Model Question of HSC Examination 2019

Chemistry Second Paper

Creative Essay Type

Subject Code [1][7][7]

Time — 2 hours 35 minutes

Full marks — 50

[N.B. -The figures in the right margin indicate full marks. Read the stems carefully and answer the associated questions. Answer any five questions.]
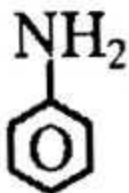
1. ▶ (A) $C_4H_8Cl_2$

a. What is Boltzmann constant?   1

b. What is meant by 50 ppm of BOD of water sample?   2

c. Show all possible stereoismers of (A) mentioning their names.   3

d. Is it possible to prepare an alkane from compound (A)? Describe it by giving all reactions.   4

2. ★ (i) $CH_3CH_2NH_2$

(ii) $(CH_3CH_2)_2NH$

(iii) NH_3

(iv)

a. What is iodimetric titration?   1

b. What is meant by 5.0 molal solution?   2

c. Prepare paracetamol from compound (iv) by giving chemical reactions.   3

d. Arrange all compounds mentioned in the stem in order of their increasing basic properties and explain.   4

3. ▶ (i) $S + OH^- \longrightarrow S^{2-} + S_2O_3^{2-}$

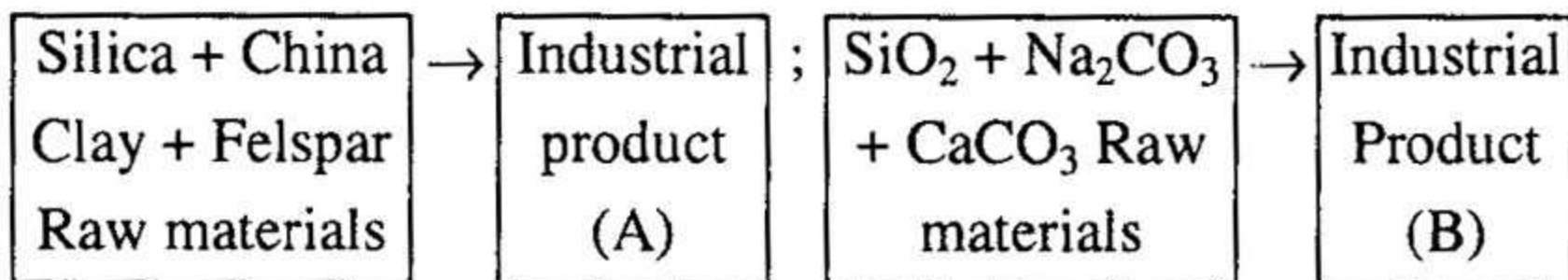(ii) $KMnO_4 + FeSO_4 + H_2SO_4 \longrightarrow$

(iii) $K_2Cr_2O_7 + FeSO_4 + H_2SO_4 \longrightarrow$

a. What is 1BTU?   1

b. Why can fullerene conduct electricity?   2

c. Balance the reaction (i) by ion electron mathod.   3

d. The amount of oxidizing agent needed to oxidize 100 g reducing agent of reaction (iii) is more than the amount of oxidizing agent needed to oxidize the same amount of reducing agent of reaction (ii). Justify it mathematically. 4

4. ▶

| Silica + China Clay + Felspar Raw materials | → | Industrial product (A) | ; | $SiO_2 + Na_2CO_3 + CaCO_3$ Raw materials | → | Industrial Product (B) |

a. What is zwitter ion? 1

b. Is cyclopropenyl cation aromatic compound? 2

c. Describe the principle of production of (A) with the chemical reactions. 3

d. Recycling of industrial product (B) is environment friendly and cost effective. Analyze it. 4

5. ▶ (i) ClO_4^- (ii) H_2SO_4 (iii) CN^- (iv) $R-NH_2$

a. What is cooking liquor? 1

b. Whay is gypsum used in cement production? 2

c. Find out the conjugate acid and conjugate base of the reaction between (i) & (ii). 3

d. All Lewis bases are Bronsted bases. Analyze it with the help of (iii) & (iv). 4

6. ★

| 300 mm(Hg) 950mL 30°C "P" Gas | 250 mm(Hg) 350mL 30°C "Q" Gas |
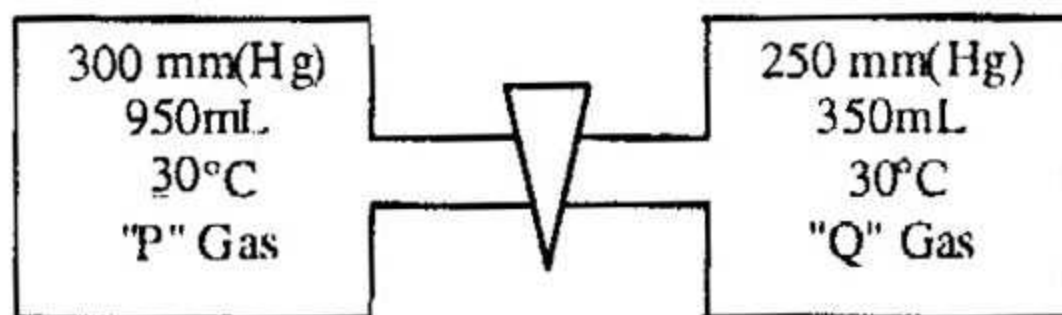
a. What is Galvanic cell? 1

b. Why can 'Cu' react with dil. HNO_3? Explain. 2

c. Calculate the number of molecules of "P" gas. 3

d. If temperature of the gases is increased at 50°C temperature, the total pressure of the gas mixture of "P" and "Q" is also increased when the cork is opened. Justify it mathematically. 4
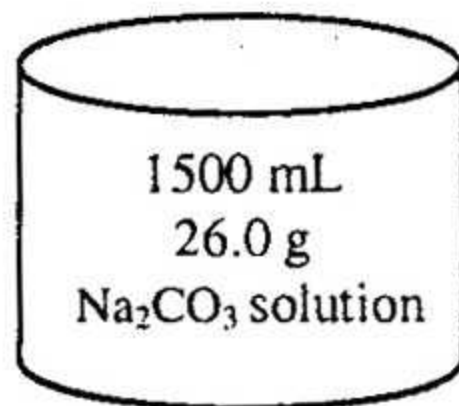
7. ★

Part-(A)   Part-(B)   Part-(C)

a. State Faraday's first law of electrolysis. 1
b. Electrochemical equivalent of 'Ag' is 1.118×10^{-3} g/C Explain it. 2
c. How ill you prepare 1.5 M solution from Pat-(A)? 3
d. Is the nature of mixture of the solution of Part-(B) and the solution Part-(C) acidic, basic or neutral? Analyze it mathematically. 4

8. ► (i) $E°_{A/A^{2+}} = 0.13$ V

(i) $E°_{B^{2+}/B} = -0.44$ V

(iii) $E°_{C^{2+}/C} = -0.14$ V

(iv) $E°_{D/D^+} = -0.80$ V

(v) ACl_2 solution

a. What is critical temperature? 1
b. Why is acidic $H_2C_2O_4$ a reductant? Explain. 2
c. Draw the cell by using (i) and (ii) mentioning cell reaction. 3
d. Can the solution of (v) be kept safe in the container mode by B, C or D? Analyze it mathematically. 4

Chemistry: Second Paper   Subject Code 1 7 7

Time — 25 minutes   Creative Multiple Choice Questions   Full marks — 25

[N.B. Choose the best answer among the options. Fill the circle in the answer sheet with ball point pen. Each question has value 1.]

1. Which two gases have same diffusion rate?
   ⓐ N_2 & CO
   ⓑ C_2H_4 & O_2
   ⓒ N_2 & O_2
   ⓓ CO & O_2

2. Which of the following gas has the RMS velocity 1927.79 ms^{-1} at 25°C?
   ⓐ CO_2
   ⓑ O_2
   ⓒ N_2
   ⓓ H_2

3. ★ Which of the following green house gases has highest concentration in atmosphere?
   ⓐ CH_4
   ⓑ CO_2
   ⓒ N_2O
   ⓓ CFC

4. ★ What amount of $CaCO_3$ will remain if 2×10^{20} molecules are removed from 10g $CaCO_3$?
   ⓐ 9.550g
   ⓑ 9.600g
   ⓒ 9.881g
   ⓓ 9.967g

5. Under different conditions, ethanol reacts with H_2SO_4 to produce—
   i. diethyl ether
   ii. ethene
   iii. ethane
   Which one is correct?
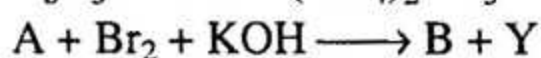   ⓐ i & ii
   ⓑ ii & iii
   ⓒ i & iii
   ⓓ i, ii & iii

6. Which alcohol cannot form alkene through dehydration?
   ⓐ CH_3OH
   ⓑ CH_3CH_2OH
   ⓒ $CH_3CH(OH)CH_3$
   ⓓ $CH_3CH_2C(OH)(CH_3)_2$

7. Which one contains two chiral carbons?
   ⓐ 2-hydroxypropanoic acid
   ⓑ butane-2, 3-diol
   ⓒ 2-methyl propanol-2
   ⓓ butanol-2

Answer questions numbers 8 and 9 according to the stem:
$$C_6H_5COOH + (NH_4)_2CO_3 \longrightarrow A + X$$
$$A + Br_2 + KOH \longrightarrow B + Y$$

8. What type of compound is A?
   ⓐ amine
   ⓑ ester
   ⓒ amide
   ⓓ anhydride

9. B of the stem—
   i. forms diazonium salt
   ii. forms white precipitate with $Br_2 + H_2O$
   iii. forms dye
   Which one is correct?
   ⓐ i & ii
   ⓑ i & iii
   ⓒ ii & iii
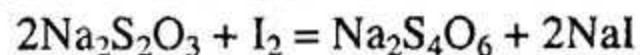   ⓓ i, ii & iii

10. What is the oxidation state of Fe in Fe_3O_4?
    ⓐ +2
    ⓑ +2.5
    ⓒ +3
    ⓓ +4

11. For which molar solution, Beer-Lambert law is applicable?
    ⓐ 0.001
    ⓑ 0.2
    ⓒ 0.5
    ⓓ 0.15

Read the stem and give answers to questions no 12 and 13:
$$2Na_2S_2O_3 + I_2 = Na_2S_4O_6 + 2NaI$$

12. The type of reaction is—
    i. neutralization
    ii. Iodimetry
    iii. Iodometry
    Which one is correct?
    ⓐ i
    ⓑ ii
    ⓒ iii
    ⓓ i & ii

13. Which compound is being oxidized in the reaction?
    ⓐ $Na_2S_2O_3$
    ⓑ $Na_2S_4O_6$
    ⓒ I_2
    ⓓ NaI

14. How many Faraday's of electricity are required to pass through $CuSO_4$ solution to deposit 1 mole of copper at the cathode?
    ⓐ 1F
    ⓑ 2F
    ⓒ 3F
    ⓓ 4F

15. Which one is used as electrode in fuel cell?
ⓐ Nickel ⓑ Platinum
ⓒ Graphite ⓓ Lead

16. What is the electrochemical equivalent of Zn?
ⓐ 3.388×10^{-4} g/c
ⓑ 3.30×10^{-4} g/c
ⓒ 3.29×10^{-4} g/c
ⓓ 3.22×10^{-4} g/c

17. Which one is the correct cell notation of the lead storage cell?
ⓐ $Pb / Pb^{2+} \| Cu^{2+} / Cu$
ⓑ $Pb/ PbSO_4 | H_2SO_4 | PbO_2 | Pb$
ⓒ $Pb/ Pb^{2+} \| Ag+ / Ag$
ⓓ $Pb/ Pb^{2+} \| H^+ / H_2, Pt$

18. Which one is associated with nanotechnology?
i. microanalysis
ii. the size of the particle is 10^{-9}m
iii. to stop material wastage
Which one of the following is correct?
ⓐ i & ii ⓑ ii & iii
ⓒ i & iii ⓓ i, ii & iii

19. Which one is fossil fuel?
ⓐ coal
ⓑ Hydrogen
ⓒ alcohol
ⓓ urenium

20. ★ How lead oxide is used in ceramic industry?
ⓐ As increaser of mechanical
ⓑ As binding agent
ⓒ non melting agent
ⓓ glazing substance

21. Which one is the coldest region in the atmosphere?
ⓐ Mesophere
ⓑ Thermosphere
ⓒ Troposphere
ⓓ Stratosphere

22. Cooking frypan contains the coating of —
ⓐ Polyethene
ⓑ Polyester
ⓒ Tetfon
ⓓ Polystyrene

23. ★ $CH_3 - CH (CH_3) - CH - CH_3.$
                                        |
                                      OH
What is the name of this compound in IUPAC process.
ⓐ 2-methyl butanol-2
ⓑ Pentanol-2
ⓒ 3-methyl butanol-2
ⓓ Pentanol-4

24. ★ Which one is the correct formula of ethanoic anhydride?
ⓐ $CH_3 - CO - CH_2 - CO - CH_3$
ⓑ $CH_3 - COO - COOCH_3$
ⓒ $CH_3 - COOCO - CH_3$
ⓓ $CH_3 - CH_2 - O - CH_2 - CH_3$

25. Lewis acid is—
i. compound with incomplete octet
ii. compound with incomplete d-orbital central atom
iii. metal ion forming complex compound
Which one is correct?
ⓐ i & ii ⓑ i & iii
ⓒ ii & iii ⓓ i, ii & iii

1	ⓐ	2	ⓓ	3	ⓑ	4	ⓓ	5	ⓐ	6	ⓐ	7	ⓑ	8	ⓒ	9	ⓓ	10	*	11	ⓐ	12	ⓑ	13	ⓐ
14	ⓑ	15	ⓒ	16	ⓐ	17	ⓑ	18	ⓑ	19	ⓐ	20	ⓓ	21	ⓐ	22	ⓒ	23	ⓒ	24	ⓒ	25	ⓓ		

10. N.B. The correct answer is +2.667 .