{cell}}$  is 1.89 V. If  $E_{\text{Co}^{2+}/\text{Co}}$  is  $-0.28$  V, what is the value of  $E_{\text{Ce}^{4+}/\text{Ce}^{3+}}$ ?

- (a) 0.28 V (b) 1.61 V (c) 2.17 V (d) 5.29 V

25. A constant current of 30 A is passed through an aqueous solution of NaCl for a time of 1.00 h. What is the volume of  $\text{Cl}_2$  gas at STP produced?

- (a) 30.00 L (b) 25.08 L (c) 12.54 L (d) 1.12 L

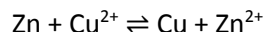
26. Consider the following reaction,



The reaction is of first order in each diagram, with an equilibrium constant of  $10^4$ . For the conversion of chair form to boat from  $e^{-E_a/RT} = 4.35 \times 10^{-8}$  at 298 K with pre-exponential factor of  $10^{12} \text{ s}^{-1}$ . Apparent rate constant ( $= k_A / k_B$ ) at 298 K is

- (a)  $4.35 \times 10^4 \text{ s}^{-1}$     (b)  $4.35 \times 10^8 \text{ s}^{-1}$   
 (c)  $4.35 \times 10^{-8} \text{ s}^{-1}$     (d)  $4.35 \times 10^{12} \text{ s}^{-1}$

27. If for the cell reaction,



Entropy change  $\Delta S^0$  is  $96.5 \text{ J mol}^{-1} \text{ K}^{-1}$ , then temperature coefficient of the emf of a cell is

- (a)  $5 \times 10^{-4} \text{ VK}^{-1}$     (b)  $1 \times 10^{-3} \text{ VK}^{-1}$   
 (c)  $2 \times 10^{-3} \text{ VK}^{-1}$     (d)  $9.65 \times 10^{-4} \text{ VK}^{-1}$

28. What transition in the hydrogen spectrum would have the same wavelength as the Balmer transition,  $n=4$  to  $n=2$  of  $\text{He}^+$  spectrum?

- (a)  $n=4$  to  $n=2$     (b)  $n=3$  to  $n=2$   
 (c)  $n=2$  to  $n=1$     (d)  $n=4$  to  $n=3$

29. What is the degeneracy of the level of H-atom that has energy  $\left(-\frac{R_H}{9}\right)$ ?

- (a) 16    (b) 9    (c) 4    (d) 1

30. Match the following and choose the correct option given below.

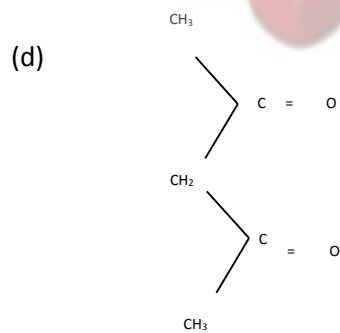
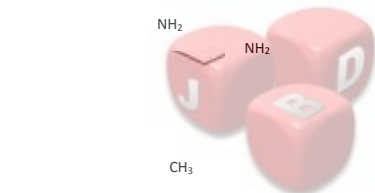
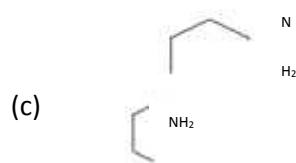
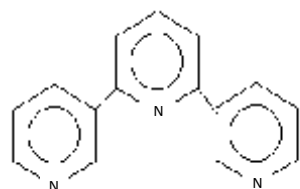
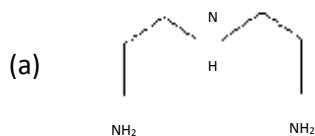
|   |               |      |                        |
|---|---------------|------|------------------------|
| A | Dry ice       | I.   | Anti-knocking compound |
| B | Semiconductor | II.  | compound               |
| C | Solder        | III. | Electronic diode or    |
| D | TEL           | IV.  | trode                  |
|   |               |      | Joining circuit        |
|   |               |      | Refrigerant for        |
|   |               |      | preserving food        |

- (b)    II    III    I    IV  
 (c)    IV    III    II    I  
 (d)    IV    II    III    I

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



31. Which of the following ligands is tetradentate?

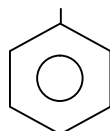
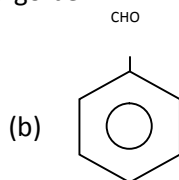
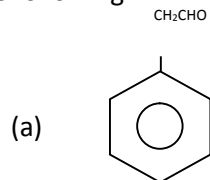


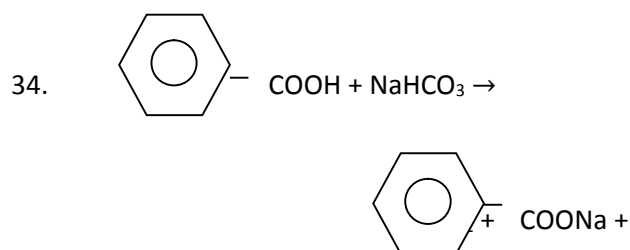
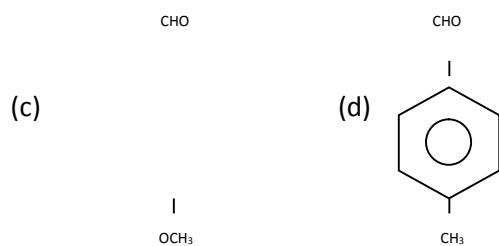
JbigDeal™

32. What is the EAN of  $[Al(C_4O_4)_3]^{3-}$ ?

- (a) 28 (b) 22 (c) 16 (d) 10

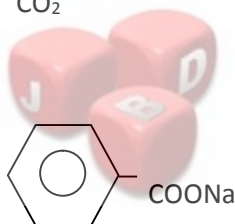
33. Which of the following does not undergo benzoin condensation?





C is with the product

(a)  $\text{CO}_2$



(c) Both (a) and (b)

(d) None of the above

35. Benzene diazonium chloride on treatment with hypophosphorous acid and water yield benzene. Which of the following is used as a catalyst in this reaction?

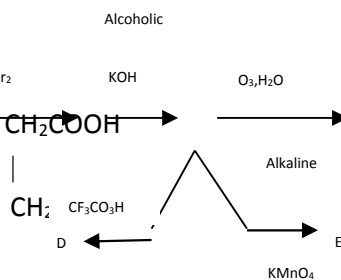
(a)  $\text{LiAlH}_4$

(b) Red p

(c) Zn

(d)  $\text{Cu}^+$

36. Consider the following reaction sequence,  $\text{CH}_2\text{COOH} \xrightarrow{\text{p-Br}_2} \text{CH}_2\text{COOH} \xrightarrow{\text{Alcoholic KOH}} \text{A} \xrightarrow{\text{O}_3, \text{H}_2\text{O}} \text{B} \xrightarrow{\text{Alkaline KMnO}_4} \text{C}$



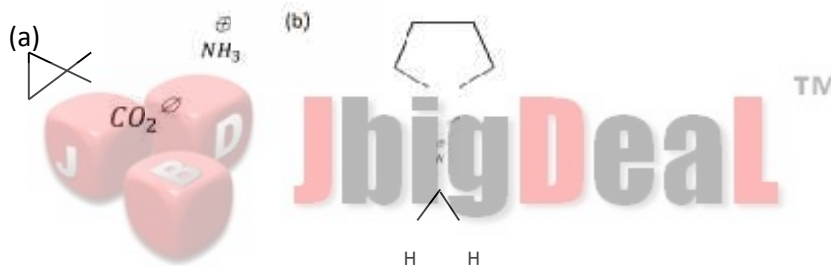
Isomers are

- (a) C and E
- (b) C and D
- (c) D and E
- (d) C,D and E

37. When a monosaccharide forms a cyclic hemiacetal, the carbon atom that contained the carbonyl group is identified as the .... Carbon atom,because

- (a) D,the carbonyl group is drawn to the right
- (b) L, the carbonyl group is drawn to the left
- (c) acetal,it forms bond to an -OR and an -OR'
- (d) anomeric, its substituents can assume an  $\alpha$  or  $\beta$  position

38. Which of the following is/ are  $\alpha$ - amino acid?



- (c) Both (a) and (b)
- (d) None of these

39. Calculate pH buffer prepared by adding 10 mL of 0.10 M acetic acid to 20 mL of 0.1 M sodium acetate [ $pK_a$  ( $CH_3COOH$ ) = 4.74]

- (a) 3.00
- (b) 4.44
- (c) 4.74
- (d) 5.04

40. The equivalent conductance of silver nitrate solution at  $250^\circ C$  for an infinite dilution was found to be  $133.3 \Omega^{-1} cm^2 equiv^{-1}$ . The transport number of  $Ag^+$  ions in very dilute solution of  $AgNO_3$  is 0,464. Equivalent conductances of  $Ag^+$  and  $NO_3^-$  (in  $\Omega^{-1} cm^2 equiv^{-1}$ ) at infinite dilution are respectively

- (a) 195.2, 133.3
- (b) 61.9, 71.4
- (c) 71.4, 61.9
- (d) 133.3, 195.2