CET – CHEMISTRY – 2011

VERSION CODE: D – 3

1. If the energies of the two photons are in the ratio of 3: 2, their wavelengths will be in the ratio of

   1) 2: 3 2) 9: 4 3) 3: 2 4) 1: 2

Ans: (1)

2. Which one of these is NOT TRUE for benzene?

   1) It forms only one type of monosubstituted product

   2) There are three carbon-carbon single bonds and three carbon-carbon double bonds

   3) Heat of hydrogenation of benzene is less than the theoretical value

   4) The bond angle between carbon-carbon bonds is 120^{o}

Ans: (2)

3. Generally, the first ionization energy increases along a period. But there are some exceptions. The one which is NOT an exception is.....

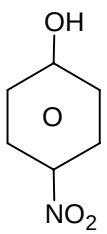
   1) Be and B 2) Na and Mg 3) Mg and Al 4) N and O

Ans: (2)

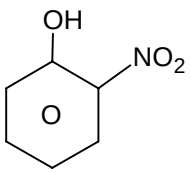
4. Out of the given two compounds, the vapour pressure of B at a particular temperature is

   1) higher than that of A

   2) lower than that of A



(A)



(B)

   3) higher or lower than A depending on the size of the vessel

   4) same as that of A

Ans: (1)

5. Increasing order of carbon-carbon bond length for the following is

C_2H_4	C_2H_2	C_6H_6	C_2H_6
(A)	(B)	(C)	(D)

1) C < B < A < D
2) B < C < A < D
3) D < C < A < B
4) B < A < C < D

Ans: (4)

6. The IUPAC name of the complex $[Co(NH_3)_4Cl_2]Cl$ is

1) tetraammine dichloro cobalt (III) chloride
2) dichloro tetraammine cobalt (III) chloride
3) tetraammine dichloro cobalt (IV) chloride
4) tetraammine dichloro cobalt (II) chloride

Ans: (1)

7. Excess of silver nitrate solution is added to 100 ml of 0.01 M Pentaaqua chloro chromium (III) chloride solution. The mass of silver chloride obtained in grams is

[Atomic mass of silver is 108]

1) 143.5×10^{-3} 2) 287×10^{-3} 3) 287×10^{-2} 4) 143.5×10^{-2}

Ans: (2)

8. The following data were obtained during the first order decomposition of $2A_{(g)} \rightarrow B_{(g)} + C_{(s)}$ at a constant volume and at a particular temperature.

Sr. No.	Time	Total pressure in Pascal
1	At the end of 10 min	300
2	After completion	200

The rate constant in min^{-1} is

1) 69.3 2) 0.0693 3) 6.93×10^{-4} 4) 6.93

Ans: (2)

9. The time required for 100% completion of a zero order reaction is

1) $\frac{a}{2k}$ 2) ak 3) $\frac{2k}{a}$ 4) $\frac{a}{k}$

Ans: (4)

10. The activation energy of a reaction at a given temperature is found to be 2.303 RT J mol^{-1}. The ratio of rate constant to the Arrhenius factor is

1) 0.1 2) 0.01 3) 0.001 4) 0.02

Ans: (1)

11. The yellow precipitate formed during the chromyl chloride test is chemically

1) lead chromate 2) chromic acid

3) sodium chromate 4) lead acetate

Ans: (1)

12. One gram of silver gets distributed between 10 cm^3 of molten zinc and 100 cm^3 of molten lead at 800°C. The percentage of silver still left in the lead layer is approximately

1) 5 2) 2 3) 1 4) 3

Ans: (4)

13. Which one of the following is true?

1) NaOH is a primary standard in volumetric analysis

2) NaOH is used in the concentration of bauxite ore

3) NaOH solution does not react with Cl_2

4) Manganous hydroxide is soluble excess of NaOH solution

Ans: (2)

14. In Ramsay and Rayleigh's isolation of noble gases from air, the nitrogen of the air is finally converted into

1) NO and NO_2 2) $NaNO_2$ only 3) $NaNO_2$ and $NaNO_3$ 4) $NaNO_3$ only

Ans: (3)

15. The spin only magnetic moment of Fe^{2+} ion (in BM) is approximately

1) 7 2) 4 3) 6 4) 5

Ans: (4)

16. A mixture of $CaCl_2$ and NaCl weighing 4.44 g is treated with sodium carbonate solution to precipitate all the calcium ions as calcium carbonate. The calcium carbonate so obtained is heated strongly to get 0.56 g of CaO. The percentage of NaCl in the mixture is

[Atomic mass of Ca = 40]

1) 75 2) 31.5 c) 40.2 d) 25

Ans: (1)

17. 50 cm^3 of 0.2 N HCl is titrated against 0.1 N NaOH solution. The titration was discontinued after adding 50 cm^3 of NaOH. The remaining titration is completed by adding 0.5 N KOH. The volume of KOH required for completing the titration is

1) 12 cm^3 2) 10 cm^3 3) 21.0 cm^3 4) 16.2 cm^3

Ans: (2)

18. The rms velocity of hydrogen is $\sqrt{7}$ times the rms velocity of nitrogen. If T is the temperature of the gas, which of the following is true?

1) $T_{H_2} = \sqrt{7}\ T_{N_2}$ 2) $T_{N_2} = T_{H_2}$ 3) $T_{N_2} = \sqrt{7}\ T_{H_2}$ 4) $T_{N_2} = 2\,T_{H_2}$

Ans: (4)

19. 25 g of each of the following gasses are taken at 27°C and 600 mm pressure. Which of these will have the least volume?

1) HCl 2) HBr 3) HI 4) HF

Ans: (3)

20. The amount of heat evolved when 500 cm^3 of 0.1 M HCl is mixed with 200 cm^3 of 0.2 M NaoH is

1) 2.292 kJ 2) 1.292 kJ 3) 22.9 kJ 4) 0.292 kJ

Ans: (1)

21. pH value of which one of the following is NOT equal to one?

1) 0.1 M HNO_3 2) 0.1 M CH_3 COOH

3) 50 cm^3 0.4 M HCl + 50 cm^3 0.2 M NaOH 4) 0.05 M H_2SO_4

Ans: (2)

22. A buffer solution contains 0.1 mole of sodium acetate dissolved in 1000 cm^3 of 0.1 M acetic acid. To the above buffer solution, 0.1 mole of sodium acetate is further added and dissolved. The pH of the resulting buffer is .....

1) pK_a + 1 2) pK_a 3) pK_a + Log 2 4) pK_a = Log 2

Ans: (3)

23. H_2S is passed into one dm^3 of a solution containing 0.1 mole of Zn^{2+} and 0.01 mole of Cu^{2+} till the sulphide ion concentration reaches 8.1 x 10^{-19} moles. Which one of the following statements is true? [K_{sp} of ZnS and CuS are 3 x 10^{-22} and 8 x 10^{-36} respectively]

1) Both CuS and ZnS precipitate 2) Only ZnS precipitates

3) No precipitation occurs 4) Only CuS precipitates

Ans: (1)

24. E_1, E_2 and E_3 are the emfs of the following three galvanic cells respectively:

(i) Zn (s) $|Zn^{2+}$ (0.1 M)|| Cu^{2+} (1M) | Cu (s)

(ii) Zn (s) $|Zn^{2+}$ (1 M)|| Cu^{2+} (1M) | Cu (s)

(iii) Zn (s) $|Zn^{2+}$ (1 M)|| Cu^{2+} (0.1M) | Cu (s)

Which one of the following is true?

1) $E_1 > E_2 > E_3$ 2) $E_2 > E_1 > E_3$ 3) $E_3 > E_2 > E_1$ 4) $E_3 > E_1 > E_2$

Ans: (1)

25. 0.023 g of sodium metal is reacted with 100 cm^3 of water. The pH of the resulting solution is .....

1) 8 2) 10 3) 12 4) 9

Ans: (3)

26. Which one of the following statements is FALSE?

1) The ore is freed from almost all nonmetallic impurities.

2) During roasting, moisture is removed from the ore.

3) The concentrated zinc blende is subjected to calcinations during its extraction by pyrometallurgy.

4) Calcination of ore is carried out in the absence of any blast of air.

Ans: (3)

27. Which one of the following sets of quantum numbers represents the highest energy level in an atom?

1) n = 3, ℓ = 1, m = 1, s = + $\frac{1}{2}$

2) n = 4, ℓ = 0, m = 0, s = + $\frac{1}{2}$

3) n = 3, ℓ = 0, m = 0, s = + $\frac{1}{2}$

4) n = 3, ℓ = 2, m = -2, s = + $\frac{1}{2}$

Ans: (4)

28. When O_2 is converted into O_2^+; .....

1) bond order decreases

2) both paramagnetic character and bond order increase

3) paramagnetic character decreases and the bond order increases

4) paramagnetic character increases

Ans: (3)

29. In chromite ore, the oxidation number iron and chromium are respectively .....

1) +3, +6 2) +3, +2 3) +2, +3 4) +2, +6

Ans: (3)

30. The number of naturally occurring p-block elements that are diamagnetic is .....

1) 6 2) 18 3) 7 4) 5

Ans: (4)

31. The enthalpy of vaporization of benzene is + 35.3 kJ/mol at its boiling point of 80^0 C. The entropy change in the transition of vapour to liquid at its boiling point is .....

[in J $mol^{-1} K^{-1}$]

1) + 100 2) – 100 3) – 342 4) + 342

Ans: (2)

32. Based on the first law of thermodynamics, which one of the following is correct?

1) For an isochoric process, $\Delta U = -q$ 2) For an isochoric process, $q = +w$

3) For a cyclic process, $q = -w$ 4) For an adiabatic process, $\Delta U = -w$

Ans: (3)

33. Consider the following gaseous equilibria with equilibrium constants K_1 and K_2 respectively.

$SO_{2\,(g)} + \frac{1}{2} O_{2\,(g)} \rightleftharpoons SO_{3\,(g)}$

$2SO_{3\,(g)} \rightleftharpoons 2SO_{2\,(g)} + O_{2\,(g)}$

The equilibrium constants are related as .....

1) $K_1^2 = \frac{1}{K_2}$ 2) $2K_1 = K_2^2$ 3) $K_2 = \frac{2}{K_1^2}$ 4) $K_2^2 = \frac{1}{K_1}$

Ans: (1)

34. During the adsorption of Krypton on activated charcoal at low temperature; .....

1) $\Delta H > 0$ and $\Delta S < 0$ 2) $\Delta H < 0$ and $\Delta S < 0$

3) $\Delta H < 0$ and $\Delta S > 0$ 4) $\Delta H > 0$ and $\Delta S > 0$

Ans: (2)

35. For the reversible reaction, $A_{(s)} + B_{(g)} \rightleftharpoons C_{(g)} + D_{(g)}$ $\Delta G^0 = -350$ kJ, which one of the following statements is true?

1) The entropy change is negative

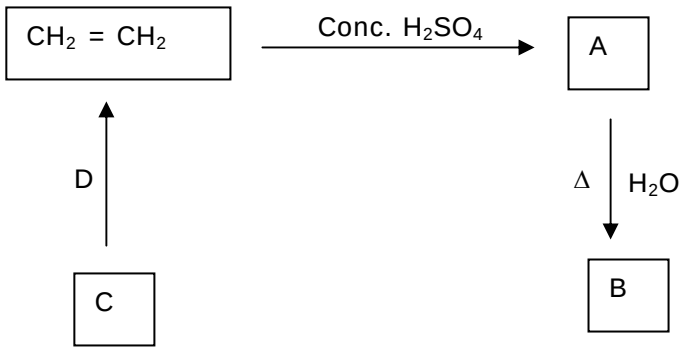
2) The reaction is thermodynamically nonfeasible

3) The reaction should be instantaneous

4) Equilibrium constant is greater then one.

Ans: (4)

36. Identify B and D is the following sequence of reactions.



1) Ethyl hydrogen sulphate and alcoholic KOH

2) Methanol and bromoethane

3) Ethanol and alcoholic KOH

4) Ethyl hydrogen sulphate and aqueous KOH

Ans: (3)

37. The compound which gives turbidity immediately with Lucas reagent at room temperature is .....

1) butan-2-ol 2) butan-1-ol

3) 2-methyl propan-1-ol 4) 2-methyl propan-2-ol

Ans: (4)

38. Ethyl benzene CANNOT be prepared by .....

1) Wurtz-Fittig reaction 2) Wurtz reaction

3) Clemmensen reduction 4) Friedel-Crafts reaction

Ans: (2)

39. 1.2 g of organic compound on Kjeldahilization liberates ammonia which consumes 30 cm^3 of 1 N HCl. The percentage of nitrogen in the organic compound is .....

1) 35 2) 30 3) 20.8 4) 46.67

Ans: (1)

40. Carbon cannot reduce Fe_2O_3 to Fe at a temperature below 983 K because .....

1) CO is thermodynamically more stable then Fe_2O_3

2) free energy change for the formation of CO is more negative then that of Fe_2O_3

3) iron has higher affinity towards oxygen then carbon

4) carbon has higher affinity towards oxygen then iron

Ans: (3)

41. Which one of the following is NOT TRUE for the hydrolysis of t-butyl bromide with aqueous NaOH?

1) The intermediate formed is a carbocation.

2) Reaction occurs through the S_N1 mechanism.

3) Rate of the reaction doubles when the concentration of t-butyl bromide is doubled

4) Rate of the reaction doubles when the concentration of alkali is doubled.

Ans: (4)

42. Following is the substitution reaction in which —CN replaces —Cl

$$R - Cl + \underset{\text{(alcoholic)}}{KCN} \xrightarrow[\Delta]{} R - CN + KCl$$

To obtain propanenitrile, R-Cl should be

1) 1- chloropropane

2) chloroethane

3) 2-chloropropane

4) chloromethane

Ans: (2)

43. The conversion of m-nitrophenol to resorcinol involves respectively

1) diazotization, reduction and hydrolysis

2) hydrolysis, diazotization and reduction

3) reduction, diazotization and hydrolysis

4) hydrolysis, reduction and diazotization

Ans: (3)

44. Formic acid is a stronger acid than acetic acid. This can be explained using

1) –I effect 2) +M effect 3) –M effect 4) +I effect

Ans: (4)

45. The reagent with which both acetaldehyde and acetone react is

1) I_2/NaOH 2) Fehling's reaction

3) Carbonic acid 4) Tollen's reagent

Ans: (1)

46. The standard emf of a galvanic cell involving 2 moles of electrons in its redox reaction is 0.59 V. The equilibrium constant for the redox reaction of the cell is

1) 10^5 2) 10^{20} 3) 10^{10} 4) 10

Ans: (2)

47. 9.65 coulombs of electric current is passed through fused anhydrous $MgCl_2$. The magnesium metal thus obtained is completely converted into a Grignard reagent. The number of moles of Grignard reagent obtained is

1) 1×10^{-4} 2) 5×10^{-4} 3) 1×10^{-5} 4) 5×10^{-5}

Ans: (1)

48. The empirical formula of a nonelectrolyte is CH_2O. A solution containing 3g of the compound exerts the same osmotic pressure as that of 0.05 M glucose solution. The molecular formula of the compound is

1) $C_2H_4O_2$ 2) CH_2O 3) $C_3H_6O_3$ 4) $C_4H_8O_4$

Ans: (1)

49. Which one of the following is a covalent crystal?

1) Ice 2) Rock salt 3) Dry ice 4) Quartz

Ans: (4)

50. Which one of the following DOES NOT involve coagulation?

1) Formation of delta region

2) Clotting of blood by the use of ferric chloride

3) Peptization

4) Treatment of drinking water by potash alum

Ans: (3)

51. Which of the following gives an aldehyde on dry distillation?

1) Calcium acetate + calcium benzoate 2) Calcium formate + calcium acetate

3) Calcium benzoate 4) Calcium acetate

Ans: (2)

52. α - maltose consists of

1) two α-D-glucopyranose units with 1-2 glycosidic linkage

2) one α-D-glucopyranose units and one β-D-glucopyranose unit with 1-2 glycosidic linkage

3) two α-D-glucopyranose units with 1-4 glycosidic linkage

4) two β-D-glucopyranose units with 1-4 glycosidic linkage

Ans: (3)

53. Which one of the following DOES NOT correctly match with each other?

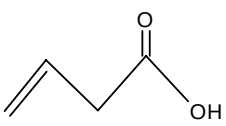
1) Lipase-enzyme 2) Silk-polyamide 3) Oxytocin-enzyme 4) Butter-fat

Ans: (3)

54. In an alkaline medium, glycine predominantly exists as/in a /an

1) anion 2) cation 3) covalent form 4) zwitterions

Ans: (1)

55. The IUPAC name of  is

1) but-1-enoic acid 2) but-3-enoic acid

3) prop-2-enoic acid 4) pent-4-enoic acid

Ans: (2)

56. A solution of two liquids boils at a temperature more than the boiling point of either of them. Hence, the binary solution shows

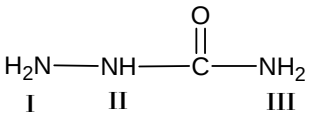
1) positive deviation from Raoult's law

2) negative deviation from Raoult's law

3) positive or negative deviation from Raoult's law depending upon the composition

4) no deviation from Raoult's law

Ans: (2)

57. Which one of the nitrogen atoms in  is the most nucleophilic?

1) I

2) III

3) All three nitrogen atoms are equally strong nucleophilic centers

4) II

Ans: (1)

58. The maximum number of possible isomers in 1-bromo-2-methyl cyclobutane is

1) 2 2) 4 3) 16 4) 8

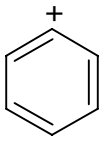
Ans: (2)

59. Which one of the following is the most energetic conformation of cyclohexane?

1) Twisted boat 2) Boat 3) Half chair 4) Chair

Ans: (3)

60. Which one of the following is an intermediate in the reaction of benzene with CH_3Cl in the presence of anhydrous $AlCl_3$?

a) CH_3^- 2) Cl^+ 3)  4) CH_3^+

Ans: (4)