

- Which of the following is not correct ?
  - Hydrolysis of  $\text{NCl}_3$  gives  $\text{NH}_3$  and  $\text{HOCl}$
  - $\text{NH}_3$  is less stable than  $\text{PH}_3$
  - $\text{NH}_3$  is a weak reducing reagent compared to  $\text{PH}_3$
  - Nitric oxide in solid state exhibits diamagnetic property
- $\text{SiO}_2$  is reacted with sodium carbonate. What is the gas liberated ?
  - $\text{CO}$
  - $\text{O}_2$
  - $\text{CO}_2$
  - $\text{O}_3$
- The compounds formed at anode in the electrolysis of an aqueous solution of potassium acetate, are
  - $\text{C}_2\text{H}_6$  and  $\text{CO}_2$
  - $\text{C}_2\text{H}_4$  and  $\text{CO}_2$
  - $\text{CH}_4$  and  $\text{H}_2$
  - $\text{CH}_4$  and  $\text{CO}_2$
- Which of the following is not correct regarding the electrolytic preparation of  $\text{H}_2\text{O}_2$  ?
  - Lead is used as cathode
  - 50%  $\text{H}_2\text{SO}_4$  is used
  - Hydrogen is liberated at anode
  - Sulphuric acid undergoes oxidation
- Which of the following is correct?
  - The pH of one litre solution containing 0.49 g of  $\text{H}_2\text{SO}_4$  is 2.0
  - The conjugate base of  $\text{H}_2\text{S}$  is  $\text{S}^{2-}$
  - $\text{BF}_3$  is a Lewis base
  - Phenolphthalein is colourless in basic medium
- Which of the following is correct ?
  - Catalyst undergoes permanent chemical change
  - Particle size of solute in true solution is  $10^{-3}$  m
  - Starch solution is a hydrosol
  - Hydrolysis of liquid ester in the presence of mineral acid is an example of heterogeneous catalysis reactions
- In an oxidation-reduction reaction,  $\text{MnO}_4^-$  ion is converted to  $\text{Mn}^{2+}$ . What is the number of equivalents of  $\text{KMnO}_4$  (mol. wt. = 158) present in 250 mL of 0.04 M  $\text{KMnO}_4$  solution ?
  - 0.02
  - 0.05
  - 0.04
  - 0.07
- Which of the following reagents converts both acetaldehyde and acetone to alkanes ?
  - $\text{Ni}/\text{H}_2$
  - $\text{LiAlH}_4$
  - $\text{I}_2/\text{NaOH}$
  - $\text{Zn-Hg}/\text{conc. HCl}$
- The heat of formation of  $\text{CO}(\text{g})$  and  $\text{CO}_2(\text{g})$  are  $\Delta H = -110$  and  $\Delta H = -393 \text{ kJ mol}^{-1}$  respectively. What is the heat of reaction ( $\Delta H$ ) (in  $\text{kJ mol}^{-1}$ ) for the following reaction ?
 
$$\text{CO}(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \longrightarrow \text{CO}_2(\text{g})$$
  - 504
  - 142.5
  - 283
  - 504
- What is the wavelength (in m) of a particle of mass  $6.62 \times 10^{-29}$  g moving with a velocity of  $10^3 \text{ ms}^{-1}$  ?
  - $6.62 \times 10^{-4}$
  - $6.62 \times 10^{-3}$
  - $10^{-5}$
  - $10^5$



11. What is the electrode potential (in V) of the following electrode at 25°C ?  
 $\text{Ni}^{2+} (0.1 \text{ M}) | \text{Ni}(s)$   
 (Standard reaction potential of  $\text{Ni}^{2+} | \text{Ni}$  is  $-0.25\text{V}$ ,  $\frac{2.303 RT}{F} = 0.06$ )
- (a)  $-0.28 \text{ V}$  (b)  $-0.34 \text{ V}$   
 (c)  $-0.82 \text{ V}$  (d)  $-0.22 \text{ V}$
12. What is the equation for the equilibrium constant ( $K_c$ ) for the following reaction?
- $$\frac{1}{2} \text{A}(g) + \frac{1}{3} \text{B}(g) \xrightleftharpoons{T(K)} \frac{2}{3} \text{C}(g)$$
- (a)  $K_c = \frac{[\text{A}]^{1/2}[\text{B}]^{1/3}}{[\text{C}]^{3/2}}$  (b)  $K_c = \frac{[\text{C}]^{3/2}}{[\text{A}]^2[\text{B}]^3}$   
 (c)  $K_c = \frac{[\text{C}]^{2/3}}{[\text{A}]^{1/2}[\text{B}]^{1/3}}$  (d)  $K_c = \frac{[\text{C}]^{2/3}}{[\text{A}]^{1/2} + [\text{B}]^{1/3}}$
13. Which of the following can give a Grignard reagent when reacted with magnesium in dry ether ?
- (a)  $\text{C}_2\text{H}_6$  (b)  $\text{C}_2\text{H}_5\text{Cl}$   
 (c)  $\text{C}_2\text{H}_5\text{OH}$  (d)  $\text{C}_2\text{H}_5\text{CN}$
14. Which of the following is not correct?
- (a) Al reacts with NaOH and liberate  $\text{H}_2$   
 (b)  $\text{AlCl}_3$  is a Lewis acid  
 (c) Al is used in the manufacture of electrical cables  
 (d) NaOH is used during Hall's process of purification of bauxite
15. A 0.5 g/L solution of glucose is found to be isotonic with a 2.5 g/L solution of an organic compound. What will be the molecular weight of that organic compound ?
- (a) 300 (b) 600  
 (c) 900 (d) 200
16. *t*-butyl chloride preferably undergo hydrolysis by
- (a)  $\text{S}_{\text{N}}1$  mechanism  
 (b)  $\text{S}_{\text{N}}2$  mechanism  
 (c) Any of (a) and (b)  
 (d) None of these
17. Oxidation state of oxygen in  $\text{F}_2\text{O}$  is
- (a) +1 (b) -1  
 (c) +2 (d) -2
18. To dissolve argentite ore which of the following is used ?
- (a)  $\text{Na}[\text{Ag}(\text{CN})_2]$  (b) NaCN  
 (c) NaCl (d) HCl
19. If 50% of a radioactive substance dissociates in 15 min, then the time taken by substance to dissociate 99% will be
- (a) 50 min (b) 100 min  
 (c) 99 min (d) 150 min
20. H—O—H bond angle in  $\text{H}_2\text{O}$  is  $104.5^\circ$  and not  $109^\circ 28'$  because of
- (a) lone pair-lone pair repulsion  
 (b) lone pair-bond pair repulsion  
 (c) bond pair-bond pair repulsion  
 (d) high electronegativity of oxygen
21. The reaction,  
 $\text{C}_6\text{H}_5\text{CHO} + \text{CH}_3\text{COOC}_2\text{H}_5 \longrightarrow \text{C}_6\text{H}_5\text{CH}=\text{CHCOOC}_2\text{H}_5$ , is called
- (a) Benzoin condensation  
 (b) Claisen condensation  
 (c) Cannizaro's reaction  
 (d) Perkin reaction
22. The best method to separate the mixture of *ortho* and *para* nitrophenol (1 : 1) is
- (a) vaporisation (b) colour spectrum  
 (c) distillation (d) crystallisation
23. Iodoform gives a precipitate with  $\text{AgNO}_3$  on heating but chloroform does not because
- (a) C—I bond in iodoform is weak and C—Cl bond in chloroform is strong  
 (b) chloroform is covalent  
 (c) iodoform is ionic  
 (d) None of the above
24. What are the values of  $n_1$  and  $n_2$  respectively for  $\text{H}_\beta$  line in the Lyman series of hydrogen atomic spectrum 44 ?
- (a) 3 and 5 (b) 2 and 3  
 (c) 1 and 3 (d) 2 and 4
25. The homologue of ethyne is
- (a)  $\text{C}_2\text{H}_2$  (b)  $\text{C}_2\text{H}_6$   
 (c)  $\text{C}_3\text{H}_8$  (d)  $\text{C}_3\text{H}_4$
26. A 0.1 aqueous solution of a weak acid is 2% ionised. If the ionic product of water is  $1 \times 10^{-14}$ , the  $[\text{OH}^-]$  is
- (a)  $5 \times 10^{-12} \text{ M}$  (b)  $2 \times 10^{-3} \text{ M}$   
 (c)  $1 \times 10^{-14} \text{ M}$  (d) None of these
27. Which of the following does not have coordinate bond?
- (a)  $\text{SO}_2$  (b)  $\text{HNO}_3$   
 (c)  $\text{H}_2\text{SO}_3$  (d)  $\text{HNO}_2$
28. The total number of orbitals in the fifth energy level is



- (a) 5 (b) 10  
(c) 18 (d) 25
29. The most probable velocity (in cm/s) of hydrogen molecule at 27°C will be  
(a)  $19.3 \times 10^4$  (b)  $17.8 \times 10^4$   
(c)  $24.93 \times 10^9$  (d)  $17.8 \times 10^8$
30. In III group precipitation,  $\text{NH}_4\text{Cl}$  is added before adding  $\text{NH}_4\text{OH}$  to  
(a) decrease conc. of  $\text{OH}^-$   
(b) prevent interference of  $\text{PO}_4^{3-}$   
(c) increase conc. of  $\text{Cl}^-$   
(d) increase conc. of  $\text{OH}^-$  ion
31. Steel is heated to below red heat and then, cooled slowly. The process refers to  
(a) hardening (b) annealing  
(c) tempering (d) nitriding
32. What is the wave number of 4<sup>th</sup> line in Balmer series of hydrogen spectrum?  
( $R = 1,09,677 \text{ cm}^{-1}$ )  
(a)  $24,630 \text{ cm}^{-1}$  (b)  $24,360 \text{ cm}^{-1}$   
(c)  $24,730 \text{ cm}^{-1}$  (d)  $24,372 \text{ cm}^{-1}$
33. 9.2 g  $\text{N}_2\text{O}_4$  is heated in a 1 L vessel till equilibrium state is established  
 $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$   
In equilibrium state 50%  $\text{N}_2\text{O}_4$  was dissociated, equilibrium constant will be  
(mol. wt. of  $\text{N}_2\text{O}_4 = 92$ )  
(a) 0.1 (b) 0.4  
(c) 0.3 (d) 0.2
34. Disperse phase and dispersion medium in butter are respectively
- (a) solid and liquid (b) liquid and solid  
(c) liquid and liquid (d) solid and solid
35. Which of the following carbonates decomposes readily at low temperatures?  
(a)  $\text{Na}_2\text{CO}_3$  (b)  $\text{K}_2\text{CO}_3$   
(c)  $\text{Li}_2\text{CO}_3$  (d)  $\text{Rb}_2\text{CO}_3$
36. The atomic number of an element 'M' is 26. How many electrons are present in the M-shell of the element in its  $M^{3+}$  state?  
(a) 11 (b) 15 (c) 14 (d) 13
37. In which of the following pairs, both molecules possess dipole moment?  
(a)  $\text{CO}_2, \text{SO}_2$  (b)  $\text{BCl}_3, \text{PCl}_3$   
(c)  $\text{H}_2\text{O}, \text{SO}_2$  (d)  $\text{CO}_2, \text{CS}_2$
38. Which one of the following reactions is called Rosenmund reaction?  
(a) Aldehydes are reduced to alcohols  
(b) Acids are converted to acid chlorides  
(c) Alcohols are reduced to hydrocarbons  
(d) Acid chlorides are reduced to aldehydes
39. During, acetylation of amines, what is replaced by acetyl group?  
(a) Hydrogen atom attached to nitrogen atom  
(b) One or more hydrogen atoms attached to carbon atom  
(c) One or more hydrogen atoms attached to nitrogen atom  
(d) Hydrogen atoms attached to either carbon atom or nitrogen atom
40. Which is used in alcoholic beverages?  
(a) Methanol (b) Ethanol  
(c) Phenol (d) Glycerol