

1. An ionic compound has a unit cell consisting of A ions at the corners of a cube and B ions on the centres of faces of the cube. The empirical formula of the compound would be
- (a) AB (b) A_2B
(c) AB_3 (d) A_3B
2. Acetylene hydrocarbons are acidic because
- (a) acetylene contains least number of hydrogen atoms
(b) acetylene has only one hydrogen atom at each carbon atom
(c) acetylene belongs to the class of alkynes with formula C_nH_{2n-2}
(d) sigma electron density of $C-H$ bond in acetylene is nearer a carbon which has 50% s -character
3. Which of the following does not contain $-COOH$ group?
- (a) Aspirin
(b) Benzoic acid
(c) Picric acid
(d) All have $-COOH$ group
4. Only an aldehyde having ... can undergoes the aldol condensation.
- (a) at least one alpha H atom
(b) at least one beta H atom
(c) no alpha H atom
(d) an aromatic ring
5. When sodium is added to ethanol,
- (a) no action occurs
(b) H_2 is formed
(c) $NaOC_2H_5$ and O_2 are formed
(d) $NaOC_2H_5$ and H_2 are formed

6. The gold number of some colloidal solutions are given below

Colloidal solution	Gold number
A	0.01
B	2.5
C	20

The protective nature of these colloidal solutions follows the order

- (a) $C > B > A$ (b) $A > B > C$
 (c) $A = B = C$ (d) $B > A > C$

7. The reaction of HBr with $\text{CH}_3-\overset{\text{CH}_3}{\text{C}}=\text{CH}_2$ in the presence of peroxide will give

- (a) $\text{CH}_3\overset{\text{CH}_3}{\text{C}}\text{BrCH}_3$ (b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$

- (c) $\text{CH}_3-\overset{\text{CH}_3}{\text{C}}\text{HCH}_2\text{Br}$ (d) $\text{CH}_3\text{CH}_2\overset{\text{CH}_3}{\text{C}}\text{HCH}_3$

8. The alcohol manufactured from water gas is

- (a) ethanol (b) methanol
 (c) isobutanol (d) butanol

9. The iodoform test is not given by

- (a) $\text{CH}_3\overset{\text{O}}{\text{C}}\text{HCH}_3$ (b) $\text{CH}_3\overset{\text{O}}{\text{C}}\text{CH}_2\text{CH}_3$

- (c) $\text{CH}_3\text{CH}_2\text{OH}$ (d) $\text{CH}_3\text{CH}_2\overset{\text{O}}{\text{C}}\text{CH}_2\text{CH}_3$

10. When 3,3-dimethyl-2-butanol is heated with H_2SO_4 , the major product obtained is

- (a) 2,2-dimethyl-1-butene
 (b) 2,3-dimethyl-1-butene
 (c) 2,3-dimethyl-2-butene
 (d) *cis* and *trans* isomers of 2,3-dimethyl-2-butene

11. The correct order of basicity of amines in water is

- (a) $(\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_3\text{N}$
 (b) $\text{CH}_3\text{NH}_2 > (\text{CH}_3)_2\text{NH} > (\text{CH}_3)_3\text{N}$
 (c) $(\text{CH}_3)_3\text{N} > (\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2$
 (d) None of the above

12. The number of nodes present in radial wave function of 3d orbital is

- (a) 1 (b) 2
 (c) 0 (d) 3

13. Which of the following has largest negative electron gain enthalpy?

- (a) F (b) Cl
 (c) Br (d) I

14. Bromine belongs to period

- (a) third (b) fourth
 (c) fifth (d) second

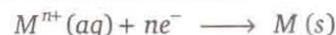
15. PCl_5 molecule has the following geometry

- (a) trigonal bipyramidal
 (b) octahedral
 (c) square planar
 (d) planar triangular

16. In an octahedral structure, the pair of d-orbitals involved in d^2sp^3 hybridisation is

- (a) $d_{x^2-y^2}, d_{xz}$ (b) d_{z^2}, d_{zx}
 (c) d_{xy}, d_{yz} (d) $d_{x^2-y^2}, d_{z^2}$

17. For the electrode reaction,



Nernst equation is

(a) $E = E^\circ + \frac{RT}{nF} \log \frac{1}{[M^{n+}]}$

(b) $E^\circ = E + \frac{RT}{nF} \ln [M^{n+}]$

(c) $E = E^\circ - \frac{RT}{nF} \ln \frac{1}{[M^{n+}]}$

(d) $\frac{E}{E^\circ} = \frac{RT}{nF} \ln [M^{n+}]$

18. Two liquids A and B boil at 145°C and 190°C respectively. At 80°C which of them has higher vapour pressure?

- (a) Liquid A
 (b) Liquid B
 (c) Both have equal vapour pressure
 (d) None of the above

19. What is the effect of carbon dioxide in water on corrosion?

- (a) Increase rusting of iron
 (b) Decrease rusting of iron
 (c) Does not affect
 (d) None of the above

20. Delocalised electrons are present in

- (a) 1,3-butadiene (b) C_6H_6
 (c) 1,3,5-hexatriene (d) All of these

21. The chemical name of isoprene is

- (a) 2-methyl-1,3-butadiene
 (b) 2-chloro-1,3-butadiene
 (c) 2-methoxypropene
 (d) None of the above

22. Assertion/Reason Type Question

Answer Codes

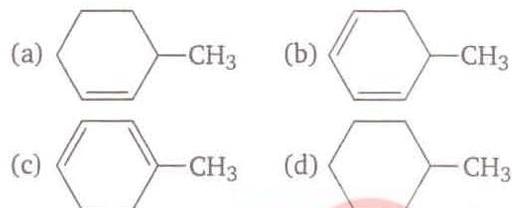
- (i) Both Assertion (A) and Reason (R) are correct and (R) is the correct explanation of (A)
 (ii) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
 (iii) (A) is correct but (R) is incorrect
 (iv) (A) is incorrect but (R) is correct

Assertion (A) Methyl cyanide on reaction with LiAlH_4 does not form ethyl amine.

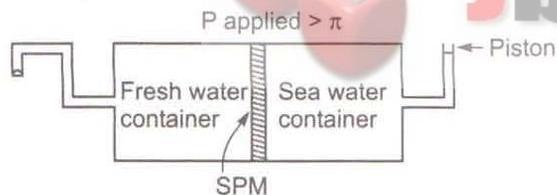
Reason (R) Acidic hydrolysis of RCN forms RCOOH.

- (a) (i) (b) (ii)
 (c) (iii) (d) (iv)

23. The Birch reduction of toluene gives



24. Given below is the sketch of a plant for carrying out a process.



Name the process occurring in the above plant.

- (a) Reverse osmosis (b) Osmosis
 (c) Diffusion (d) None of these

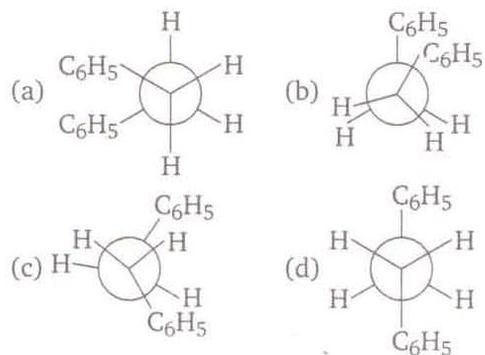
25. In a reaction between A and B, the initial rate of reaction (r_0) was measured for different initial concentrations of A and B as given below

$A/\text{mol L}^{-1}$	0.20	0.20	0.40
$B/\text{mol L}^{-1}$	0.30	0.10	0.05
$r_0/\text{mol L}^{-1}\text{s}^{-1}$	5.07×10^{-5}	5.07×10^{-5}	1.43×10^{-4}

What is the order of the reaction with respect to A and B?

- (a) 2.5, 1.0 (b) 1.5, 0
 (c) 2.5, 0 (d) 1.5, 1

26. The most stable conformation of 1,2-diphenyl ethane is



27. According to nuclear reaction,



the mass number of Be atom is

- (a) 4 (b) 8
 (c) 6 (d) 9

28. Formula of asbestos is

- (a) $[\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2]_n$
 (b) $\text{Ca}_2\text{Mg}_5(\text{Si}_4\text{O}_{11})_2(\text{OH})_2$
 (c) $\text{CaMg}(\text{SiO}_3)_2$
 (d) $\text{Ca}_3\text{Si}_3\text{O}_9$

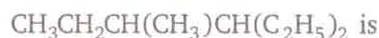
29. Which of the following resonating structures is not correct for CO_2 ?

- (a) $\text{:}\ddot{\text{O}}=\text{C}=\ddot{\text{O}}\text{:}$ (b) $\text{:}\ddot{\text{O}}\equiv\text{C}\equiv\ddot{\text{O}}\text{:}$
 (c) $\text{:}\ddot{\text{O}}\equiv\text{C}\equiv\ddot{\text{O}}\text{:}$ (d) $\text{:}\ddot{\text{O}}\equiv\text{C}-\ddot{\text{O}}\text{:}$

30. At 25°C , 3 g of a solute A in 100 mL of an aqueous solution gave an osmotic pressure of 2.5 atmosphere. What is the molar mass of solute?

- (a) 293 (b) 239
 (c) 392 (d) 932

31. The correct IUPAC name of



- (a) 4-ethyl-3-methylhexane
 (b) 3-ethyl-4-methylhexane
 (c) 3-methyl-4-ethylhexane
 (d) 3-iso-pentylpropane

32. Reduction of carbonyl compounds to alkanes with NH_2NH_2 and NaOH is called

- (a) Ponndrof verley reduction
 (b) Clemmensen's reduction
 (c) Wurtz reaction
 (d) Wolff-Kishner reduction

33. General formula of alkynes is

- (a) C_nH_{2n} (b) $\text{C}_n\text{H}_{2n+2}$
 (c) $\text{C}_{2n+2}\text{H}_n$ (d) $\text{C}_n\text{H}_{2n-2}$

34. Alkaline KMnO_4 oxidises acetylene to
 (a) acetic acid (b) ethyl alcohol
 (c) ethylene glycol (d) oxalic acid
35. Dehydration of alcohol is an example of
 (a) redox reaction
 (b) elimination reaction
 (c) substitution reaction
 (d) addition reaction
36. Gun metal is
 (a) Cu, Zn, Sn (b) Cu, Zn, Ni
 (c) Cu, Zn, P (d) C, N, Fe
37. How many moles of nitrogen are needed to produce 8.2 moles of ammonia by reaction with hydrogen?
 (a) 2.1 (b) 3.1
 (c) 3.2 (d) 4.1
38. The temperature of a gas in a closed container is 27°C . If the temperature is raised to 327°C , the pressure exerted is
 (a) reduced to half
 (b) doubled
 (c) reduced to one third
 (d) cannot be predicted
39. Molar heat capacity of ethanol is 110.4 JK^{-1} . Its specific heat capacity is
 (a) 2.4 (b) 55.2
 (c) 5.078 (d) 110.4
40. For the water gas reaction,

$$\text{C}(s) + \text{H}_2\text{O}(g) \rightleftharpoons \text{CO}(g) + \text{H}_2(g)$$
 the standard Gibbs energy at 1000 K is -8.1 kJmol^{-1} . What is its equilibrium constant?
 (a) 2.60 (b) 4.62
 (c) 2.64 (d) None of these
41. For the reaction,

$$2\text{NO}(g) + \text{Cl}_2(g) \rightleftharpoons 2\text{NOCl}(g)$$
 which is true?
 (a) $K_p = K_c \times RT$ (b) $K_p = K_c (RT)^2$
 (c) $K_p = \frac{K_c}{RT}$ (d) $K_p = \frac{K_c}{(RT)^2}$
42. Oxidation number of Mn in MnO_4^- ion is
 (a) +1 (b) -7
 (c) -1 (d) +7
43. Which of the following is not alkali metal?
 (a) Na (b) Fr
 (c) Ca (d) K
44. Inert pair effect is predominant in
 (a) Si (b) Pb
 (c) Ge (d) Sn
45. How many σ and π bonds are there in the molecule of tetracyanoethene?

$$(\text{NC})_2\text{C}=\text{C}(\text{CN})_2$$

 (a) $9\sigma, 7\pi$ (b) $5\sigma, 9\pi$
 (c) $5\sigma, 8\pi$ (d) $9\sigma, 9\pi$
46. Baeyer's reagent is
 (a) aqueous KMnO_4
 (b) neutral KMnO_4
 (c) alkaline KMnO_4
 (d) aqueous bromine water
47. Percentage of lead in lead pencil is
 (a) zero (b) 20
 (c) 80 (d) 60
48. Low spin complex is formed by
 (a) sp^3d^2 hybridisation
 (b) sp^3d hybridisation
 (c) d^2sp^3 hybridisation
 (d) sp^3 hybridisation
49. Hybrid state of central oxygen atom in ether is
 (a) sp (b) sp^2
 (c) sp^3d (d) sp^3
50. Clemmensen reduction of a ketone is carried out in the presence of
 (a) LiAlH_4 in ether
 (b) Zn-Hg with HCl
 (c) glycol with KOH
 (d) H_2 with Pd as catalyst
51. The electrophile involved in the nitration of benzene is
 (a) NO (b) NO_2^-
 (c) NO_2 (d) NO_2^+
52. In the reaction,

$$\text{C}_6\text{H}_5-\text{N}^+\equiv\text{NCl}^- + \text{H}_3\text{PO}_2 + \text{H}_2\text{O} \longrightarrow ?$$
 the product formed will be
 (a) $\text{C}_6\text{H}_5\text{OH}$
 (b) C_6H_6
 (c) $\text{C}_6\text{H}_5\text{Cl}$
 (d) $\text{C}_6\text{H}_5-\text{C}_6\text{H}_5$
53. Amylopectin is a polymer of
 (a) β -D-glucose
 (b) α -D-glucose
 (c) β -D-fructose
 (d) α -D-mannose

54. Across the lanthanide series, the basicity of the lanthanide hydroxides

- (a) increases
- (b) decreases
- (c) first increases and then decreases
- (d) first decreases and then increases

55. When sodium and chlorine ion react, energy is

- (a) released and ionic bonds are formed
- (b) released and covalent bonds are formed
- (c) absorbed and ionic bonds are formed
- (d) absorbed and covalent bonds are formed



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Answer – Key

1. c	2. d	3. c	4. a	5. d	6. b	7. c	8. b	9. d	10. c
11. a	12. c	13. b	14. b	15. a	16. d	17. c	18. a	19. a	20. d
21. a	22. d	23. c	24. a	25. b	26. d	27. d	28. b	29. c	30. a
31. b	32. d	33. d	34. d	35. b	36. a	37. d	38. b	39. a	40. c
41. c	42. d	43. c	44. b	45. d	46. c	47. a	48. c	49. d	50. b
51. d	52. b	53. b	54. b	55. a					