

GGSIU chemistry 2011

1. Assertion A The radial probability distribution curves of 1s, 2p, 3d orbitals are identical in shape.

Reason R The number of nodal planes present in these orbitals are different.

- a Both A and R are true and R is the correct explanation of A
- b Both A and R are true and R is not the correct explanation of A.
- c A is true and R is false
- d A is false but R is true.

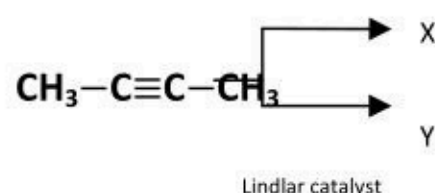
2. Which one of the following have largest mass?

- a 5.6 L CO₂ at STP
- b 2 g H₂ gas
- c 6×10^{22} molecules of H₂ gas
- d 1.0 g atom of He gas

3. The correct statement is

- a most probable velocity of gas molecules increases with increase in temperature
- b the fraction of gas molecules having most probable speed decreases with the rise in temperature
- c at given temperature, the rms speed of the gas is maximum while most probable speed is maximum
- d All the above

4.

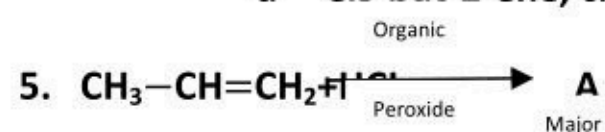


X and Y are respectively.

- a Trans-but-2-ene, cis-but-2-ene
- b Cis-but-2-ene, trans-but-2-ene

c Trans-but-2-ene, trans-but-2-ene

d Cis-but-2-ene, cis-but-2-ene



The product A is

a $\text{CH}_3-\text{CH}-\text{CH}_3$

|
Cl

b $\text{CH}_3-\text{CH}_2-\text{Cl}$

c $\text{CH}_2=\text{CH}-\text{CH}_2$

|
Cl

d $\text{CH}_3-\text{CH}=\text{CH}-\text{Cl}$

6. Which of the following is not an anti ferromagnetic?

a V_2O_3 b Ti_2O_3

c Fe_2O_3 d Mn_2O_3

7. A compound of A and B crystallizes in a cubic lattice in which the A atoms occupy the lattice points at the corners of the cube. The B atoms occupy the centre of each fcc of the cube. The probable formula of the compound is

a A_3B b AB

c AB_3 d AB_2

8. The average molecular mass of colloids can be determined by

a Tyndall effect

b Brownian movement

c Osmotic pressure

d flocculation

9. Cottrell smoke precipitator works on the principle of

a neutralization

b distribution law

c Le Chatelier principle

d addition

10. The only non-metallic element exists in liquid state is

a F_2 b Br_2

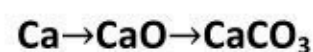
c Cl_2 d Hg

11. Which of the following set of elements mostly occur as sulphide ores?

a Zn, Cu, Na b Zn, Cu, P c

Fe, Al, Ti d Cu, Ag, Au

12. The maximum amount of $CaCO_3$ that can be obtained from 4 g of calcium as per the sequence of reactions is



a 20 g b 40 g

c 10 g d 80 g

13. The standard Gibbs energy change for the formation of propane C_3H_8 at 298 K is [Given ΔH_f° of propane is -103.85 kJ/mol;

$$S_m^\circ C_3H_8g = 270.0 \text{ JK}^{-1} \text{ mol}^{-1};$$

$$S_m^\circ H_2g = 130.68 \text{ JK}^{-1} \text{ mol}^{-1};$$

$$S_m^\circ C_{\text{graphite}} = 5.79 \text{ JK}^{-1} \text{ mol}^{-1};]$$

a -12.34 kcal b -10.98

c 12.354 kcal d 10.98 kcal

14. One molal aqueous solution of $PdCl_4 \cdot 6H_2O$ has a freezing point 269.28 K. Assuming 100% ionization of complex, calculate the molecular formula of the complex.

[K_f for water = $1.86 \text{ K kg mol}^{-1}$] The salt is a hydrated complex.

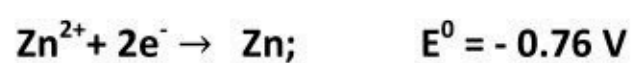
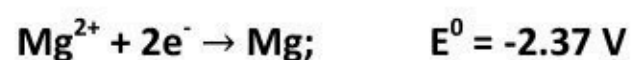
a $[PdH_2O_2Cl_4] \cdot 4H_2O$

b $[PdH_2O_3Cl_3]Cl \cdot 3H_2O$

c $[PdH_2O_4Cl_4]Cl_4 \cdot 2H_2O$

d $[PdH_2O_6]Cl_4$

15. Standard reduction potential values for the electrodes are given below



Which of the following statements is correct?

- a Zinc will reduce Fe^{2+}
- b Zinc will reduce Mg^{2+}
- c Mg oxidizes Fe
- d Zinc oxidizes Fe

16. Which of the following is true regarding periodicity of elements?

- a Elements of same group are characterized by same valence shell electronic configuration.
- b The most electropositive elements are positioned on right hand side of the Modern periodic Table
- c On going from Li to F there would be decrease in ionization energy .
- d reducing property of elements increases from Na to Cl in 3rd period elements.

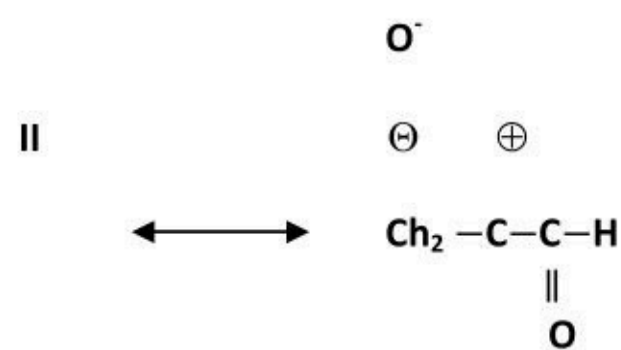
17. Which of the following pairs have same EAN value?

- a $[\text{NiCO}_4]$, $[\text{FeCN}_6]^{4-}$
- b $[\text{Ni(en)}_2]$, $[\text{FeH}_2\text{O}_6]^{2+}$
- c $[\text{Co(CN)}_6]^{3-}$, $[\text{FeCN}_6]^{4-}$
- d All the above

18. Relative stabilities of the following structures of $\text{CH}_2 = \text{CH}-\text{CHO}$ are

In this decreasing order





III

- a II>I>III b I>II>III
c III>II>I d I>III>II

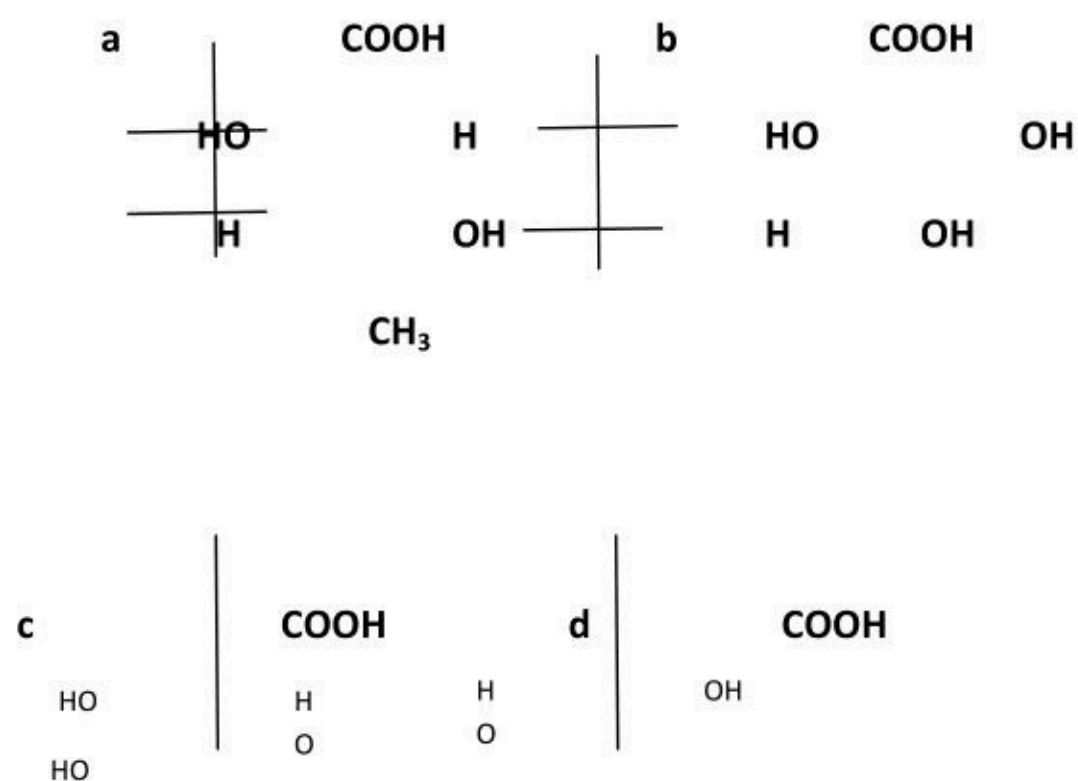
19. One mole of N_2 gas at 0.8 atm takes 38 s to diffuse through a pinhole, whereas one mole of unknown gas is

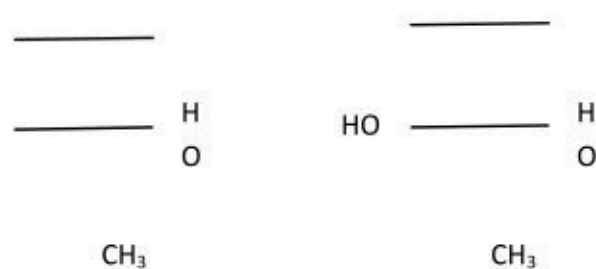
- a 126 b 64
c 252 d 80

20. Which of the following sets of quantum numbers are not possible?

- I. $n=0, l=0, m=0, s=+\frac{1}{2}$
II. $n=1, l=0, m=0, s=-\frac{1}{2}$
III. $n=3, l=2, m=-3, s=+\frac{1}{2}$
IV. $n=2, l=1, m=0, s=-\frac{1}{2}$
- a II and III b III and IV
c I and III d I and IV

21. 2R, 3S – 2, 3-dihydroxybutanoic acid is





- I. X is a war gas
- II. X is a thiol
- III. Y is a heterocyclic, aromatic
- IV. Y is an isomer of ethanol, correct statements are

- a I,IV b I,III,IV
- c I,III d I,II,III,IV

23. Regarding the mechanism of electrophilic substitution, the false statement is

- a rate limiting step is formation of arenium ion
- b arenium ion can stabilise through resonance
- c arenium ion is aromatic
- d initial step is generation of electrophile

24. Identify incorrect statements.

- I. Halo group activates benzene ring by mesomeric effect and destabilizes it by inductive effect
- II. Halo group is deactivating group
- III. Benzene is 10^4 times more reactive than nitrobenzene towards nucleophile
- IV. CF_3 is a strongly deactivating group

- a I,II,III b III only
- c II only d II,IV

25. Number of moles of hydrogen atoms required to get one mole of hydrazobenzene from nitrobenzene is

- a 10 b 5 c 8 d 4

26. Fischer esterification is

- a nucleophilic substitution reaction
- b electrophilic substitution reaction
- c electrophilic addition reaction
- d free radical substitution reaction

27. Which of the following can be used in making floor polish?

- a Aniline
- b Benzaldehyde
- c Nitrobenzene
- d Benzene diazonium chloride

28. The standard electrode potentials of four elements P, Q, R and S are -2.65, -1.66, -0.80 and +0.86 V. The highest chemical activity will be exhibited by

- a Q b P
- c S d R

29. Ethylene glycol is used as coolant in car radiators, in order to prevent the solution from freezing at -0.3°C . The amount of ethylene glycol to be added to 5 kg of water is For water $K_f = 1.86 \text{ km}^{-1}$

- a 20 g b 50 g
- c 40 g d 30 g

30. Electrolysis of dilute aqueous NaCl solution was carried out by passing 10 mA current. The time required to liberate 0.01 moles of H_2 gas at the cathode is

- a $9.65 \times 10^{-4} \text{ s}$ b $19.3 \times 10^{-4} \text{ s}$
- c $28.95 \times 10^{-4} \text{ s}$ d $38.6 \times 10^{-4} \text{ s}$

31. The half-life period if the first order chemical reaction is 6.93 min. The time required for the completion of 99% of the chemical reaction will be $\log 2 = 0.3010$

- a 230.3 min b 23.03 min
- c 46.06 min d 460.6 min

32. Solutions A,B,C and D are respectively 0.1 M glucose, 0.05 M NaCl, 0.05 M BaCl₂ and 0.1 M AlF₃. Which one of the following pairs is isotonic?

- a A and C b b and C
c A and B d A and D

33. p[H of CH₃COOH and CH₃COONa buffer is 4.8. In which of the following conditions, the buffer capacity will be maximum?

	[CH ₃ COOH]	[CH ₃ COONa]
a	0.1 M,	0.2 M
b	0.2 M	0.1 M
c	0.34 M	0.34 M
d	0.34 M	0.30 M

34. 50 mL of sample of hard water gave good lather with 6 mL of standard soap solution 1 mL soap solutions = 1 mg CaCO₃. If the hardness is only due to MgHCO₃, the weight of milk of lime required to remove the hardness completely from 100 kg of that sample of water is

- a 17.8 g b 8.9 g
c 178 g d 89 g

35. 0.2 g of an organic compound gave 0.17 g NH₃ in kjeldhal's method. The percentage weight of nitrogen in the given compound is

- a 60% b 80%
c 70% d 90%

36. At constant temperature, the kinetic energy of a gas is independent on

I. pressure II. Volume III. Density

- a I,II b II,III
c I,III d I,II,III

37. 33.6 L of water vapour at STP are condensed to liquid state. The volume occupied by it is approximately

- a 1 mL b 18 mL
c 27 mL d 127 mL

38. A open vessel containing air at 27° is heated to 127°C . The fraction of air originally present in the bottle that is expelled is

- a 50% b 25%
- c 33% d 40%

39. Which one is correct for $k = Ae^{-E_a/RT}$

- a E_a is energy of activation
- b R is Rydberg's constant
- c K is equilibrium constant
- d A is adsorption

40. A reaction involving two different reactants can never be

- a unimolecular reaction
- b I order reaction
- c II order reaction
- d bimolecular reaction

41. The number of $d\pi - p\pi$ bonds present respectively in $\text{SO}_2, \text{SO}_3, \text{ClO}_4^-$ are

- a 0,1,2 b 1,2,3
- c 2,3,4 d 2, 3,3

42. How many unit cells are present in a cubic shaped ideal crystal of NaCl of mass 1.0 g?

- a 1.28×10^{21} b 1.71×10^{21}
- c 2.57×10^{21} d 5.14×10^{21}

43. 20 mL of a sample of H_2O_2 gives 400 mL oxygen measured at NTP. The sample should be labeled as

- a 5 V H_2O_2
- b dil. H_2O_2
- c anhy. H_2O_2
- d 20 V H_2O_2

44. Identify the correctly matched lists

	List I		List II
i	Total number of lines in H-spectrum for a transition 5 → 1	A	Decreases
ii	Intensity of spectral line in the spectrum, as n value increases	B	H-spectrum
iii	Band spectrum is due to	C	10
iv	The proof for the presence of energy levels in an atom	D	Rotations and vibrations of atoms in molecules in addition to electronic transition
		E	Increases

- a i -A, ii -E, iii -D, iv -B
 b i -E, ii -E, iii -D, iv -D
 c i -C, ii -A, iii -D, iv -B
 d i -C, ii -E, iii -D, iv -B

45. Between any two of following molecules, hydrogen bonding is not possible


- a two primary amine molecules
 b two secondary amine molecules
 c two tertiary amine molecules
 d two ammonia molecules

46. Which of the following elements does not show +4 oxidation state?

- a Zr b Pt
 c La d Ti

47. The pH of saturated aqueous solution of NaClO_4 is 10. If the K_{sp} of Ba(OH)_2 is 5×10^{-13} , the concentration of Ba^{2+} ions in the solution is

- a 1×10^{-2} b 1×10^{-3}
 c 5×10^{-5} d 1×10^{-5}

48.  A. A and B are geometrically isomers. 'A' is more symmetrically than 'B'. 'B' has higher heat of hydrogenation than 'A'. Then 'X' and 'Y' are respectively

- a Li/Liq NH_3 , $\text{H}_2/\text{Lindlar's catalyst}$

- b $\text{Li/Liq. NH}_3, \text{Na/Liq. NH}_3$
- c $\text{H}_2/\text{Lindlar's catalyst, Na/Liq. NH}_3$
- d $\text{H}_2/\text{Pt, H}_2/\text{Lindlar's catalyst}$

49. Pick the correct statements.

- I. The repeating unit of polyacetylene contains $\text{C}=\text{C}$ bond
 - II. Acetylene ozonide involves $\text{sp}^3 - \text{sp}^3$ overlap
 - III. Alkyne with maximum number of acidic hydrogen atoms is ethyne
 - IV. Ozonolysis product of acetylene is a dial
- a I, II, III b II, III, IV
- c I, II, III, IV d I, IV

50. Regarding urea the correct statements are

- A. it is a monoacidic base
 - B. dipole moment = 0
 - C. C-N bond order is 1
 - D. it exhibits resonance
- a A, D b B, C, D
- c A, B, D d C, D