

## VITEEE chemistry 2014

1. The standard molar heat of formation of ethane,  $\text{CO}_2$  and water (l) are respectively -21.1, -94.1 and -63.3 kcal. The standard molar heat of combustion of ethane will be

- (a) -372 kcal    (b) 162 kcal  
(c) -240 kcal    (d) 183.5 kcal

2. The solubility product of  $\text{Ag}_2\text{CrO}_4$  is  $32 \times 10^{-12}$ . What is the concentration of  $\text{CrO}_4^{2-}$  ions in that solution?

- (a)  $2 \times 10^{-4}$  M    (b)  $16 \times 10^{-4}$  M  
(c)  $8 \times 10^{-4}$  M    (d)  $8 \times 10^{-8}$  M

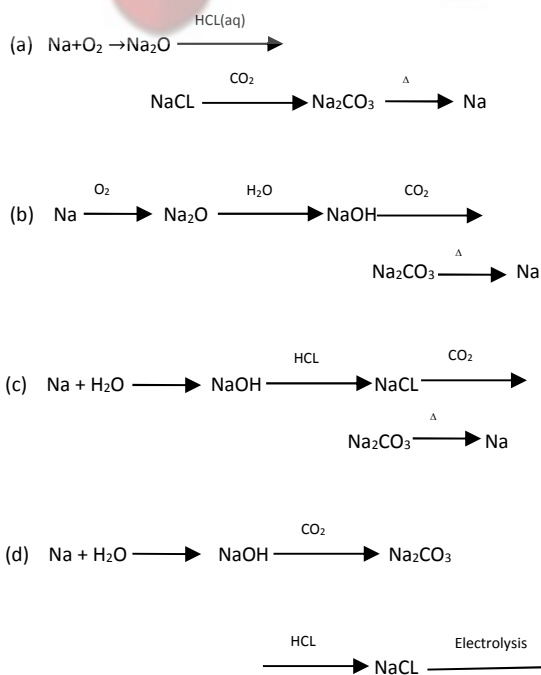
3. The equivalent conductivity of a solution containing 2.54g of  $\text{CuSO}_4$  per L is  $91.0 \text{ W}^{-1} \text{ cm}^2 \text{ eq}^{-1}$ . Its conductivity would be

- (a)  $2.9 \times 10^{-3} \Omega^{-1} \text{ cm}^{-1}$   
(b)  $1.8 \times 10^{-2} \Omega^{-1} \text{ cm}^{-1}$   
(c)  $2.4 \times 10^{-4} \Omega^{-1} \text{ cm}^{-1}$   
(d)  $3.6 \times 10^{-3} \Omega^{-1} \text{ cm}^{-1}$

4. The half-life of two samples are 0.1 and 0.8 s. Their respective concentration are 400 and 50 respectively. The order of the reaction is

- (a) 0    (b) 2  
(c) 1    (d) 4

5. Which sequence of reactions shows correct chemical relation between sodium and its compounds?



6. Purest form of iron is

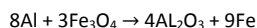
- (a) pig iron    (b) wrought iron

- (c) cast iron (d) steel

7. Which has the smallest size?

- (a)  $\text{Na}^+$  (b)  $\text{Mg}^{2+}$   
(c)  $\text{Al}^{3+}$  (d)  $\text{p}^{5+}$

8. In the reaction,



The number of electrons transferred from the reductant to the oxidant is

- (a) 8 (b) 4  
(c) 16 (d) 24

9. The bond angles of  $\text{NH}_3$ ,  $\text{NH}_4^+$  and  $\text{NH}_2^-$  are in the order

- (a)  $\text{NH}_2^- > \text{NH}_3 > \text{NH}_4^+$  (b)  $\text{NH}_4^+ > \text{NH}_3 > \text{NH}_2^-$   
(c)  $\text{NH}_3 > \text{NH}_2^- > \text{NH}_4^+$  (d)  $\text{NH} > \text{NH}_4^+ > \text{NH}_2^-$

10. A gaseous mixture containing  $\text{He}$ ,  $\text{CH}_4$  and  $\text{SO}_2$  was allowed to effuse through a fine hole then find what the molar ratio of gases coming out initially? (Given mixture contains  $\text{He}$ ,  $\text{CH}_4$  and  $\text{SO}_2$  in 1:2:3 mole ratio).

- (a)  $\sqrt{2} : \sqrt{2} : 3$  (b) 2:2:3  
(c) 4:4:3 (d) 1:1:3

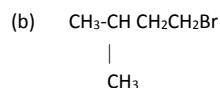
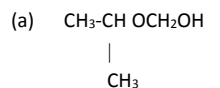
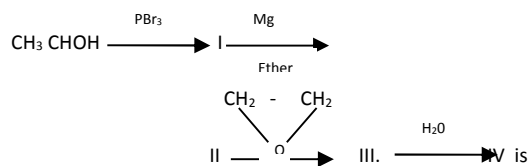
11. According to Bohr's theory, the angular momentum for an electron of 3<sup>rd</sup> orbit is

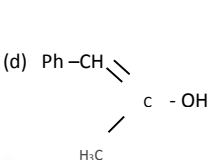
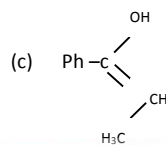
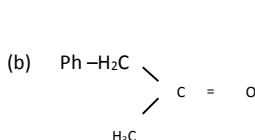
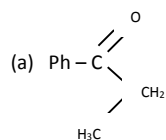
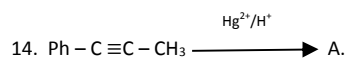
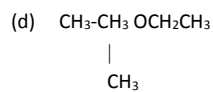
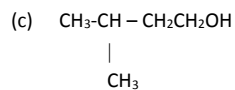
- (a)  $3\hbar$  (b)  $1.5\hbar$   
(c)  $9\hbar$  (d)  $2\frac{\hbar}{\pi}$

12. 2.76 g of silver carbonate on being strongly heated yields a residue weighing

- (a) 3.54 g (b) 3.0 g  
(c) 1.36 g (d) 2.16 g

13. The final product (IV) in the sequence of reactions





15. Which of the following has an ester linkage?

- (a) Nylon-66      (b) Dacron  
(c) PVC            (d) Bakelite

16. Which of the following pairs give positive Tollen's test?

- (a) Glucose, sucrose  
(b) Glucose, fructose  
(c) Hexanal, acetophenone  
(d) Fructose, sucrose

17. Peptisation involves

- (a) precipitation of colloidal particles  
(b) distintegration of colloidal aggregates  
(c) evaporation of dispersion medium  
(d) impact of molecules of the dispersion medium on the colloidal particles

18. Which of the following has the maximum number of unpaired d-electrons?

- (a)  $\text{Fe}^{2+}$     (b)  $\text{Cu}^+$



- (c) Zn (d)  $\text{Ni}^{3+}$

19. Iodine is formed when potassium iodide reacts with a solution of

- (a)  $\text{ZnSO}_4$   
 (b)  $\text{CuSO}_4$   
 (c)  $(\text{NH}_4)_2\text{SO}_4$   
 (d)  $\text{Na}_2\text{SO}_4$

20. Which of the following does not represent the correct order of the property indicated?

- (a)  $\text{Sc}^{3+} > \text{Cr}^{3+} > \text{Fe}^{3+} > \text{Mn}^{3+}$  - ionic radii  
 (b)  $\text{Sc} < \text{Ti} < \text{Cr} < \text{Mn}$  - density  
 (c)  $\text{Mn}^{2+} > \text{Ni}^{2+} > \text{Co}^{2+} < \text{Fe}^{2+}$  - ionic radii  
 (d)  $\text{FeO} < \text{CaO} < \text{MnO} < \text{CuO}$  - basic nature

21. If the elevation in boiling point of a solution of 10 g of solute (mol. Wt. = 100) in 100 g of water is  $\Delta T_b$ , the ebullioscopic constant of water is

- (a) 10 (b)  $100 T_b$   
 (c)  $\Delta T_b$  (d)  $\frac{10 T_b}{10}$

22. Which of the following compounds cannot be prepared single by the Wurtz reaction?

- (a)  $\text{C}_2\text{H}_6$   
 (b)  $(\text{CH}_3)_2\text{CHCH}_3$   
 (c)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$   
 (d) All of the above can be prepared

23. Which of the following oxides is strongly basic?

- (a)  $\text{Ti}_2\text{O}$   
 (b)  $\text{B}_2\text{O}_3$   
 (c)  $\text{Al}_2\text{O}_3$   
 (d)  $\text{Ga}_2\text{O}_3$

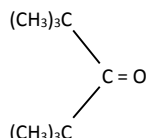
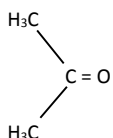
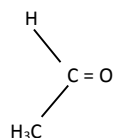
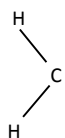
24. In Langmuir's model of adsorption of a gas on a solid surface,

- (a) the rate of dissociation of adsorbed molecules from the surface does not depend on the surface covered  
 (b) the adsorption at a single site on the surface may involve multiple molecules at the same time  
 (c) the mass of gas striking a given area of surface is proportional to the pressure of the gas  
 (d) the mass of gas striking a given area of surface is independent of the pressure of the gas

25. How many sigma and pi-bonds are there in the molecule of dicyanoethene ( $\text{CN-CH}=\text{CH-CN}$ )?

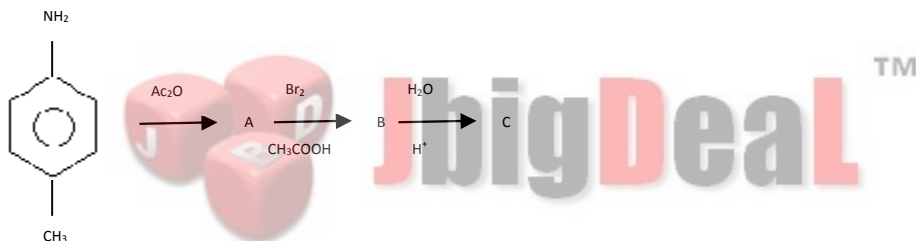
- (a) 3 sigma and 3 pi
- (b) 5 sigma and 2 pi
- (c) 7 sigma and 5 pi
- (d) 2 sigma and 3 pi

26. What will be the order of reactivity of the following carbonyl compounds with Grignard's reagent?

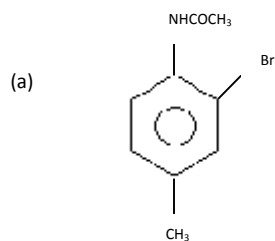


- (a) I > II > III > IV
- (b) IV > III > II > I
- (c) II > I > IV > III
- (d) III > II > I > IV

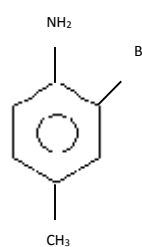
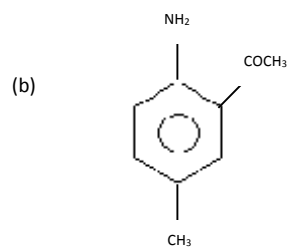
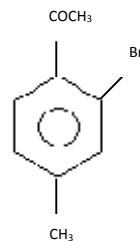
27.



The final product 'C' in the above reaction is



(c)



28. Which of the following isomerism is shown by ethyl acetoacetate?



- (b) halogen
- (c) sulphur
- (d) phosphorus

33. The volume strength of 1.5 N H<sub>2</sub>O<sub>2</sub> solution is

- (a) 16.8 L    (b) 8.4 L
- (b) 4.2 L    (d) 5.2 L

34.  $\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \rightarrow \text{Mn}^{2+} + 4\text{H}_2\text{O}$ ;

$$E^0 = 1.51 \text{ V}$$

$\text{MnO}_2 + 4\text{H}^+ + 2\text{e}^- \rightarrow \text{Mn}^{2+} + 2\text{H}_2\text{O}$ ;

$$E^0 = 1.23 \text{ V } E_{\text{MnO}_4^-/\text{MnO}_2}^0 \text{ is}$$

- (a) 1.70 V    (b) 0.91 V
- (c) 1.37 V    (d) 0.548 V

35. A metal has bcc structure and the edge length of its unit cell is 3.04 Å. The volume of the unit cell in cm<sup>3</sup> will be

- (a)  $1.6 \times 10^{21} \text{ cm}^3$     (b)  $2.81 \times 10^{-23} \text{ cm}^3$
- (c)  $6.02 \times 10^{-23} \text{ cm}^3$     (d)  $6.6 \times 10^{-24} \text{ cm}^3$

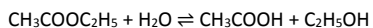
36. Among  $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ ,  $[\text{Fe}(\text{CN})_6]^{3-}$ ,  $[\text{Fe}(\text{Cl})_6]^{3-}$  species, the hybridization state of the Fe atom are respectively.

- (a)  $d^2sp^3$ ,  $d^2sp^3$ ,  $sp^3d^2$
- (b)  $sp^3d^2$ ,  $d^2sp^3$ ,  $d^2sp^3$
- (c)  $sp^3d^3$ ,  $d^2sp^3$ ,  $sp^3d^2$
- (d) None of the above

37. Which of the following hydrogen bonds are strongest in vapour phase?

- (a) HF ..... HF
- (b) HF ..... HCl
- (c) HCl ..... HCl
- (d) HF ..... HI

38. The rate constant for forward reaction and backward reaction of hydrolysis of ester are  $1.1 \times 10^{-2}$  and  $1.5 \times 10^{-3}$  per minute respectively. Equilibrium constant for the reaction is



- (a) 334.7
- (b) 7.33
- (c) 5.33
- (d) 33.3

39. 19.85 mL of 0.1 N NaOH reacts with 20 mL of HCL solution for complete neutralization. The molarity of HCL solution is

- (a) 9.9
- (b) 0.99
- (c) 0.099
- (d) 0.0099

40. An f-shell containing 6 unpaired electrons can exchange

- (a) 6 electrons
- (b) 9 electrons
- (c) 12 electrons
- (d) 15 electrons



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