Model Question of HSC Examination 2020

Chemistry Second Paper Subject Code | 1 | 7 | 7 |

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. ✪

100 mL H_2 t = 25°C P = 101.325 kPa	50 mL N_2 t = 25°C P = 101.325 kPa	40 mL O_2 t = 25°C P = 101.325 kPa

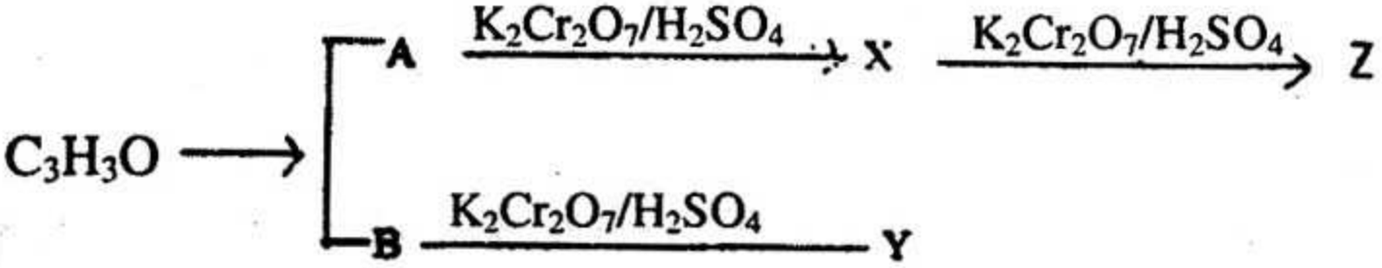
a. What is conjugate base? 1

b. Why is the pressure of real gases less than that of ideal gases? 2

c. If above three gases are pumped into a 250 ml flask, then what will be the total pressure of the gas mixture at given temperature. 3

d. If the gases mixture of 250 ml flask in heated at 30°C temperature then whether the total pressure of a the mixture will be changed or not? Analyze mathematically. 4

2. ▶



Here, Compound A is a primary alcohol and B is a s secondary alcohol.

a. What is free radical? 1

b. Why Phenol is acidic but alcohol is neutral? 2

c. How will you prepare alkane from the compound 'Y'? 3

d. Between the compound X and Z, which one gives nucleophilic addition reaction? Give logics for you answer. 4

3. ▶ Two steel industry of Chittagong, PHP and KSRM imported impure iron ore from two different countries. To determine the percentage of iron, an analyst took 1.5 gram sample from the iron of both industries and dissolved it in diluted sulphuric acid to prepare 100ml solutions separately for two sample. For complete titration of 25 mL of both solution, it required 24.5 mL and 22.5 mL 0.02M $KMnO_4$ solution respectively.

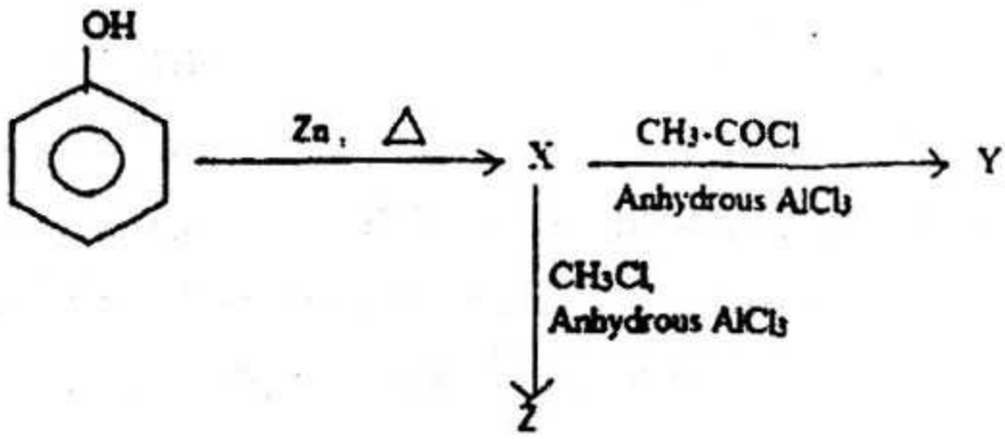
a. What is Beer's law? 1

b. Why 200 ppm concentration of a solution is standard solution? 2

c. Balance the reaction which happens in the above titration according to ion-electron method. 3

d. Between the iron sample of PHP and KSRM, percentage of iron in which steel industry is more? Give answer by mathematical analysis. 4

4. ✪



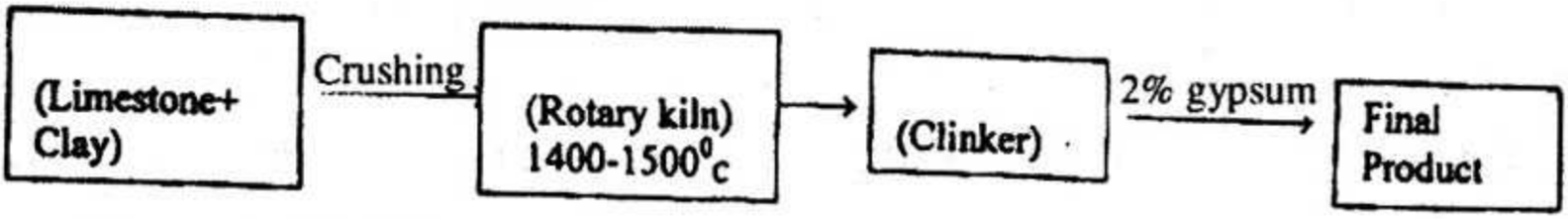
a. What is plasticity? 1
b. How will you distinguish between propene and propyne? 2
c. How will you prepare paracetamol from compound 'X'? Write with reaction. 3
d. Between the compound Y and Z, which is more reactive in electrophilic substitution reaction? Justify your answer. 4

5. ▶

Substance	Name
A	Alanine
B	Glycine
X	α-D-Glucose
Y	β-D-Glucose

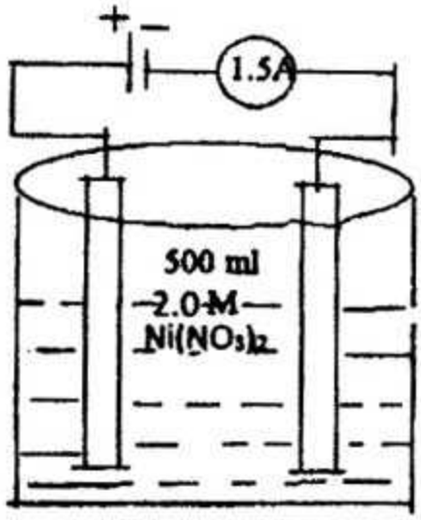
a. What is 'Zwitter ion''? 1
b. Why 'Nylon-66' is called condensation polymer? 2
c. How will you prepare a polypeptide using the substance A and B? Explain with reaction. 3
d. Between X and Y, which substance form cellulose and which form starch? Explain with their structiure. 4

6. ✪



a. What is ETP? 1
b. What is meant by annealing of glass? 2
c. Explain the dry process with reactions for manufacturing the final product that mentioned in the above stem. 3
d. How can you control the air pollutants in the different steps of the product? 4

7. ▶



a. What is super conductor? 1

b. What is meant by the electrochemical equivalent of Copper is 0.000329gram/ Coulomb? 2

c. If the above mentioned electric current passed through the solution for 2 hours 30 minutes then how much nickel will be deposited at cathode? (Atomic mass of Ni is 58.7) 3

d. Determine the change of the concentration Ni^{2+} ion due to passing 3F electricity in the above electrolysis. 4

8. ▶ Zn/Zn^{2+} (1.0M) $||$ Ag^{+}(1.0M)/Ag

$E^{0}_{Ag/Ag+} = -0.80V$; $E^{0}_{zn/zn^{2+}} = 0.76V$

a. What is solution pressure? 1

b. Why salt bridge is necessary in Galvanic cell? 2

c. If the concentration of Zn^{2+} and Ag^{+} in the above cell is $0.001 mol/dm^3$ and $0.1 mol/dm^3$ respectively, then calculate its cell potential at 25°C temperature. 3

d. If the right half cell is replaced by Mg^{2+} (1.0)/ Mg, then whether the reaction will occur spontaneously or not? Analyze with respect of $\Delta G°$, ($E°Mg^{2+}/Mg = -2.3V$) 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 of the following is more concentrated solution of NaOH?

ⓐ 20 ml 0.1M ⓑ 10 ml 0.5M
ⓒ 10 ml 0.2M ⓓ 50 ml 0.05M

2. What is the concentration of 5% NaOH?

ⓐ 0.5M ⓑ 1.0M
ⓒ 1.25M ⓓ 5.0M

3. Which of the following is true?

ⓐ 1mol $KMnO_4 \equiv 5$mol $C_2O_4^{2-}$
ⓑ 1mol $K_2Cr_2O_7 \equiv 5$ molFe^{2+}
ⓒ 1mol $KClO_3 \equiv 6$ mol I^-
ⓓ 1mol $FeSO_4 \equiv 5$ mol MnO_4^-

4. What is the oxidation number of the central atom of $S_4O_6^{2-}$?

ⓐ 2 ⓑ 2.5
ⓒ 3 ⓓ 6

5. ✪ How much gm of Na_2CO_3 required to make 250mL of decimolar solution?

ⓐ 2.65g ⓑ 5.3g
ⓒ 26.5g ⓓ 2.5g

6. ✪ What is the electrochemical equivalent of Ag^+? (Ag = 108)

ⓐ 0.0011 ⓑ 0.0055
ⓒ 0.010 ⓓ 0.111

7. Lead storage battery recharge again if—

ⓐ Emf become zero
ⓑ Emf become under 1.17v
ⓒ Reactoin stopped
ⓓ Specific gravity of H_2SO_4 reduce

8. What is the volume of gas at SATP?

ⓐ 22.4L ⓑ 24.48L
ⓒ 24.80L ⓓ 22.84L

9. Which of the following is Lewis acid?

ⓐ NH_3 ⓑ BF_3
ⓒ HCl ⓓ H_2O

10. Which of the following is strongest acid?

ⓐ CH_3COOH ⓑ HCOOH
ⓒ $ClCH_2COOH$ ⓓ Cl_2CH_2COOH

11. In the solution of 2, 4 DNP orange yellow precipitate gives—

i. aldehyde
ii. ketone
iii. formic acid

Which of the following is true?

ⓐ i & ii ⓑ ii & iii
ⓒ i & iii ⓓ i, ii & iii

12. Which of the following is heterocyclic aromatic compound?

ⓐ toluene ⓑ pyridine
ⓒ phenol ⓓ benzoic acid

13. In the paracetamol present functional groups are—

i. –OH
ii. $-NH_2$
iii. $-CONH_2$

Which of the following is true?

ⓐ i & ii ⓑ ii & iii
ⓒ i & iii ⓓ i, ii & iii

14. Size of nano particles—

ⓐ 1-100nm ⓑ 1-50nm
ⓒ 1-10nm ⓓ 0.1-0.5nm

15. Which of the following is secondary standard substance?

ⓐ Na_2CO_3 ⓑ $K_2Cr_2O_7$

ⓒ $H_2C_2O_4.2H_2O$ ⓓ $KMnO_4$

16. $CH_3 - I + KCN_{(ac)} \xrightarrow{\Delta}$ 'A' in hydrolysis of A we can find–

i. CH_3OH

ii. CH_3COOH

iii. NH_3

Which of the following is true?

ⓐ i & ii ⓑ ii & iii

ⓒ i & iii ⓓ i, ii & iii

17. Formula of China clay–

ⓐ $Al_2O_3.2SiO_2.2H_2O$

ⓑ $Al_2O_3.K_2O.SiO_2$

ⓒ $CaO.Al_2O_3.6SiO_2$

ⓓ $Na_2O.Al_2O_3.6SiO_2$

18. IUPAC name of $(CH_3)_3C–OH$ is?

ⓐ 2-methyl propanol-2

ⓑ tri methyl methanol

ⓒ 2, 2 di methyl ethanol

ⓓ tri methyl carbinol

19. Which is called carbolic acid?

ⓐ toluene ⓑ phenol

ⓒ ethanoic acid ⓓ ethyne

20. Which of the following is ring deactivating group?

ⓐ –OH

ⓑ –R

ⓒ –COOH

ⓓ $–NH_2$

21. ✪ Which type of coal has the most amount of calorie?

ⓐ Pit

ⓑ Lignite

ⓒ Anthrasite

ⓓ Bituminuous

22. $2Fe_2Cl_2+Cl_2 \rightarrow 2FeCl_3$ in this reaction—

i. Fe^{2+} acts as a reluctant

ii. Cl^- is a spectator ion

iii. 2 electrons are exchanged

Which of the following is true?

ⓐ i & ii ⓑ i & iii

ⓒ ii & iii ⓓ i, ii & iii

Answer 23 and 24 in light of the following :

$M_{(s)}/M^{2+}_{(aq)}||H^+/H_2,Pt;$ $E°_{Cell} = +0.76v$

$M_{(s)}/M^{2+}_{(aq)}||N^{2+}_{(aq)}/N_{(s)};$ $E°_{Cell} = +1.1v$

23. What is the value of E for N^{2+}/N?

ⓐ +2.86V ⓑ +1.1V

ⓒ –0.34V ⓓ +0.34V

24. ✪ According to the above stem—

i. NSO_4 solution cannot be kept in M made container

ii. With N/N^{2+}, Hydrogen electrode can be used as cathode

iii. In the reactivity series M is placed above Hydrogen and N is placed below Hydrogen

Which of the following is true?

ⓐ i & ii ⓑ i & iii

ⓒ ii & iii ⓓ i, ii & iii

25. ✪ How many isomers are there in C_2H_6O?

ⓐ 1 ⓑ 3

ⓒ 4 ⓓ 2

Ans.																									
	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	ⓓ		