

Model Question of HSC Examination 2020

Chemistry Second Paper

Subject Code

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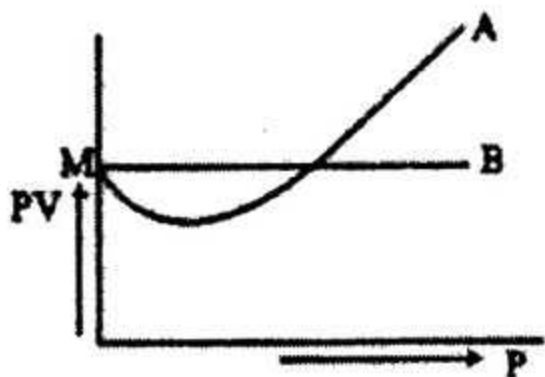
Time — 2 hours 35 minutes

Creative Essay Type

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. ►



Mass of 50 molecules of 'A' gas is

$$2.656 \times 10^{-21} \text{ g}$$

- Define molar gas constant? 1
- How does HSO_4^- act as both acid and base? 2
- Calculate the root mean square velocity of 'A' gas at 37°C temperature. 3
- Predict whether the gas 'A' mentioned in the stem is real or ideal, if it is real, analyze the causes of deviation from ideal behavior of the gas. 4

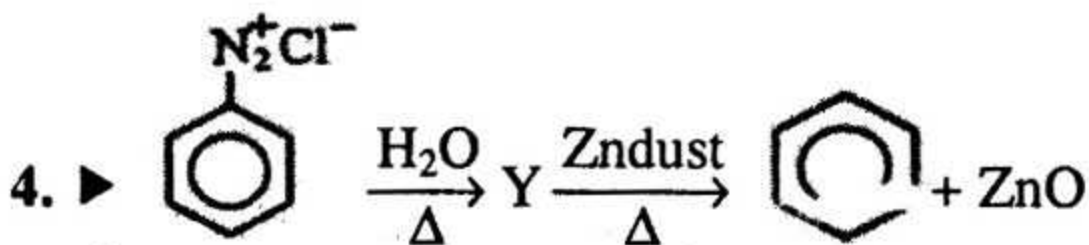
2. ► At 30°C temperature, 1.5atm pressure in a container of volume 5.0L nitrogen, oxygen and carbon-di-oxide remains mixed with other. Total mole number of gases is 30. The

concentration of nitrogen and oxygen is 2molL^{-1} and 1.5molL^{-1} .

- What is partial pressure? 1
- Why is rms velocity better than average velocity? 2
- What is the partial pressure of CO_2 gas in the mixture? 3
- If nitrogen gas is separated from the mixture, partial pressure of remaining gases will be changed or not? Analyze it. 4

3. ★ Two isomers of $\text{C}_3\text{H}_6\text{O}$ are A & B respectively. They react with 2, 4 – DNP to give yellow precipitate. Compound 'A' reacts with Tollen's reagent but 'B' does not react.

- What is Beer-Lambert's law? 1
- What is the difference between BOD and COD? 2
- Discuss the stepwise reaction of A and B with Grignard reagent? 3
- Which one among A & B is more active in nucleophilic addition reaction? 4



- What is mole fraction? 1

- b. What do you mean by standard reduction potential of copper is +0.34V? 2
- c. Prepare the medicine for fever & headache from Y of stem. 3
- d. Discuss the reason why the compound Y of stem is soluble in warm water but not in cold water. 4

5. ★

60ml HCl solution

Soln-A

40ml semimolar NaOH solution

Soln-B

30ml 10% Na ₂ CO ₃ solution
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Soln-C

Solution-A is neutralized by solution-B partially and the solution-C is required to complete the neutralization.

- a. What is ETP? 1
- b. Why there is no specific indicator for weak acid & weak base? 2
- c. Find the concentration of solution-A. 3
- d. Analyze the nature of the mixture of 150ml 0.44M H₂SO₄ solution and solution-C in stem. 4

6. ★ 2g iron ore is dissolved in dilute H₂SO₄ and made a solution of 100 ml. To titrate 25ml of the solution, 22.5ml of 0.02M KMnO₄ is needed.

- a. What is reference electrode? 1
- b. Find the concentration of 2% NaOH in ppm. 2

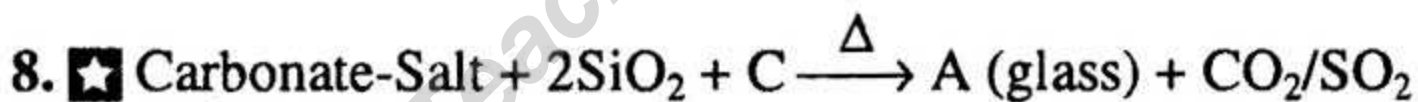
- c. Balance the redox reaction in stem by ion-electron method. 3
- d. Will the amount of iron in ore be same or different if same concentration and same volume of $K_2Cr_2O_7$ instead of $KMnO_4$? Analyze it. 4



here, $E^\circ_{x/x^+} = + 0.799V$ and $E^\circ_{y/y^{2+}} = 2.87V$

[atomic mass of Br = 79.9]

- a. What is titration? 1
- b. What is racemic mixture optically inactive? 2
- c. 1.26F electricity is passed through solution of YBr_2 ; then what is the amount of molecules accumulated at anode? 3
- d. Is there any change in *e.m.f* in case of given reaction and opposite reaction? Analyse mathematically. 4



Different classes of glass have different composition.

- a. What is nano-particle? 1
- b. What do you know about effluent treatment plant? 2
- c. Write down the principle of production of A mentioned in the stem? 3
- d. Describe the effect of by-products in the stem on the environment. 4

[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. Phenol is—

- i. Weaker acid than water
- ii. stronger acid than water
- iii. stronger acids than 1^o, 2^o, 3^o alcohol

Which of followings is correct?

- (a) i & ii
- (b) i & iii
- (c) ii & iii
- (d) i, ii & iii

2. Molar concentration of 10% NaCl solution?

- (a) 1.709 mol/L
- (b) 170.9 mol/L
- (c) 0.1709 mol/L
- (d) 17.09 mol/L

3. \star Constant "a" in Van der Waals equation is associated with—

- (a) Intermolecular attraction
- (b) Intermolecular repulsion
- (c) actual volume of molecules
- (d) Hydrogen bond

4. Real gas obey's law—

- (a) low temperature
- (b) 0° temperature
- (c) room temperature
- (d) very high temperature

5. Which of the following gases show maximum deviation from ideal behavior?

- (a) H₂
- (b) He
- (c) CH₄
- (d) N₂

6. NH₃ can donate lone pair electron— who has told it?

- (a) Arrhenus
- (b) Lewis
- (c) Bronsted
- (d) Dalton

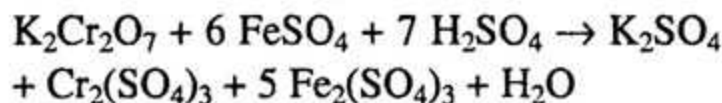
7. Which one shows aldol condensation reaction?

- (a) HCHO
- (b) PhCHO

(c) (CH₃)₃CCHO

(d) CH₃CHO

Redox reaction is given below & answer next two question :



8. In balancing equation—

- i. K₂Cr₂O₇ is present
- ii. 7 H₂SO₄ is present
- iii. 6 FeSO₄ is present

Which of followings is correct?

- (a) i & ii
- (b) i & iii
- (c) ii & iii
- (d) i, ii & iii

9. Which one is oxidizing agent?

- (a) K₂Cr₂O₇
- (b) FeSO₄
- (c) H₂SO₄
- (d) H₂O

10. What is the critical temperature of CO₂?

- (a) -240°C
- (b) -31°C
- (c) 31°C
- (d) 240°C

11. Which type of organic compound is detected by Carbylamine test?

- (a) Primary amine
- (b) Aldehyde
- (c) Acid
- (d) Alcohol

12. Which has the highest oxidation number for chlorine?

- (a) HClO
- (b) HClO₂
- (c) HClO₃
- (d) HClO₄

13. At SATP molar volume is—

- (a) 22.4 L/mol
- (b) 22.414 L/mol
- (c) 24.4 L/mol
- (d) 24.789 L/mol

14. ★ What is the mole fraction of NaCl when 10g of NaCl is mixed with 20g of H₂O?

- (a) 0.133
- (b) 0.143
- (c) 0.150
- (d) 0.160

15. Which one is meta direction group?

- (a) -NO₂
- (b) -CH₃
- (c) -OH
- (d) NH₂

16. Which one is more stable carbocation?

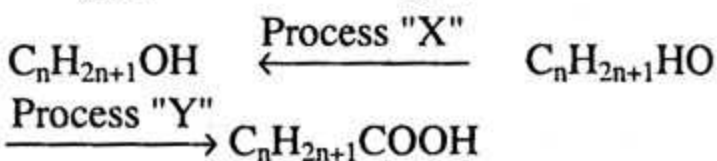
- (a) 1° carbocation
- (b) -CH₃ carbocation
- (c) 2° carbocation
- (d) 3° carbocation

17. ★ Which one can give the cannizzaro reaction?

- (a) CH₃CH₂ - CHO
- (b) (CH₃)₂CH - CHO
- (c) C₆H₅ - CHO
- (d) CH₃CHO

18. What is the numerical value of compression factor (Z) at NTP?

- (a) 1
- (b) 2
- (c) 3
- (d) 4



From the stem give answer next two question

19. According to stem "X" is?

- (a) Oxidation
- (b) Reduction

- (c) Anhydride
- (d) Neutralization

20. According to stem "Y" is?

- (a) Anhydride
- (b) Oxidation
- (c) Reduction
- (d) Polymerization

21. A decimolar H₂SO₄ solution of volume 250cm³ will have?

- (a) 45g
- (b) 2.45g
- (c) 98g
- (d) 49g

22. ★ In case of molar solution?

- i. it is a standard solution
- ii. its concentration is 1M
- iii. one mole of solute remains in one litre solution

Which of followings is correct?

- (a) i & ii
- (b) i & iii
- (c) ii & iii
- (d) i, ii & iii

23. What is glass?

- (a) Sodium calcium silicate
- (b) Sodium aluminium
- (c) Sodium phosphate
- (d) Aluminium silicate

24. Which raw materials used in ceramics industries?

- (a) Hydrated aluminium silicate
- (b) Sodium silicate
- (c) Calcium silicate
- (d) Al₂(SO₄)₃

25. Which one is used as reference cell?

- (a) Standard H₂ electrode
- (b) Glass electrode
- (c) Calomel electrode
- (d) Cadmium electrode

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