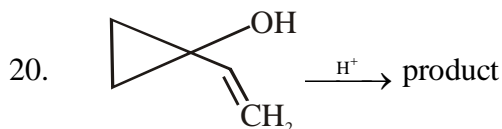
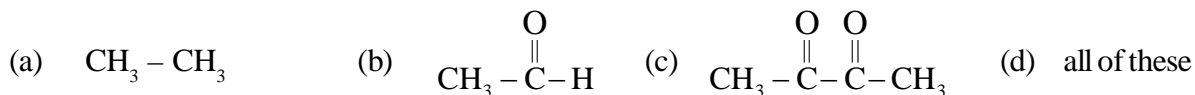


## SAMPLE SET OF QUESTIONS (CHEMISTRY)

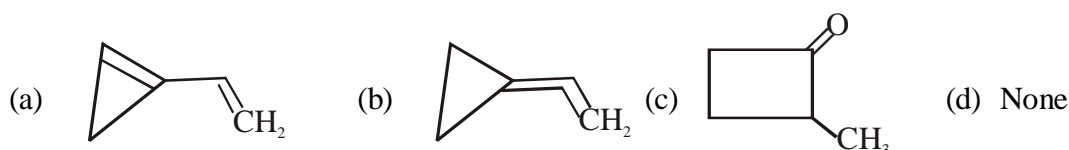
Choose the correct answer from the choices given below

1. The enthalpy change accompany the reaction  $2A_{g(aq)}^{+} + CrO_{4(aq)}^{2-} \longrightarrow Ag_2CrO_4(s)$  in  
(a) enthalpy of solution (b) enthalpy of formation  
(c) enthalpy of dilution (d) enthalpy of precipitation
2. Which of the following relations is not true ?  
(a)  $dU = Tds - PdV$  (b)  $dG = Vdp - SdT$   
(c)  $Tds = dH - Vdp$  (d)  $dA = PdV - SdT$
3. At the inversion temperature –  
(a) the second virial co-efficient of a gas is zero.  
(b) the gas changes from one allotropic form to another  
(c) the Joule thomson effect is zero  
(d) the gas can be liquified.
4. For \_\_\_\_\_ order reaction the unit of rate constant is same as that of rate of reaction.  
(a) first (b) zero (c) third (d) second
5. Toluene with chlorine in pressure of light forms benzyl chloride & in presence of catalyst form p-chloro toluene. The type of kinetics it follows :  
(a) competing side reactions (b) opposing reaction  
(c) consecutive reaction (d) none of these
6. The free energy change ( $\Delta G$ ) is related to the emf of a cell (E) as  
(a)  $(\Delta G) = -\frac{EF}{RT}$  (b)  $\Delta G = -\frac{RT}{nF} \ln E$  (c)  $E = -nF\Delta G$  (d)  $-E = \frac{\Delta G}{nF}$
7. What is the bond order of  $O_2^{+}$   
(a) 2 (b) 3 (c) 2.5 (d) 1.5
8. Perchlorate ion ( $ClO_4^{-}$ ) involves the hybridisation  
(a)  $sp^3$  (b)  $sp^3d^1$  (c)  $sp^2$  (d)  $sp^2d$
9.  $CH_3HgOH$  is a combination of  
(a) Soft – Soft (b) hard-hard (c) Soft-hard (d) Hard-soft
10. Ground state term for  $d^2$  configuration is  
(a)  $^3F$  (b)  $^3P$  (c)  $^1G$  (d)  $^1S$
11. The CFSE for a high spin  $d^4$  octahedral complex ion is  
(a)  $-14 Dq$  (b)  $-6 Dq$  (c)  $-12 Dq$  (d)  $0 Dq$
12. A positron is emitted from  ${}_{11}^{23}Na$ . The ratio of the atomic mass and atomic number of the resulting nuclide is  
(a)  $\frac{22}{10}$  (b)  $\frac{22}{11}$  (c)  $\frac{23}{10}$  (d)  $\frac{23}{12}$
13. Inert ligands are  
(a)  $\sigma$  doner  $\pi$  acceptor (b)  $\sigma$  doner  $\sigma$  acceptor  
(c)  $\pi$  doner  $\sigma$  acceptor (d)  $\pi$  doner  $\pi$  acceptor
14. 3,3 - dimethyl butan-2-ol on heating with conc.  $H_2SO_4$  gives –  
(a) 2, 3 – dimethyl but-2-ene (b) 3-methyl but-2-ene  
(c) 2, 3 – dimethyl but - 2- ene (d) all of these
15. The reaction, Benzene diazonium chloride with phenol is called  
(a) diazotisation (b) coupling reaction  
(c) dye formation (d) synthesis
16. Cyclo Propene  $\xrightarrow{NBS}$  P, The product, P is  
(a) 3-Bromo cyclopropene (b) 1, 2 - dibromocyclopropane  
(c) 1, 3 – dibromopropane (d) 1, – Bromo cyclopropene

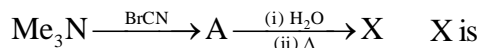
17. benzaldehyde with malonic acid in presence of pyridine base form cinnamic acid. Such a reaction is named as \_\_\_\_\_
- (a) Claisen condensation (b) Knoevenagel reaction  
(c) Aldol condensation (d) Perkin's reaction
18. Which of the following compounds is not optically active ?
- (a) Trans - cyclooctene (b) lactic acid  
(c) Tartaric acid (d) Malonic acid
19. Phorolysis of acetone at room temperature produces \_\_\_\_\_



Major product of the reaction is :

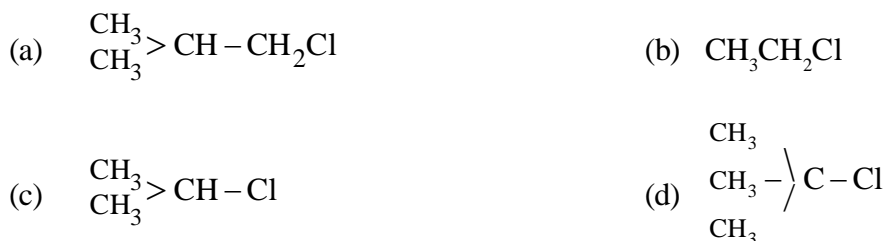


21. Neopentyl alcohol on treatment with HBr gives
- (a) Neopentyl bromide (b) 2-bromo-2-methyl butane  
(c) 2-methyl-2-butane (d) 2-methyl-1-butane
22. In the reaction



- (a)  $\text{MeNH}_2$  (b)  $\text{Me}_3\text{NO}$  (c)  $\text{Me}_2\text{NH}$  (d)  $\text{Me}_2\text{NCOOH}$

23. Which of the following compounds most readily undergoes most readily by  $\text{S}_{\text{N}}2$  mechanism.



24. Predict the product of the reaction below



25. Aniline absorbs at 280 nm but in acidic solution the main absorption band is seen at 203 nm. This is because of
- (a) Bathochromic shift (b) Hyper chromic shift  
(c) Hypsochromic shift (d) Hypochromic shift
26. What are the normal modes of vibrations in  $\text{CH}_4$  molecule
- (a) 6 (b) 9 (c) 7 (d) 8
27. The Mc Lafferty rearrangement peak for an unbranched aldehyde appears at
- (a) m/e 30 (b) m/e 44 (c) m/e 60 (d) m/e 70
28. What are the number of NMR peaks with relative intensity of toluene
- (a) 2 (5 : 3) (b) 2 (3 : 1) (c) 3 (2:2:3) (d) 4(1:2:3:2)

29. Among the cations the capacity to undergo exchange reactions was the order
- (a)  $\text{Na}^+ > \text{Ca}^{2+} > \text{Sr}^{2+} > \text{Al}^{3+}$  (b)  $\text{Al}^{3+} > \text{Na}^+ > \text{Sr}^{2+} > \text{Ca}^{2+}$   
(c)  $\text{Ca}^{2+} > \text{Sr}^{2+} > \text{Al}^{3+} > \text{Na}^+$  (d)  $\text{Al}^{3+} > \text{Sr}^{2+} > \text{Ca}^{2+} > \text{Na}^+$
30. For detection of aldehydes and ketones which transition is most authentic
- (a)  $\sigma \rightarrow \sigma^*$  (b)  $\pi \rightarrow \pi^*$  (c)  $n \rightarrow \sigma^*$  (d)  $n \rightarrow \pi^*$
31. Heme is a porphyrin complex of
- (a) Mg II (b) Fe II (c) Fe III (d) Zn II
32. During biological nitrogen fixation nitrifying bacteria convert
- (a)  $\text{NO}_3^-$  to  $\text{NH}_4^+$  (b)  $\text{N}_2$  to  $\text{NH}_4^+$  (c)  $\text{NH}_4^+$  to  $\text{NO}_3^-$  (d)  $\text{NO}_3^-$  to  $\text{N}_2$
33.  $\text{Fe}_2(\text{CO})_9$  has
- (a) one bridging carbonyl (b) two bridging carbonyl  
(c) three bridging carbonyl (d) none of these
34. An example of olefin complex is
- (a) Ferrocene (b) Zeise salt  
(c) Bis( $\eta^6$ -benzene) chromium (d)  $(\text{CO})_6\text{CO}_2$  (Phc  $\equiv$  C Ph)
35.  $\text{NH}_4\text{NO}_3(\text{s}) \rightleftharpoons \text{NH}_3(\text{g}) + \text{HCl}(\text{g})$
- The above system consists of \_\_\_\_\_ number components when  $P_{\text{NH}_3} > P_{\text{HCl}}$
- (a) 1 (b) 2 (c) 3 (d) 4
36. The chemical potential of a component in three phase system is
- (a) same in all the three phases (b) different in all the phases  
(c) same in first and second phase (d) same in first and third phase.



## ANSWERS

- |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | d | 2.  | d | 3.  | c | 4.  | b | 5.  | a | 6.  | d | 7.  | c |
| 8.  | a | 9.  | c | 10. | a | 11. | b | 12. | c | 13. | a | 14. | c |
| 15. | b | 16. | a | 17. | b | 18. | d | 19. | c | 20. | c | 21. | b |
| 22. | c | 23. | b | 24. | a | 25. | c | 26. | b | 27. | b | 28. | a |
| 29. | d | 30. | d | 31. | b | 32. | c | 33. | c | 34. | b | 35. | b |
| 36. | a |     |   |     |   |     |   |     |   |     |   |     |   |

