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# KCET EXAMINATION – 2022
# SUBJECT : CHEMISTRY (VERSION – B3)

**DATE :- 17-06-2022** **TIME : 02.30 PM TO 03.50 PM**

1. A first order reaction is half completed in 45 min. How long does it need 99.9% of the reaction to be completed?
   1) 10 Hours 2) 20 Hours
   3) 5 Hours 4) 7.5 Hours

**Ans.** 4

**Sol.** $t_{99.9\%} = 10t_{50\%}$
$= 10 \times 45\,\text{min} = 450\,\text{min} = 7.5\,\text{hours}$

2. The rate of the reaction
$CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$
is given by the equation , Rate= $K[CH_3COOC_2H_5][NaOH]$. If concentration is expressed in mol $L^{-1}$, the unit of K is
   1) $L\,mol^{-1}s^{-1}$ 2) $s^{-1}$
   3) $mol^{-2}L^2s^{-1}$ 4) $molL^{-1}s^{-1}$

**Ans.** 1

**Sol.** 2nd order reaction

3. Colloidal solution commonly used in the treatment of skin disease is
   1) Colloidal Gold
   2) Colloidal Antimony
   3) Colloidal Sulphur
   4) Colloidal Silver

**Ans.** 3

**Sol.** Conceptual

4. Specific conductance of 0.1 M $HNO_3$ is $6.3 \times 10^{-2}$ $ohm^{-1}$ $cm^{-1}$. The molar conductance of the solution is
   1) 6.300 $ohm^{-1}cm^2mol^{-1}$
   2) 63.0 $ohm^{-1}cm^2mol^{-1}$
   3) 630 $ohm^{-1}cm^2mol^{-1}$
   4) 315 $ohm^{-1}cm^2mol^{-1}$

**Ans.** 3

**Sol.** $\lambda_m = \frac{1000k}{C} = \frac{1000 \times 6.3 \times 10^{-2}}{0.1}$
$= 630\,ohm^{-1}cm^2mol^{-1}$

5. For spontaneity of a cell, which is correct?
   1) $\Delta G = +ve, \Delta E = +ve$ 2) $\Delta G = -ve$
   3) $\Delta G = 0, \Delta E = 0$ 4) $\Delta G = -ve, \Delta E = 0$

**Ans.** 2

**Sol.** Conceptual

6. For $n^{th}$ of reaction, Half-life period is directly proportional to
   1) $a^{n-1}$ 2) $a^{1-n}$ 3) $\frac{1}{a^{n-1}}$ 4) $\frac{1}{a^{1-n}}$

**Ans.** 3

**Sol.** $t_{1/2} \propto \frac{1}{a^{n-1}}$

7. Half-life of a reaction is found to be inversely proportional to the fifth power is initial concentration, the order of reaction is

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

**Ans. 2**

**Sol.** $t_{1/2} \propto \frac{1}{a^{n-1}}; n = 6$

8. The strong reducing property of hypophosphorous acid is due to

1) Two P-H bonds

2) Presence of phosphorus in its highest oxidation state

3) Its concentration

4) The positive valency of phosphorus

**Ans. 1**

**Sol.** Conceptual

9. A transition metal exists in its highest oxidation state. It is expected to behave as

1) An oxidizing agent

2) A reducing agent

3) A chelating agent

4) A central metal in a co-ordination compound

**Ans. 1**

**Sol.** Conceptual

10. What will be the value of x in $Fe^{x+}$, if the magnetic moment $\mu = \sqrt{24}BM$?

1) 0 2) +1 3) +2 4) +3

**Ans. 3**

**Sol.** $n = 4$

$Fe^{+2} = 3d^6$

11. Which can adsorb larger of hydrogen gas?

1) Finely divided platinum

2) Colloidal $Fe(OH)_3$

3) Finely divided nickel

4) Colloidal solution of palladium

**Ans. 4**

**Sol.** Conceptual

12. The property of halogens which is not correctly matched is

1) I > Br > Cl > F (density)

2) F > Cl > Br > I (electron gain enthalpy)

3) F > Cl > Br > I (ionization enthalpy)

4) F > Cl > Br > I (electronegativity)

**Ans. 2**

**Sol.** Conceptual

13. Which noble gas has least tendency to form compounds?

1) Ar 2) Kr 3) He 4) Ne

**Ans. 3**

**Sol.** Conceptual

14. $(NH_4)_2Cr_2O_7$ on heating liberates a gas. The same gas will be obtained by

1) Treating $H_2O_2$ with $NaNO_2$

2) Treating $Mg_3N_2$ with $H_2O$

3) Heating $NH_4NO_3$

4) Heating $NH_4NO_2$

**Ans. 4**

**Sol.** $(NH_4)_2Cr_2O_7 \xrightarrow{heat} Cr_2O_3 + 4H_2O + N_2$

$NH_4NO_2 \xrightarrow{\Delta} 2H_2O + N_2$

15. The complex hexamine platinum (IV) chloride will give _____ number of ions on ionization.

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

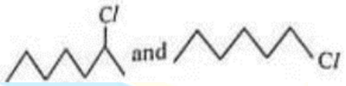
**Ans. 3**

**Sol.** $[Pt(NH_3)_6]Cl_4 \longrightarrow [Pt(NH_3)_6]^{+4} + 4Cl^-$

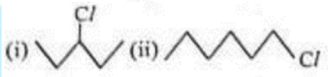
Five ions are produced

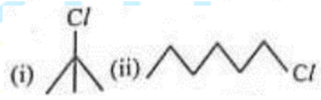
16. In the following pairs of halogen compounds, which compound undergoes faster $SN^1$ reaction?

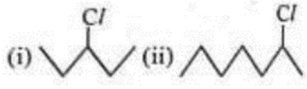
(i) 

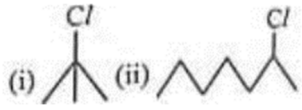

(ii) 


1) 


2) 


3) 


4) 


**Ans. 4**

**Sol.** Reactivity order of $Sn^1$ reaction is $3^0 > 2^0 > 1^0$

17. The only Lanthanoid which is radioactive
1) Promethium 2) Praseodymium
3) Lanthanum 4) Cerium

**Ans.** 1

**Sol.** Conceptual

18. All Cu(II) halides are known, except the iodide, the reaction for it is that
1) $Cu^{+2}$ has much more negative hydration enthalpy
2) $Cu^{+2}$ ion has smaller size
3) Iodide is bulky ion
4) $Cu^{+2}$ oxidises iodide to iodine

**Ans.** 4

**Sol.** Conceptual

19. The correct IUPAC name of cis-platin is
1) Diammine dichloride platinum (O)
2) Dichlorido diammine platinum (IV)
3) Diammine dichlorido platinum (II)
4) Diammine dichloride platinum (IV)

**Ans.** 3

**Sol.** $\left[Pt(NH_3)_2Cl_2\right]$ = cis-platin

20. Crystal Field Splitting Energy (CFSE) for $[CoCl_6]^{4-}$ is $18000\,cm^{-1}$. The Crystal Field Splitting Energy (CFSE) for $[CoCl_4]^{2-}$ will be
1) $8000\,cm^{-1}$ 2) $10,000\,cm^{-1}$
3) $18,000\,cm^{-1}$ 4) $16,000\,cm^{-1}$

**Ans.** 1

**Sol.** $\Delta_t = \frac{4}{9}\Delta_0 = \frac{4}{9}\times 18000 cm^{-1} = 8000 cm^{-1}$

21. The major product obtained when ethanol is heated with excess of conc. $H_2SO_4$ at at 443K is
1) ethane 2) methane
3) ethene 4) ethyne

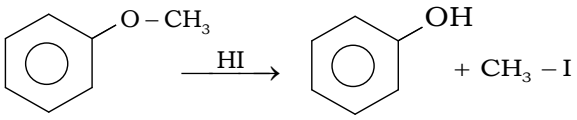
**Ans.** 3

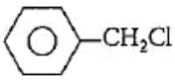
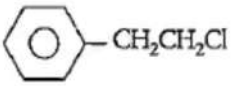
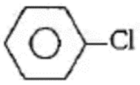
**Sol.** $CH_3 - CH_2 - OH \xrightarrow[443K]{Conc.H_2SO_4} CH_2 = CH_2$

22. Among the following, the products formed by the reaction of anisole with HI are
1) Benzene + Methanol
2) Phenol + Methane
3) Phenol + Iodomethane
4) Sodium phenate + Methanol

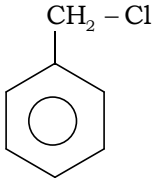
**Ans.** 3

**Sol.**




23. Which one of the following Chlorohydrocarbon readily undergoes solvolysis?
1)  2) 
3) $CH_2 = CHCl$ 4) 

**Ans.** 1

**Sol.**  on solvolysis give more stable benzyl carbocation

24. Identify the products A and B in the reactions:
$R - X + AgCN \rightarrow A + Ag\,X$
$R - X + KCN \rightarrow B + K\,X$
1) A = RNC; B = RCN
2) A = RNC; B = RNC
3) A = R – CN; B = RCN
4) A = RCN; B = RNC

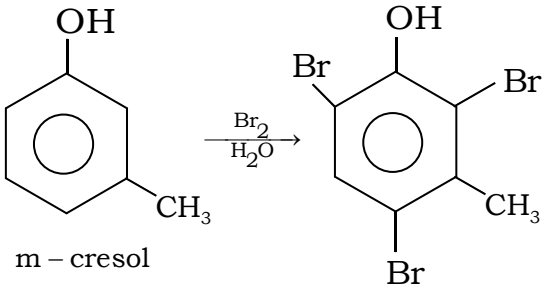
**Ans.** 1

**Sol.** $R - X + AgCN \rightarrow \underset{(A)}{R - NC} + AgX$
$R - X + KCN \rightarrow \underset{(B)}{R - CN} + KX$

25. An organic compound with molecular formula $C_7H_8O$ dissolves in NaOH and gives a characteristic colour with $FeCl_3$. On treatment with bromine, it gives a tribromo derivative $C_7H_5OBr_3$. The compound is
1) m-Cresol 2) p-Cresol
3) Benzyl alcohol 4) o-Cresol

**Ans.** 1

**Sol.** Phenols gives characteristic colour with $FeCl_3$




m – cresol

Meta-derivative of phenol only gives tribromo derivative

26. In Kolbes reaction the reacting substances are

1) Sodium phenate and $CCl_4$

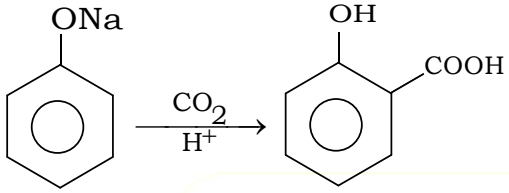
2) Phenol and $CHCl_3$

3) Sodium phenate and $CO_2$

4) Phenol and $CCl_4$

**Ans. 3**

**Sol.**




27. In Carbylamine test for primary amines the resulting foul smelting product is

1) $CH_3NC$ 2) $COCl_2$

3) $CH_3NCl_2$ 4) $CH_3CN$

**Ans. 1**

**Sol.** Carbylamine test for primary amines the resulting isocyanide

$$CH_3 - NH_2 \xrightarrow[NaOH]{CHCl_3} CH_3NC$$

28. Ethanoic acid undergoes Hell-Volhard Zelinsky reaction but Methanoic acid does not, because of

1) absence of $\alpha - H$ atom in ethanoic acid

2) higher acidic strength of ethanoic acid than methanoic acid

3) presence of $\alpha - H$ atom in methanoic acid

4) presence of $\alpha - H$ atom in ethanoic acid

**Ans. 4**

**Sol.** Carboxylic acid with alpha hydrogen undergoes HVZ reaction

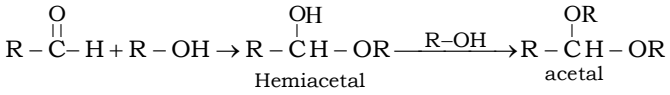
29. The general name of the compound formed by the reaction between aldehyde and alcohol is

1) Glycol 2) Acetate

3) Ester 4) Acetal

**Ans. 4**

**Sol.**




30. Reaction by which benzaldehyde can not be prepared is

1) Toluene $\xrightarrow[(ii)\ H_3O^+]{(i)\ CrO_2Cl_2 \text{ in } CS_2}$

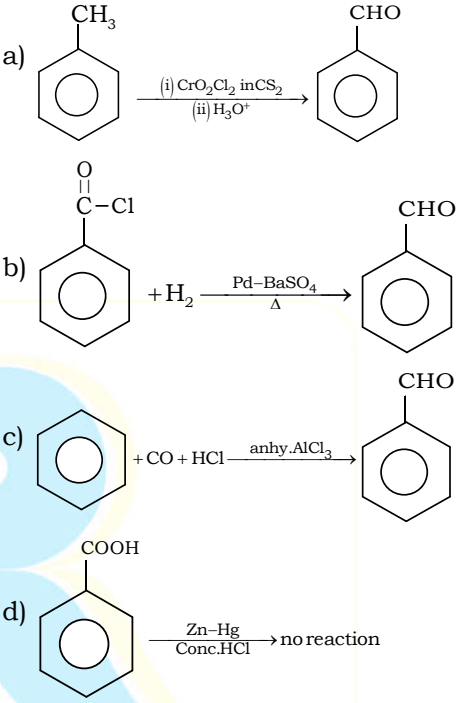
2) Benzoyl chloride $+H_2 \xrightarrow[\Delta]{Pd-BaSO_4}$

3) Benzene $+CO + HCl \xrightarrow{\text{anhydrous } AlCl_3}$

4) Benzoic acid $\xrightarrow{Zn-Hg \text{ and con.HCl}}$

**Ans. 4**

**Sol.**




31. The test to differentiate between pentan-2-one and pentan-3-one is

1) Fehling's test 2) Iodoform test

3) Baeyer's test 4) Benedict's test

**Ans. 2**

**Sol.** $[CH_3 - \overset{O}{\overset{\|}{C}} - CH_2 - CH_2 - CH_3$ / $CH_3 - CH_2 - \overset{O}{\overset{\|}{C}} - CH_2 - CH_3]$

32. A secondary amine is
1) a compound with an $NH_2$ group on the carbon atom in number 2 position
2) a compound in which 2 of the hydrogen of $NH_3$ have been replaced by organic groups
3) an organic compound with two $NH_2$ group
4) a compound with two carbon atom and an $NH_2$ group

**Ans. 2**

**Sol.** $\left[R-\ddot{N}H-R\right]$

33. Which of the following is correctly matched?
1) Bakelite - Novolac
2) Polyster - tetrafluoroethene
3) Nylon - acrylonitrile
4) Teflon – copralactum

**Ans. 1**

**Sol.** Conceptual

34. Which institute has approved the emergency use of 2-deoxy-D-Glucose as additive therapy for COVID-19 patients?
1) Ministry of Health and Family Welfare
2) Drug Controlled General of India
3) Indian Council of Medical Research
4) World Health Organisation

**Ans. 2**

**Sol.** Conceptual

35. A Nucleic acid, whether DNA or RNA gives on complete hydrolysis, two purines bases, two pyrimidine bases, a pentose sugar and phosphoric acid. Nucleotides which are intermediate products in the hydrolysis contain
1) purine or pyrimidine base and ortho-phosphoric acid
2) purine or pyrimidine base, a pentose sugar and ortho-phosphoric acid
3) purine or pyrimidine base and pentose sugar
4) a purine base, pentose sugar and ortho-phosphoric acid

**Ans. 2**

**Sol.** Conceptual

36. Which is most VISCOUS?
1) Ethylene glycol 2) Glycerol
3) Methanol 4) Ethanol

**Ans. 2**

**Sol.** Conceptual

37. The volume of 2.8 g of CO at $27^0$C and 0.821 atm, pressure is (R - 0.08210 lit.atm.$K^{-1}mol^{-1}$)
1) 3 litres 2) 30 litres
3) 0.3 litres 4) 1.5 litres

**Ans. 1**

**Sol.** Conceptual

38. The work done when 2 moles of an ideal gas expands reversibly and isothermally from a volume of 1L to 10L at 300K is
(R - 0.0083 kJ K $mol^{-1}$)
1) 0.115 kJ 2) 58.5 kJ
3) 11.5 kJ 4) 5.8 kJ

**Ans. 3**

**Sol.** $W=-2.303\ nRT\log V_2/V_1$

39. An aqueous solution of alcohol contains 18g of water and 414g of ethyl alcohol. The mole fraction of water is
1) 0.7 2) 0.9 3) 0.1 4) 0.4

**Ans. 3**

**Sol.** $n_{C_2H_5OH}=\frac{414}{46}=9$

$n_{H_2O}=\frac{18}{18}=1$

$X_{H_2O}=\frac{1}{10}=0.1$

40. If wavelength of photon is $2.2\times10^{-11}$m and $h=6.6\times10^{-34}$ J s , then momentum of photon
1) $1.452\times10^{-44}$ kg m $s^{-1}$
2) $6.89\times10^{43}$ kg m $s^{-1}$
3) $3\times10^{-23}$ kg m $s^{-1}$
4) $3.33\times10^{-22}$ kg m $s^{-1}$

**Ans. 3**

**Sol.** $\lambda=\frac{h}{mv}=\frac{h}{p}$

$p=\frac{h}{\lambda}=\frac{6.6\times10^{-34}}{2.2\times10^{-11}}=3\times10^{-23}$

41. Elements X, Y and Z have atomic number 19, 37 and 55 respectively. Which of the following statements is true about them?
1) Z would have the highest ionization potential
2) Y would have the highest ionization potential
3) Their ionization potential would increase with increasing atomic number
4) Y would have an ionization potential between those of X and Z

**Ans.** **4**

**Sol.** Conceptual

42. In oxygen and carbon molecule the bonding is
1) $O_2 : 1\sigma, 1\pi; C_2 : 0\sigma, 2\pi$
2) $O_2 : 0\sigma, 2\pi; C_2 : 2\sigma, 0\pi$
3) $O_2 : 1\sigma, 1\pi; C_2 : 1\sigma, 1\pi$
4) $O_2 : 2\sigma, 0\pi; C_2 : 0\sigma, 2\pi$

**Ans.** **1**

**Sol.** Conceptual

43. Amphoteric oxide among the following:
1) $Ag_2O$ 2) $SnO_2$ 3) BeO 4) $CO_2$

**Ans.** **2 and 3**

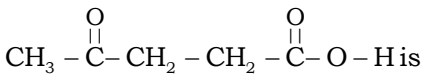
**Sol.** Conceptual

44. Which property of $CO_2$ makes it biologically and geo-chemically important?
1) Its low solubility in water
2) Its high compressibility
3) Its acidic nature
4) Its colourless and odourless nature

**Ans.** **1**

**Sol.** Its low solubility in water makes it of biological and geo-chemical importance. It form carbonic acid with water which dissociates to give $HCO_3^-$ ions. $H_2CO_3 / HCO_3^-$ buffer system helps to maintain pH of blood between 7.26-7.42

45. The IUPAC name for



1) 1-carboxybutan-3-one
2) 4-oxopentanoic acid
3) 1-hydroxy pentane-1, 4-dione
4) 1,4-dioxopentanol

**Ans.** **2**

**Sol.** Conceptual

46. 1 mole of HI is heated in a closed container of capacity of 2 L. At equilibrium half a mole of HI is dissociated. The equilibrium constant of the reaction is
1) 0.25 2) 0.35 3)1 4) 0.5

**Ans.** **1**

**Sol.**

$$2HI \rightleftharpoons H_2 + I_2$$

1 0 0
0.5 0.25 0.25

$$K_C \frac{[H_2][I_2]}{[HI]^2}$$

$$K_C = \frac{\frac{0.25}{2} \times \frac{0.25}{2}}{\frac{0.5}{2} \times \frac{0.5}{2}} = \frac{1}{4} = 0.25$$

47. Which among the following has highest pH?
1) $1M H_2SO_4$ 2) 0.1M NaOH
3) 1M HCl 4) 1M NaOH

**Ans.** **4**

**Sol.** Conceptual

48. In which of the following compounds, an element exhibits two different oxidation states?
1) $N_2H_4$ 2) $N_3H$
3) $NH_2CONH_2$ 4) $NH_4NO_3$

**Ans.** **4**

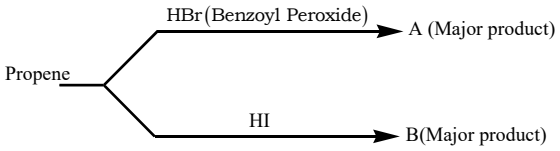
**Sol.** Conceptual

49. Which of the following hydrides is electron deficient?
1) $CH_4$ 2) $B_2H_6$ 3) NaH 4) $CaH_2$

**Ans.** **2**

**Sol.** Conceptual

50. Identify A and B in the reaction




1) $A: CH_3 - \underset{\underset{Br}{|}}{C}H - CH_3$.

$B: CH_3 - CH_2 - CH_2 - I$

2) $A: CH_3 - \underset{\underset{Br}{|}}{C}H - CH_3$,

$B: CH_3 - \underset{\underset{I}{|}}{C}H - CH_3$

3) $A: CH_3 - CH_2 - CH_2 - Br$,

$B: CH_3 - CH_2 - CH_2 - I$

4) $A: CH_3 - CH_2 - CH_2 - Br$,

$B: CH_3 - \underset{\underset{I}{|}}{C}H - CH_3$

**Ans. 4**

**Sol.** Conceptual

51. Vacant space in body centered cubic lattice unit cell is about

1) 23% 2) 46% 3) 32% 4) 10%

**Ans. 3**

**Sol.** Conceptual

52. How many number of atoms are there in a cube based unit cell, having one atom on each corner and 2 atom on each body diagonal of cube?

1) 4 2) 9 3) 8 4) 6

**Ans. 2**

**Sol.** Conceptual

53. Which of the following is NOT true about the amorphous solids?

1) Amorphous solids can be moulded by heating

2) They are anisotropic in nature

3) On heating they may become crystalline at certain temperature

4) They may become crystalline on keeping for long time.

**Ans. 2**

**Sol.** Conceptual

54. Which of the following colligative properties can provide molar mass of proteins, polymers, and colloids with greater precision?

1) Depression in freezing point

2) Osmotic pressure

3) Relative lowering of vapour pressure

4) Elevation in boiling point

**Ans. 2**

**Sol.** Conceptual

55. In Fuel cells _____ are used as catalysts.

1) Zinc - Mercury

2) Lead - Manganese

3) Platinum - Palladium

4) Nickel - Cadmium

**Ans. 3**

**Sol.** Conceptual

56. The molar conductivity is maximum for the solution of concentration

1) 0.005 M 2) 0.001 M

3) 0.004 M 4) 0.002 M

**Ans. 2**

**Sol.** $\Delta_m = \frac{k \times 1000}{M}$

Lower the molarity higher the molar conductivity

57. Alkali halides do not show dislocation defect because

1) Cations and anions have almost equal size

2) There is large difference in size of cations and anions

3) Cations and anions have low co-ordination number.

4) Anions cannot be accommodated in vacant spaces.

**Ans. 2**

**Sol.** Conceptual

58. Solubility of a gas in a liquid increases with

1) increase of P and decrease of T

2) decrease of P and decrease of T

3) increase of P and increase of T

4) decrease of P and increase of T

**Ans. 1**

**Sol.** Conceptual

59. The rise in boiling point of a solution containing 1.8 g of glucose in 100g of solvent is 0.1 $^0$C. The molal elevation constant of the liquid is

1) 2K kg / mol 2) 10K kg / mol

3) 0.1K kg / mol 4) 1K kg / mol

**Ans. 4**

**Sol.** $\Delta T_b = K_b.m.i \Rightarrow 0.1 = K_b \times \frac{1.8}{180} \times \frac{1000}{100} \times 1$

$K_b = 1$

60. If 3 g of glucose (molar mass = 180g) is dissolved in 60 g of water at $15^0$C, the osmotic pressure of the solution will be

1) 6.57 atm 2) 5.57 atm

3) 0.34 atm 4) 0.65 atm

**Ans. 1**

**Sol.** $\pi = C.R.T = \frac{w_2}{M_2}\frac{1000}{V(m\ell)} \times R.T$

$\Rightarrow \frac{3}{180} \times \frac{1000}{60} \times 0.0821 \times 288 = 6.568$ atm