

Chemistry Question Bank

Prepared By: Dr. Y. S. Yadav

(Objective Type)

1. The boiling point is not affected due to hydrogen bonding in
(a) Water (b) Ammonia (c) Methyl alcohol (d) Hydrogen chloride

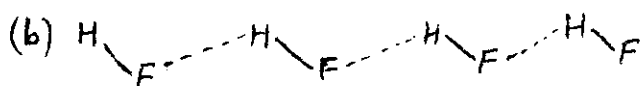
2. There is no hydrogen bonding in

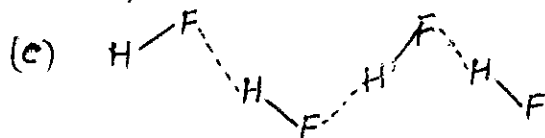
~~(a) HF~~ ~~(b) NH₃~~ ~~(c) HCl~~ ~~(d) H₂O~~

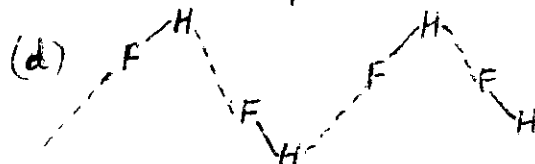
(a) Acetic acid (b) Ammonia (c) Ethyl alcohol (d) Diethyl ether

3. The H-bonds in solid HF can be best represented as

(a) $H-F \cdots H-F \cdots H-F$

(b) 

(c) 

(d) 

4. Which of the following statements is incorrect?

(a) He₂ does not exist because its bond order is zero

(b) O₂, O₂⁻ and O₂⁺ are all paramagnetic

(c) Any two atomic orbitals can combine to form two molecular orbitals

(d) $\pi(2p_x)$ and $\pi(2p_y)$ are degenerate molecular orbitals

5. Bond order of N-O bonds in nitrate ion is

(a) 1.0 (b) 1.25 (c) 1.05 (d) 1.33

6. The bond length of H₂⁺, H₂⁻ and H₂ are in the order

(a) H₂⁺ > H₂ > H₂⁻ (b) H₂ > H₂⁺ > H₂⁻ (c) H₂⁻ > H₂ > H₂⁺ (d) H₂⁻ > H₂⁺ > H₂

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7. Which of the following theory provides good explanation about the paramagnetic behaviour of oxygen
(a) Resonance Theory (b) Molecular orbital Theory
(c) Valence Bond Theory (d) VSEPR Theory
8. The term which fits best for liquid crystals is:
(a) Mesomorphic state (b) Isotropy (c) Anisotropy (d) Amorphous state
9. Smectic Liquid Crystals flow ~~as~~
(a) as normal liquid (b) with limited mobility (c) is Newtonian
(d) as a viscous liquid
10. The radius of Na^+ is 95 pm and that of Cl^- ion is 181 pm. Hence the co-ordination number of Na^+ will be
(a) 4 (b) 6 (c) 8 (d) Unpredictable
11. The second order Bragg diffraction of X-rays with $\lambda = 1.00 \text{ \AA}$ from a set of parallel planes in a metal occurs at an angle of 60° . The distance between the scattering planes in crystal is
(a) 1.00 \AA (b) 0.575 \AA (c) 2.00 \AA (d) 1.15 \AA
12. Which statement is true among the following
(a) Diamond is crystalline while graphite is amorphous
(b) Fullerenes are allotropes of fluorine
(c) Crystalline solids are not anisotropic
(d) The unit cell of a NaCl lattice is electrically charged
13. SHE may be represented as
(a) $\text{H}^+(1\text{M}) | (1\text{atm}) \text{H}_2, \text{Pt}$ (b) $\text{Pt}, \text{H}_2(1\text{atm}) | \text{H}^+(1\text{M})$
(c) $\text{Pt}, \text{H}_2(1\text{M}) | \text{H}^+(1\text{atm})$ (d) $\text{H}^+(1\text{M}) | \text{H}_2(1\text{atm})$

14. KCl can not be used as a salt bridge for the cell
- (a) $\text{Cu}(s) | \text{CuSO}_4(aq) || \text{AgNO}_3(aq) | \text{Ag}(s)$
- (b) $\text{Zn}(s) | \text{ZnSO}_4(aq) || \text{CuSO}_4(aq) | \text{Cu}(s)$
- (c) $\text{Pt} | \text{H}_2(g), \text{QH}^+(unknown) || \text{Hg}_2\text{Cl}_2(s) | \text{Hg}$
- (d) $\text{Zn} | \text{Zn}^{2+}(1.0M) || \text{Cd}^{2+}(1.0M) | \text{Cd}$
15. The name associated with equation $E = E^\circ + \frac{RT}{nF} \ln \frac{[M^{n+}]}{M}$ is
- (a) van der Waals equation (b) Berthelot equation (c) Nernst equation
(d) Bragg's equation
16. Hydrogen-Oxygen Fuel Cell based on the
- (a) Combustion of hydrogen to form water
(b) Formation of water by hydrogen and oxygen at 2500°C
(c) Combustion of methane in presence of oxygen
(d) Combustion of any fuel to produce hydrogen and oxygen
17. Effect of temperature on the rate constant of a chemical reaction may be given by
- (a) Rate law equation (b) Arrhenius equation (c) Nernst equation
(d) First order reaction
18. Rate of reaction is
- (a) Never negative (b) May be negative at times
(c) Always negative (d) negative depending upon the conditions of the reaction

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19. Write 'T' against true and 'F' against false statement

- (a) In case of complex reaction, the slowest step is called the rate determining step
- (b) Order of a reaction can not be fractional while molecularity can be fractional
- (c) Rate constant of a reaction or specific reaction rate is equal to the rate of reaction when the concentration of each of the reactants is taken as 1 mol/L
- (d) Rate law differs from law of mass action

20. The reactions of higher order are rare because

- (a) Many body collisions involve very high activation energy
- (b) Many body collisions have a low probability energy
- (c) Many body collisions are not energetically favoured
- (d) Many body collisions can take place only in the gaseous phase

21. Pieces of wood burn faster than a log of wood of the same mass because

- (a) Surface area of a log of wood is larger and needs more time to burn
- (b) pieces of wood have larger surface area
- (c) All pieces of wood catch fire at the same time
- (d) Block of wood has higher density than pieces of the same wood

22. A zero order reaction is one whose rate is independent of

- (a) Temperature of the reaction (b) Presence of light
(c) Concentration of the reactants (d) Catalyst used

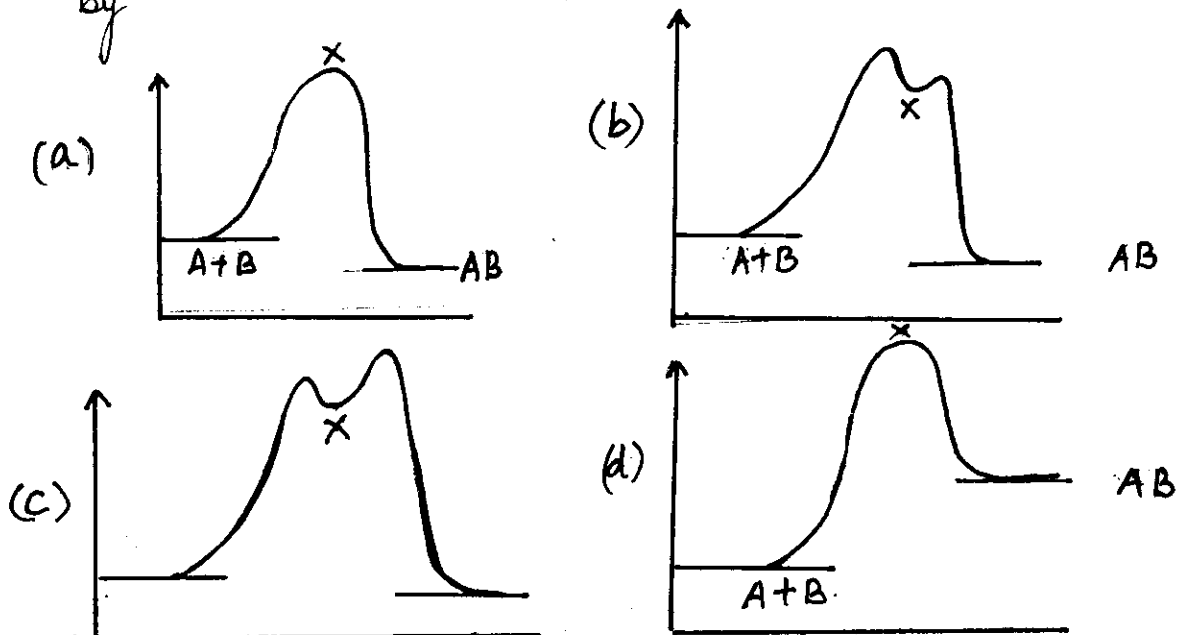
23. Which of the following statement is incorrect?

- (a) Rate law expression can not be written from the stoichiometric equation
(b) Law of mass action expression can be written from the balanced equation
(c) Specific reaction rate of a reaction is constant at constant temperature
(d) Rate of reaction and rate constant have same units

24. An exothermic chemical reaction occurs in two steps as follows:



The progress of the reaction can be best represented by



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25. Chemically, rust is
 (a) Fe_2O_3 (b) $Fe(OH)_3$ (c) $Fe_2O_3 \cdot xH_2O$ (d) $FeCO_3$
26. Galvanized iron sheets are coated with
 (a) Nickel (b) Chromium (c) Copper (d) Zinc
27. In which of the following will the corrosion of iron be most rapid?
 (a) In pure water (b) In pure oxygen (c) In air and moisture
 (d) In air and saline water
28. According to electrochemical theory of corrosion, the metal undergoing corrosion acts as
 (a) Anode (b) cathode (c) neither anode nor cathode
 (d) Either anode or cathode depending upon its standard reduction potential
29. Phase diagram of water system does not contain
 (a) Three areas (b) Three stable curves (c) one metastable curve
 (d) quadruple point
30. The phase rule is a versatile tool for the study of
 (a) Heterogeneous equilibria (b) Homogeneous equilibria
 (c) Ionic equilibria (d) Chemical equilibria
31. Select the E and Z isomers among the following
- (a) $\begin{array}{l} Cl \\ | \\ C \\ | \\ CH_3 \end{array} \begin{array}{l} Br \\ | \\ C \\ | \\ CH_2CH_3 \end{array}$ (b) $\begin{array}{l} Cl \\ | \\ C \\ | \\ CH_3 \end{array} \begin{array}{l} C_2H_5 \\ | \\ C \\ | \\ CHO \end{array}$ (E)
- (c) $\begin{array}{l} CH_3 \\ | \\ C \\ | \\ H \end{array} \begin{array}{l} CH_3 \\ | \\ C \\ | \\ CH_2CH_3 \end{array}$ (d) $\begin{array}{l} CH_3 \\ | \\ C \\ | \\ H \end{array} \begin{array}{l} CH_2CH_3 \\ | \\ C \\ | \\ CH_3 \end{array}$

32. The (R)- and (S)- enantiomers of an optically active compound differ in
- Their reactivity with achiral reagents
 - Their optical rotation of plane polarized light
 - Their melting points
 - Their solubility in achiral reagents
33. Which of the following carbocation is most stable
- ~~$\text{C}_6\text{H}_5\text{CH}_2^+$~~ (a) CH_3CH_2^+ (b) $\text{CH}_2=\text{CH}^+$
 - (c) $\text{CH}\equiv\text{C}^+$ (d) C_6H_5^+
34. Which of the following is the least stable carbanion?
- $\text{HC}\equiv\text{C}^-$ (b) $(\text{C}_6\text{H}_5)_3\text{C}^-$ (c) $(\text{CH}_3)_3\text{C}^-$ (d) CH_3^-
35. Which of the following is the most stable free radical
- $(\text{CH}_3)_3\text{C}^\cdot$ (b) $\text{CH}_3\dot{\text{C}}\text{H}_2$ (c) $(\text{CH}_3)_2\dot{\text{C}}\text{H}$ (d) $\dot{\text{C}}\text{H}_3$
36. Which of the following is the strongest nucleophile
- $\text{HC}\equiv\text{C}^-$ (b) $\text{H}_2\text{C}=\text{C}^-$ (c) CH_3-C^- (d) NH_2^-
37. The most stable carbanion among the following is
- $\text{C}_6\text{H}_5\text{CH}_2^-$ (b) $\text{C}_6\text{H}_5\text{CH}_2^-$ (c) $\text{C}_6\text{H}_5\text{CH}_2^-$ (d) $\text{C}_6\text{H}_5\text{CH}_2^-$
38. Aldol Condensation is given by aldehydes and ketones having
- At least 4 carbon atoms
 - At least one α -hydrogen
 - No α -hydrogen
 - 6 Hydrogen atoms

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39. Cannizzaro Reaction is given by
(a) Aldehydes with no α -hydrogen (b) Formaldehyde only
(c) All ketones (d) Two molecules of acetone
40. The Diels-Alder reaction is usually
(a) Reversible (b) Irreversible (c) Quasireversible (d) Violent
41. Which of the following is not a biopolymer
(a) Proteins (b) Nucleic acids (c) Cellulose (d) Neoprene
42. Which of the following is not an addition polymer
(a) Polystyrene (b) PVC (c) Polypropylene (d) Nylon
43. Which of the following is not a condensation polymer
(a) Melamine formaldehyde resin
(b) Bakelite
(c) Polythene
(d) Polyester
44. The process of vulcanization was introduced by
(a) Charles Goodyear (b) Kolbe (c) Wohler (d) Beckmann
45. Organic Compounds in which a metal is directly linked to carbon are termed
(a) Grignard Reagents (b) Organometallic Compounds
(c) Metal carbonyls (d) Metal carbides
46. Which one is not organometallic compound
(a) Methyl Lithium (b) Triethyl Aluminium
(c) Tetraethyl Lead (d) Lithium Aluminiumhydride

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46. Which of the following chemicals is used in calgon conditioning
(a) NaOH (b) Na_2CO_3 (c) $\text{Na}_2[\text{Na}_4(\text{PO}_3)_6]$ (d) ~~$\text{Ca}[\text{Na}_2\text{P}_2\text{O}_7]$~~
(d) Na_2SO_4
47. Which one is not used for sterilization of water
(a) Bleaching powder (b) Liquid chlorine (c) Chloramine
(d) EDTA
48. Zeolite is
(a) Pentahydrated Copper Sulphate (b) Sodium Carbonate decahydrate
(c) Hydrated sodium aluminosilicate (d) Sodium hexameta phosphate
49. The titrations involving soluble silver salt as titrant are known as
(a) Precipitation titration (b) Argentometric titration
(c) Iodine titration (d) Silver chloride titration
50. The composition of biogas excludes
(a) Methane (b) Hydrogen (c) Carbon dioxide (d) Oxygen
51. Which variety of coal is used in metallurgy?
(a) Peat (b) Anthracite (c) Bituminous (d) Lignite
52. For acidification of KMnO_4 in redox titration only
(a) Sulphuric acid is used (b) HCl acid is used
(b) HNO_3 is used (c) CH_3COOH is used

53. Wave number is the reciprocal of
(a) Number of waves (b) Wavelength expressed in centimeters
(c) No. of photons (d) Energy of waves of particular radiation
54. Electromagnetic radiation stretching from cosmic rays at one end to radiowaves at the other, constitutes
(a) Electromagnetic spectrum (b) Absorbance and transmittance
(c) photons (d) Blackbody radiation
55. Infrared Spectroscopy is also known as
(a) Rotational spectroscopy (b) Vibrational spectroscopy
(c) Bending spectroscopy (c) Stretching spectroscopy
56. The plot of percentage IR radiation versus wavelength is known as
(a) Infrared spectrum (b) Electromagnetic spectrum
(c)
57. IR spectra is also called
(a) Footprint (b) Fingerprint (c) Thumbimpression
(d) Photoprint
58. Organic applications of UV spectroscopy are mainly concerned with
(a) Conjugated systems (b) Single bond systems (c) Triple bond systems
(d) Binary systems

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59. The number of signals expected in $\text{H}-\overset{\text{Br}}{\underset{\text{Cl}}{\text{C}}}-\text{H}$

- (a) 3. (b) 2 (c) 1 (d) 5

60. Which of the following nuclei ~~do not~~ show nuclear magnetic resonance

- (a) ^{13}C (b) ^{16}O (c) ^{32}S (d) ^1H