Model Question Paper - 3

12th Standard CBSE

Chemistry

Reg.No. : ☐☐☐☐☐☐

Time : 02:00:00 Hrs

Total Marks : 100

Section - A

1) 5ml of 1 N HCl, 20ml of N/2 H_2SO_4 and 30ml of N/3 HNO_3 are mixed together and the volume made to one litre. The normality of the resulting solution is   **1**

   (a) N/5   (b) N/10   (c) N/20   (d) N/40

2) The unit of ebullioscopic constant is **1**

   (a) K kg mol^{-1} or K (molality)$^{-1}$ (b) mol kg K^{-1} or K^{-1} (molality)   (c) kg mol^{-1} K^{-1} or K^{-1} (molality)$^{-1}$

   (d) K mol kg^{-1} or K (molality)

3) Which cell will measure standard electrode potential of copper electrode ?   **1**

   (a) Pt (s) | H_2 (g, 0.1 bar) | H$^+$ (aq., 1 M) || Cu^{2+} (aq., 1 M) | Cu

   (b) Pt (s) | H_2 (g, 1 bar) | H$^+$ (aq., 1 M) || Cu^{2+} (aq., 2 M) | Cu

   (c) Pt (s) | H_2 (g, 1 bar) | H$^+$ (aq., 1 M) || Cu^{2+} (aq., 1 M) | Cu

   (d) Pt (s) | H_2 (g, 1 bar) | H$^+$ (aq., 0.1 M) || Cu^{2+} (aq., 1 M) | Cu

4) In the electrolysis of aqueous sodium chloride solution which of the half cell reaction will occur at anode ?   **1**

   (a) $Na^+(aq) + e^- \longrightarrow Na(s); E^{\ominus}_{cell} = -2.71V$

   (b) $2H_2O(l) \longrightarrow O_2(g) + 4H^+(aq) + 4e^-; E^{\ominus}_{cell} = 1.23V$

   (c) $H^+(aq) + e^- \longrightarrow \frac{1}{2}H_2(g); E^{\ominus}_{cell} = 0.00V$ (d) $Cl^-(aq) \longrightarrow \frac{1}{2}Cl_2(g) + e^-; E^{\ominus}_{cell} = 1.36V$

5) In an experiment 0.04 F was thorugh 400 ml of 1 M solution of NaCl. What would be the pH of the solution after the electrolysis ?   **1**

   (a) 8   (b) 10   (c) 13   (d) 6   (e) 9

6) For the reaction R $\longrightarrow$ P, a graph of [R] against time is found to be a straight line with negative slope. What is the order of reaction ?   **1**

   (a) Second order   (b) Third order   (c) First order   (d) Zero order

7) The role of a catalyst is to change **1**

   (a) Gibbs energy of reaction   (b) enthalpy of reaction   (c) activation energy of reaction

   (d) equilibrium constant

8) The dispersed phase and dispersion medium of fog respectively are   **1**

   (a) solid, liquid   (b) liquid, liquid   (c) liquid, gas   (d) gas, liquid

9) On addition of one mL solution of 10% NaCI to 10 mL gold sol in the presence of 0.0250 g of starch, the coagulation is just prevented. Starch has the following gold number :

    (a) 0.025   (b) 0.25   (c) 2.5   (d) 25.

1

10) In the extraction of chlorine by electrolysis of brine.......

    (a) oxidation of Cl^- ions to chlorine gas occurs   (b) reduction of Cl^- ions to chlorine gas occurs

    (c) for overall reaction ΔG^0 has negative value   (d) a displacement reaction takes place

1

11) Which of the following reactions occur during calcination?

    (a) $CaCO_3 \longrightarrow CaO + CO_2$ (b) $2FeS_2 + \frac{1}{2}O_2 \longrightarrow Fe_2O_3 + 4SO_2$ (c) $Al_2O_3 \cdot xH_2O \longrightarrow Al_2O_3 + xH_2O$

    (d) $ZnS + \frac{3}{2}O_2 \longrightarrow ZnO + SO_2$

1

12) Which of the following is isoelectronic pair?

    (a) ICl_2, ClO_2 (b) BrO_2^-, BrF_2^+ (c) ClO_2, BrF (d) CN^-, O_3

1

13) The gases produced in the reaction, $Pb(NO_3)_2 \xrightarrow{\triangle}$ and $NH_4NO_3 \xrightarrow{\triangle}$ are respectively

    (a) N_2O, NO (b) N_2O, NO_2 (c) NO, NO_2 (d) NO_2, N_2O

1

14) Oxidation states of P in $H_4P_2O_5$, $H_4P_2O_6$ and $H_4P_2O_7$, are respectively

    (a) +3, +4, +5   (b) +3, +5, +4   (c) +5, +3, +4   (d) +5, +4, +3

1

15) Which of the following polymer is stored in the liver of animals ?

    (a) Amylose   (b) Cellulose   (c) Amylopectin   (d) Glycogen

1

16) Which of the following is a conjugated protein ?

    (a) Phosphoprotein   (b) Glycoprotein   (c) Chromoprotein   (d) All of these

1

17) Which of the following is a biodegradable polymer?

    (a) Cellulose   (b) Polythene   (c) PVC   (d) Nylon-6

1

18) Which of the following polymers are thermoplastic?

    (a) Teflon   (b) Natural rubber   (c) Neoprene   (d) Polystyrene

1

19) Formation of polyethylene from calcium carbide takes place as follows: $CaC_2 + 2H_2O \longrightarrow Ca(OH)_2 + C_2H_2$ $C_2H_2 +_2 \longrightarrow C_2H_4$ $nC_2H_4 \longrightarrow (CH_2-CH_2)_n$ The amount of polyethylene obtained from 64.0kg of CaC_2 is

    (a) 7kg   (b) 14kg   (c) 21kg   (d) 28kg

1

20) For a non-ideal solution showing positive deviations, ΔV_{mixing} is .... and ΔH_{mixing} is ....

1

Section - B

21) On passing H_2S gas through dilute HNO_3, the colourless solution becomes turbid. Why?

2

22) Give one example each of 'oil in water' and 'water in oil' emulsions.

2

23) What is laughing gas ? How is it prepared ?

2

24) Complete the following reaction? $HNO_3 \xrightarrow{P_4O_{10}, \triangle} ?$

2

25) How will you bring about the conversion : methyl bromide to methyl iodide ?

2

26) What is plane polarized light ?

2

27) What do prefixes (+),(-) and $(\pm)$ before an organic compound mean ?

2

28) Compare the strength of following acids: (i) Formic acid,   (ii) Acetic acid,   (iii) Benzoic acid.

2

Section - C

29) Oxidation of ketones involves carboncarbon bond cleavage. Name the products formed on oxidation of 2, 5-dimethylhexan-3-one. **3**

30) The density of chromium metal is 7.2 g cm^{-3} . If the unit cell is cubic with edge length of 289 pm, determine the type of unit cell (simple, body centred or face centred) [Atomic mass of Cr = 52 a.m.u., $N_0 = 6.02 \times 10^{23}$ mol^{-1}]. **3**

31) Calculate the normal boiling point of a sample of sea water containing 3.5% of NaCl and 0.13% of MgCl$_2$ by mass. **3**

Given Kb (water) = 0.52 K kg mol^{-1} (Mol. Wt. of NaCl =58.5 g mol^{-1}. MgCl$_2$ = 95g mpl^{-1})

32) Write two basic requirements for refining of a metal by Monds process and by van Arkel method. **3**

33) How are metals used as semiconductors refined? What is principle of method used? **3**

34) In general it is observed that the rate of chemical reaction doubles with every 10° rise in temperature. If the generalization holds good for the reaction in the temperature range 295 K to 305 K, what would be the value of activation energy for the this reaction? **3**

(R = 8.314 J mol^{-1} K^{-1})

35) Explain the following: **3**

(a) Same substance can act both as colloids and crystalloids.

(b) Artifical rain is caused by spraying salt over clouds.

(c) When a beam of light is passed through a colloidal sol, the path of the beam gets illuminated.

36) 50 mL of 1M oxalic acid is shaken with 0.5 g of wood charcoal.The final concentration of the solution after adsorption is 0.6M. calculate the amount of oxalic acid adsorbed per gram of charcoal. **3**

Section - D

37) What are biodegradable polymers ? Give an example of such a polymer and mention its uses. **5**

38) An almorphous solid "A" burns in air to form a gas "B" Which turns lime water milky. The gas is also produced as a by-product during roasting of sulphide ore. This gas decolourises acidified aqueous KMnO$_4$ solution and reduces Fe^{3+} to Fe^{2+}. Identify the soild "A" and the gas "B" and write the reactions involved. **5**

39) (a) Assuming complete ionization, calculate the expected freezing point of solution prepared by dissolving 6.00 g of Glauber's salt, Na$_2$SO$_4$. 10H$_2$O in 0.1 kg of H$_2$O. (K$_f$ for H$_2$O = 1.86 K kg mol^{-1}) [At. mass of Na = 23, S = 32, O= 16, H = 1 u]. (b) Two liquids X and Y boil at 110 ^{o}C and 130 ^{o}C respectively. Which of them has higher vapor pressure at 50°C ? **5**

40) A doctor has advised a patient suffering from high blood pressure to take less quantity of the salt. On the basis of above para, give answer of following questions- **5**

(i) What is the role of salt in increasing blood pressue?

(ii) How does less intake of salt help in reducing blood .pressure?

(iii)What is the value associated with this?

41) Due to hectic and busy schedule, Mr. Angad made his life full of tensions and anxiety. He started taking sleeping pills to overcome the depression without consulting the doctor. Mr. Deepak, a close friend of Mr. Angad, advised him to stop taking sleeping pills and and suggested to change his lifestyle by doing yoga, meditation and some physical exercise. Mr. Angad followed his friend's advice and after few days he started feeling better. After rearing the above passage, answer the following: **5**

(i) What are the values (at least two) displayed by Mr. Deepak?

(ii) Why is it not advisable to take sleeping pills without consulting doctor?

(iii) What are tranquilizers? Give two examples.

42) At constant temperature and volume, X decomposes as $2 X (g) \longrightarrow 3 Y (g) + 2 Z (g)$. P_x is the partial pressure of X. **5**

Observation No.	Time (in minutes)	P_x (in mm of Hg)
1	0	800
2	100	400
3	200	200

(i) What is the order of reaction with respect to X ? (ii) Find the time for 75% completion of the reaction. (iii) Find the total pressure when pressure of X is 700 mm of Hg.

43) Benzene on reaction with HOCI in presence of an acid produces organic compound (A), (A) on treatment with $NaNH_2$/liq. NH_3 furnishes another organic compound (B). (B) on treatment with HBF_4 affords an organic compound (C) wich on heating with NaNO2 gives organic compound (D). Identify (A), (B), (C) and (D). **5**

44) An organic compound (A) with molecular formula C_6H_6O gives a characteristic colour with aqueous $FeCl_3$ solution.When (A) is treated with CO_2 and NaOH at 410K under pressure,it gives compound (B) which upon acidification gives compound (C).Compound (C) reacts with acetyl chloride to give (D) which is a popular pain killer,Deduce the structures of (A),(B),(C) and (D) and explain all the reactions involved. **5**

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