UR ACADEMY, BANGALORE

KCET 2023-24 Chemistry – Version B2

1. Select the correct statement: **(Out of syllabus)**
   (A) Roasting involves heating the ore in the absence of air.
   (B) Calcination involves heating the ore above its melting point.
   (C) Smelting involves heating the ore with suitable reducing agent and flux below its melting point.
   (D) Calcination of calcium carbonate is endothermic.
   Ans: (D)

2. NO_2 gas is: **(Out of syllabus)**
   (A) Colourless, neutral
   (B) Colourless, acidic
   (C) Brown, acidic
   (D) Brown, neutral
   Ans: (C)

3. Identify the incorrect statement from the following: **(Out of syllabus)**
   (A) Oxides of nitrogen in the atmosphere can cause depletion of the ozone layer.
   (B) Ozone absorbs the intense ultraviolet radiation of Sun.
   (C) Depletion of ozone layer is because of its chemical reactions with chlorofluoro alkanes.
   (D) Ozone absorbs infrared radiation.
   Ans: (D)

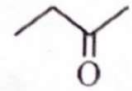
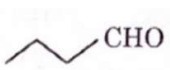
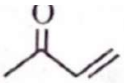
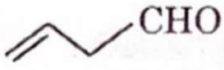
4. Gold sol is not a: **(Out of syllabus)**
   (A) Macromolecular colloid
   (B) Lyophobic colloid
   (C) Multimolecular colloid
   (D) Negatively charged colloid
   Ans: (A)

5. The incorrect statement about Hall-Heroult process is: **(Out of syllabus)**
   (A) Carbon anode is oxidised to CO and CO_2.
   (B) Na_3AlF_6 helps to decrease the melting point of the electrolyte.
   (C) CaF_2 helps to increase the conductivity of the electrolyte.
   (D) Oxidation state of oxygen changes in the overall cell reaction.
   Ans: (D)

6. Propanone and Propanal are:
   (A) Position isomers
   (B) Functional isomers
   (C) Chain isomers
   (D) Geometrical isomers
   Ans: (B)

7. Sodium ethanoate on heating with soda lime gives 'X'. Electrolysis of aqueous solution of sodium ethanoate gives 'Y'. 'X' and 'Y' respectively are:
   (A) Methane and Ethane
   (B) Methane and Methane
   (C) Ethane and Methane
   (D) Ethane and Ethane
   Ans: (A)

8. But-1-yne on reaction with dil. H_2SO_4 in presence of Hg^{2+} ions at 333 K gives:

(A)  (B)  (C)  (D) 

Ans: (A)

9. Biologically active adrenaline and ephedrine used to increase blood pressure contain: **(Out of syllabus)**
(A) Primary amino group (B) Secondary amino group
(C) Tertiary amino group (D) Quaternary ammonium salt
Ans: (B)

10. In the reaction Aniline $\xrightarrow[\text{dil. HCl}]{NaNO_2}$ P $\xrightarrow[NaOH]{\text{Phenol}}$ Q,

'Q' is :
(A) $C_6H_5N_2Cl$ (B) ortho-hydroxyazobenzene
(C) para-hydroxyazobenzene (D) meta-.hydroxyazobenzene
Ans: (C)

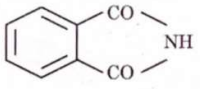
11. The female sex hormone which is responsible for the development of secondary female characteristics and participates in the control of menstrual cycle is: **(Out of syllabus)**
(A) Testosterone (B) Estradiol (C) Insulin (D) Thyroxine
Ans: (B)

12. The type of linkage present between nucleotides is:
(A) Phosphoester linkage (B) Phosphodiester linkage
(C) Amide linkage (D) Glycosidic linkage
Ans: (B)

13. $\alpha-D-(+)-$ glucose and $\beta-D-(+)-$ glucose are:
(A) Enantiomers (B) Conformers (C) Epimers (D) Anomers
Ans: (D)

14. Which of the following set of polymers are used as fibre? **(Out of syllabus)**
(i) Teflon (ii) Starch (iii) Terylene (iv) Orlon
(A) (i) and (ii) (B) (ii) and (iii) (C) (iii) and (iv) (D) (i) and (iv)
Ans: (C)

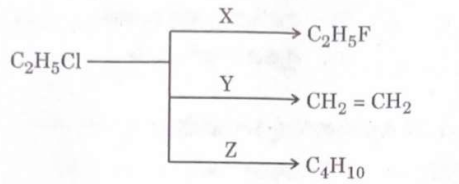
15. The biodegradable polymer obtained by polymerisation of Glycine and Aminocaproic acid is:
(Out of syllabus)
(A) Nylon 6 (B) PHBV
(C) Nylon 2 – Nylon 6 (D) Nylon 6, 10
Ans: (C)

16. The compound  is:

(A) Sucralose (B) Aspartame (C) Saccharin (D) Alitame
Ans: (incorrect option)

17. Which one of the following is a cationic detergent? **(Out of syllabus)**
(A) Cetyltrimethylammonium bromide (B) Sodium dodecylbenzene sulphonate
(C) Dodecylbenzene sulphonic acid (D) Dodecylbenzene
Ans: (A)

18. In the following scheme of reaction,



X, Y and Z respectively are:
(A) AgF, alcoholic KOH and benzene (B) HF, aqueous KOH and Na in dry ether
(C) Hg_2F_2, alcoholic KOH and Na in dry ether (D) CoF_2, aqueous KOH and benzene
Ans: (C)

19. 8.8 g of monohydric alcohol added to ethyl magnesium iodide in ether liberates 2240 cm^3 of ethane at STP. This monohydric alcohol when oxidised using pyridinium-chlorochromate, forms a carbonyl compound that answers silver mirror test (Tollens' test). The monohydric alcohol is:
(A) butan-2-ol (B) 2, 2-dimethyl propan-1-ol
(C) pentan-2-ol (D) 2, 2-dimethyl ethan-1-ol
Ans: (B)

20. When a tertiary alcohol 'A' ($C_4H_{10}O$) reacts with 20% H_3PO_4 at 358 K, it gives a compound 'B' (C_4H_8) as a major product. The IUPAC name of the compound 'B' is:
(A) But-1-ene (B) But-2-ene (C) Cyclobutane (D) 2-Methylpropene
Ans: (D)

21. PCC is:
(A) $K_2Cr_2O_7 + \text{Pyridine}$
(B) $CrO_3 + CHCl_3$
(C) $CrO_3 + H_2SO_4$
(D) A complex of chromium trioxide with pyridine + HCl
Ans: (D)

22. On treating 100 mL of 0.1 M aqueous solution of the complex $CrCl_3 \cdot 6H_2O$ with excess of $AgNO_3$, 2.86 g of AgCl was obtained. The complex is;
(A) $\left[Cr(H_2O)_3Cl_3\right].3H_2O$ (B) $\left[Cr(H_2O)_4Cl_2\right]Cl.2H_2O$
(C) $\left[Cr(H_2O)_5Cl\right]Cl_2.H_2O$ (D) $\left[Cr(H_2O)_6Cl_3\right]$
Ans: (C)

23. The complex compounds $[Co(NH_3)_5SO_4]Br$ and $[Co(NH_3)_5Br]SO_4$ are:
(A) Coordination isomers (B) Geometrical isomers
(C) Optical isomers (D) Ionisation isomers
Ans: (D)

24. Which of the following statements are true about $[CoF_6]^{3-}$ ion?
I. The complex has octahedral geometry.
II. Coordination number of Co is 3 and oxidation state is + 6.
III. The complex is sp^3d^2 hybridised.
IV. It is a high spin complex.
(A) I, II and IV (B) I, III and IV (C) II and IV (D) II, III and IV
Ans: (B)

25. A haloalkane undergoes S_N2 or S_N1 reaction depending on:
(A) Solvent used in the reaction (B) Low temperature
(C) The type of halogen atom (D) Stability of the haloalkane
Ans: (A)

26. 2-Methyl propane can be prepared by Wurtz reaction. The haloalkanes taken along with metallic sodium and dry ether are:
(A) chloromethane and 2-chloropropane (B) chloroethane and chloromethane
(C) chloroethane and 1-chloropropane (D) chloromethane and 1-chloropropane
Ans: (A)

27. In the analysis of III group basic radicals of salts, the purpose of adding $NH_4Cl_{(s)}$ to NH_4OH is:
(A) to increase the concentration of OH^- ions. (B) to precipitate the radicals of group IV and V.
(C) to suppress the dissociation of NH_4OH. (D) to introduce Cl^- ions.
Ans: (C)

28. Solubility product of CaC_2O_4 at a given temperature in pure water is $4\times10^{-9}\left(\text{mol L}^{-1}\right)^2$. Solubility of CaC_2O_4 at the same temperature is:
(A) $6.3\times10^{-5}\ \text{mol L}^{-1}$ (B) $2\times10^{-5}\ \text{mol L}^{-1}$ (C) $2\times10^{-4}\ \text{mol L}^{-1}$ (D) $6.3\times10^{-4}\ \text{mol L}^{-1}$
Ans: (A)

29. In the reaction between moist SO_2 and acidified permanganate solution:
(A) SO_2 is oxidized to SO_4^{2-}
MnO_4^- is reduced to Mn^{2+}
(B) SO_2 is reduced to S
MnO_4^- is oxidized to MnO_4
(C) SO_2 is oxidized to SO_3^{2-}
MnO_4^- is reduced to MnO_2
(D) SO_2 is reduced to H_2S
MnO_4^- is oxidized to MnO_4
Ans: (A)

30. Which one of the following properties is generally not applicable to ionic hydrides? **(Out of syllabus)**
A) Non-volatile (B) Non-conducting in solid state
(C) Crystalline (D) Volatile
Ans: (D)

31. Which one of the following nitrate will decompose to give NO_2 on heating? **(Out of syllabus)**
(A) $NaNO_3$ (B) KNO_3 (C) $RbNO_3$ (D) $LiNO_3$
Ans: (D)

32. Which of the following halides cannot be hydrolysed? **(Out of syllabus)**
(A) CCl_4 (B) $SiCl_4$ (C) $GeCl_4$ (D) $SnCl_4$
Ans: (A)

33. 0.48 g of an organic compound on complete combustion produced 0.22 g of CO_2. The percentage of C in the given organic compound is:
(A) 25 (B) 50 (C) 12.5 (D) 87.5
Ans: (C)

34. In the given sequence of reactions, identify 'P', 'Q', 'R' and 'S' respectively.

$$CH_2=CH_2 \xrightarrow{P} \underset{\underset{Br}{|}}{-CH_2-}\underset{\underset{Br}{|}}{CH_2} \xrightarrow{Q} CH_2=CH-Br \xrightarrow{R} CH\equiv CH \xrightarrow{S} C_6H_6$$

(A) Br_2, Alc. KOH, NaOH, Al_2O_3
(B) HBr, Alc. KOH, CaC_2, $KMnO_4$
(C) HBr, Alc. KOH, $NaNH_2$, Red hot iron tube
(D) Br_2, Alc. KOH, $NaNH_2$, Red hot iron tube
Ans: (D)

35. The first chlorinated organic insecticide prepared is:
(A) Gammexane (B) Chloroform (C) $COCl_2$ (D) DDT
Ans: (D)

36. Which of the following crystals has the unit cell such that a = b ≠ c and $\alpha=\beta=90°,\gamma=120°$?
(Out of syllabus)
(A) Zinc blende (B) Graphite (C) Cinnabar (D) Potassium dichromate
Ans: (B)

37. MnO exhibits: **(Out of syllabus)**
(A) Ferrimagnetism (B) Antiferromagnetism
(C) Ferromagnetism (D) Paramagnetism
Ans: (B)

38. The number of atoms in 4.5 g of a face-centred cubic crystal with edge length 300 pm is :
(Given density = 10 g cm^{-3} and $N_A = 6.022 \times 10^{23}$) **(Out of syllabus)**
(A) 6.6×10^{20} (B) 6.6×10^{23} (C) 6.6×10^{19} (D) 6.6×10^{22}
Ans: (D)

39. Vapour pressure of a solution containing 18 g of glucose and 178.2 g of water at 100°C is:
(Vapour pressure of pure water at 100°C = 760 torr)
(A) 76.0 torr (B) 752.4 torr
(C) 7.6 torr (D) 3207.6 torr
Ans: (B)

40. A mixture of phenol and aniline shows negative deviation from Raoult's law. This is due to the formation of:
(A) Polar covalent bond (B) Non-polar covalent bond
(C) Intermolecular Hydrogen bond (D) Intramolecular Hydrogen bond
Ans: (C)

41. Which one of the following pairs will show positive deviation from Raoult's Law?
(a) Water − HCl (B) Benzene − Methanol
(C) Water − HNO_3 (D) Acetone – Chloroform
Ans: (B)

42. How many Coulombs are required to oxidise 0.1 mole of H_2O oxygen?
(a) 1.93×10^5 C (B) 1.93×10^4 C (C) 3.86×10^4 C (D) 9.65×10^3 C
Ans: (B)

43. A current of 3 A is passed through a molten calcium salt for 1 hr 47 min 13 sec. The mass of calcium deposited is : (Molar mass of Ca = 40 g mol^{-1})
(A) 6.0 g (B) 2.0 g (C) 8.0 g (D) 4.0 g
Ans: (D)

44. The value of 'A' in the equation $\lambda_m = \lambda_m^o - A\sqrt{C}$ is same for the pair:
(A) NaCl and $CaCl_2$ (B) $CaCl_2$ and $MgSO_4$
(C) NaCl and KBr (D) $MgCl_2$ and NaCl
Ans: (C)

45. For the reaction, A ⇌ B, E_a = 50 kJ mol^{-1} and ΔH = − 20 kJ mol^{-1}. When a catalyst is added, E_a decreases by 10 kJ $moll^{-1}$. What is the E_a for the backward reaction in the presence of catalyst?
(A) 60 kJ mol^{-1} (B) 40 kJ mol^{-1} (C) 70 kJ mol^{-1} (D) 20 kJ mol^{-1}
Ans: (A)

46. For the reaction $PCl_5 \rightarrow PCl_3 + Cl_2$, rate and rate constant are 1.02×10^{-4} $molL^{-1}s^{-1}$ and 3.4×10^{-5} s^{-1} respectively at a given instant. The molar concentration of PCl_5 at that instant is:
(A) 8.0 mol L^{-1} (B) 3.0 mol L^{-1} (C) 0.2 mol L^{-1} (D) 2.0 mol L^{-1}
Ans: (B)

47. Which one of the following does not represent Arrhenius equation?
(A) $\log k = \log A - \frac{Ea}{2.303RT}$ (B) $k = Ae^{-Ea/RT}$
(C) $\ln k = -\frac{Ea}{RT} + \ln A$ (D) $k = Ae^{Ea/RT}$
Ans: (D)

48. Identify the incorrect statement: **(Out of syllabus)**
(A) Values of colligative properties of colloidal solution are of small order compared to values of true solution.
(B) Tyndall effect is observed only when diameter of the dispersed particles is not much smaller than wavelength of incident light.
(C) Colour of colloidal solution depends on the wavelength of light scattered by the dispersed particles. .
(D) Brownian movement is due to balanced bombardment of molecules of dispersion medium on colloidal particles.

Ans: (D)

49. For the coagulation of positively charged hydrated ferric-oxide sol, the flocculating power the ions is in the order: **(Out of syllabus)**

(A) $PO_4^{3-} > SO_4^{2-} > Cl^- > \left[Fe(CN)_6\right]^{4-}$ (B) $Cl^- > SO_4^{2-} > PO_4^{3-} > \left[Fe(CN)_6\right]^{4-}$

(C) $SO_4^{2-} = Cl^- = PO_4^{3-} = \left[Fe(CN)_6\right]^{4-}$ (D) $\left[Fe(CN)_6\right]^{4-} > PO_4^{3-} > SO_4^{2-} > Cl^-$

Ans: (D)

50. For which one of the following mixtures is composition uniform throughout?

(A) Sand and water (B) Grains and pulses with stone

(C) Mixture of oil and water (D) Dilute aqueous solution of sugar

Ans: (D)

51. The energy associated with first orbit of He^+ is:

(A) 0 J (B) -8.72×10^{-18} J (C) -4.58×10^{-18} J (D) -0.545×10^{-18} J

Ans: (B)

52. A metalloid is:

(A) Bi (B) Sb (C) P (D) Se

Ans: (B)

53. A pair of isoelectronic species having bond order of one is:

(A) N_2, CO (B) N_2, NO^+ (C) O_2^{2-}, F_2 (D) CO, NO^+

Ans: (C)

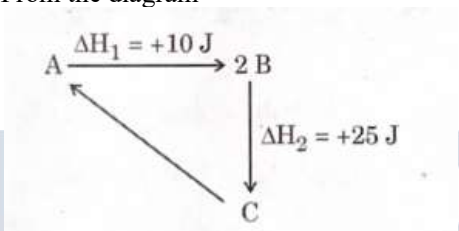
54. Identify the wrong relation for real gases: **(Out of syllabus)**

(A) $Z = \dfrac{V_{ideal}}{V_{real}}$ (B) $p_{ideal} = p_{real} + \dfrac{an^2}{V^2}$

(C) $V_{real} = V_{ideal} - nb$ (D) $\left(p + \dfrac{a}{V^2}\right)(V - b) = RT$

Ans: (A)

55. From the diagram



$\Delta_r H$ for the reaction $C \rightarrow A$ is:

(A) +35 J (B) −15J (C) −35J (D) +15J

Ans: (C)

56. The transition element (≈ 5%) present with lanthanoid metal in Misch metal is:

(A) Mg (B) Fe (C) Zn (D) Co

Ans: (B)

57. Match the following:

I.	Zn^{2+}	i.	d^8 configuration
II.	Cu^{2+}	ii.	colourless
III.	Ni^{2+}	iii.	μ = 1.73 BM

Codes:

	I	II	III
(A)	i	ii	iii
(B)	ii	iii	i
(C)	ii	i	iii
(D)	i	iii	ii

Ans: (B)

58. Which of the following statements related to lanthanoids is incorrect?
(A) Lanthanoids are silvery white soft metals.
(B) Samarium shows + 2 oxidation state.
(C) Ce^{+4} solutions are widely used as oxidising agents in titrimetric analysis.
(D) Colour of Lanthanoid ion in solution is due to d − d transition.
Ans: (D)

59. The correct decreasing order of boiling point of hydrogen halides is:
(A) HF > HCl > HBr > HI (B) HI > HBr> HCl > HF
(C) HF > HI > HBr > HCl (D) HI > HF > HBr > HCl
Ans: (C)

60. The synthetically produced radioactive noble gas by the collision of $^{249}_{98}Cf$ with $^{48}_{20}Ca$ is: **(Out of syllabus)**
(A) Radon (B) Radium (C) Oganesson (D) Xenon
Ans: (C)