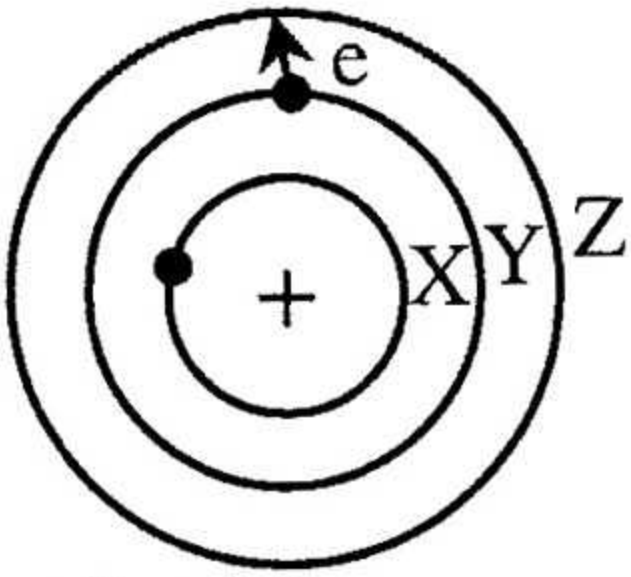
Dinajpur Board–2017

Chemistry First Paper Subject Code | 1 | 7 | 6 |

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. ▶



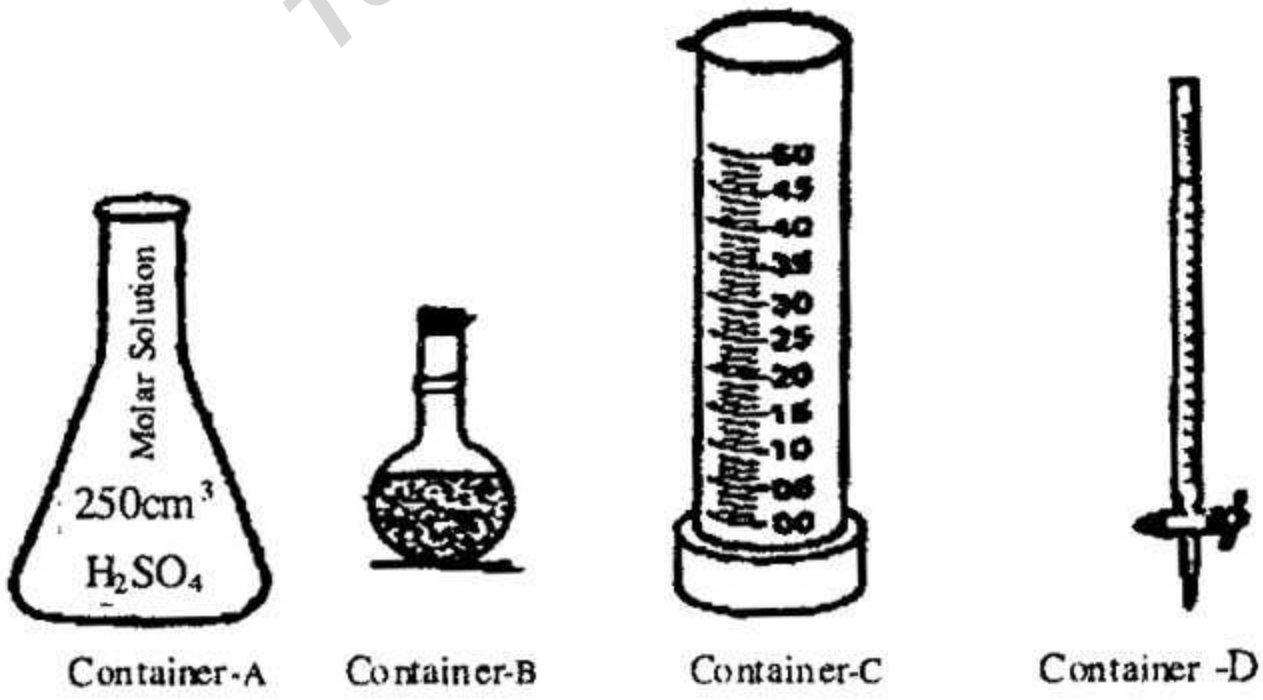
a. What is the Hund's rule? 1

b. Polarisation of cation by anion does not ocur. Why? 2

c. Calculate the absorbed radiation by the electron transition shown in the stem. 3

d. One electron of S orbital of Z energy shell and another electron of S orbital of Y energy shell are moving in the same direction. The two electrons obey the Pauli's exclusion principle — explain. 4

2. ▶



a. What is first aid box? 1

b. The value of neutralisation enthalpy of NaOH and HF is higher than the constant value. Why? 2

c. Calculate the mass of H_2SO_4 in container A. 3

d. Which of the glass-ware are esstntial for quantitative analysis? Analyse. 4

3. ✪ The atomic numbers of D, Q and R elements are 6, 7 and 8 respectively.

a. What are vander waals forces? 1

b. Between $CaCl_2$ and $AlCl_3$ salts, which one is more water-soluble? Why? 2

c. Hydrogen bonding is principally responsible for the physical states of DH_4 and H_2R — explain. 3

d. Analyse the reasons for the variation of shapes of three hydride molecules of the elements mentioned in the stem. 4

4. ▶

A	B	C
20 mL 0.1M H_2SO_4	6mL 0.025M NaOH	150mL 0.85M CH_3COOH $K_a = 1.85 \times 10^{-5}$

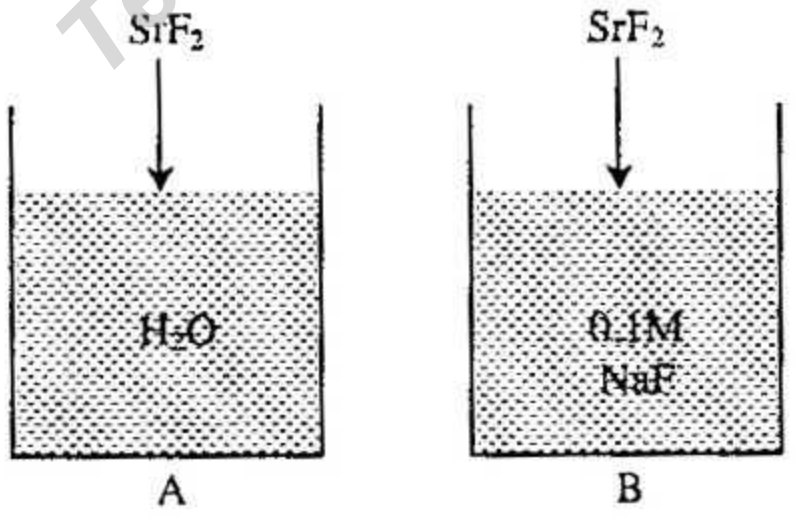
a. What is green chemistry? 1

b. How would you detect Al^{3+} ion in a solution? 2

c. Calculate the pH of (B + C) mixture. 3

d. Analyse the nature of the mixture (A + B). 4

5. ▶



The solubility product of SrF_2 in container A is 8×10^{-10}.

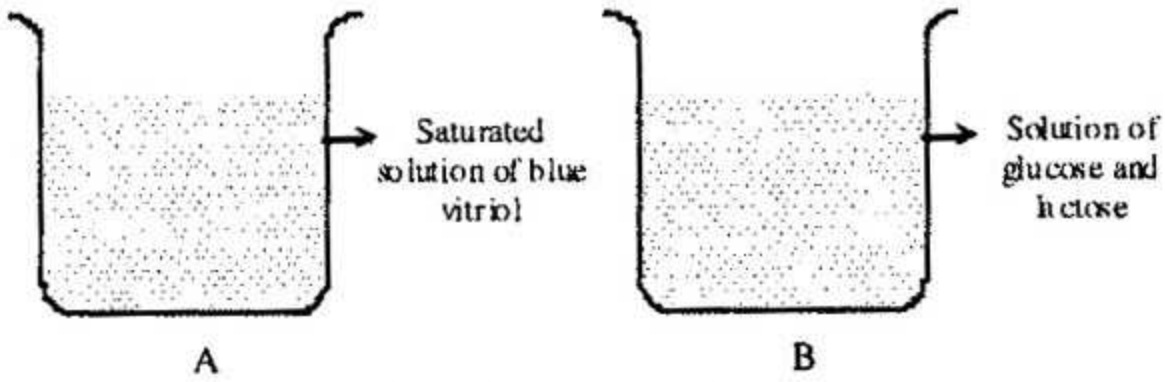
a. What is food security? 1

b. Which of the acids between $HClO_4$ and $HBrO_4$ is more acidic? Explain. 2

c. Determine the solubility of SrF_2 in container B. 3

d. Analyse the reasons for the variation of solubility of SrF_2 in container A and B. 4

6. ★

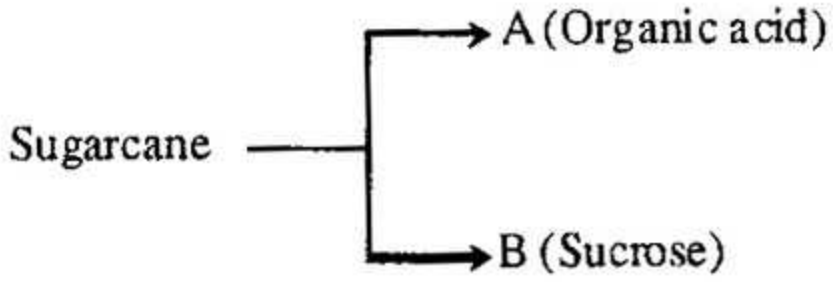


a. What is vacuum distillation? 1
b. What do you understand by solubility product? 2
c. Describe the method for the separation of solute from container-A. 3
d. Analyse the application of chromatographic method for the solution of container B. 4

7. ★

a. Write down the law of mass action. 1
b. The pH of pure water is 7.0. Why? 2
c. Calculate the pH of solution of container A (Ka = 1.8×10^{-4}) . 3
d. Will there be any change of pH when a small amount of HCl is added to the container C? Analyse with reasons. 4

8. ▶



a. What is orbital – hybridisation? 1
b. Why is the first ionisation potential of nitrogen higher than that of oxygen? 2
c. Describe with equations the preparation of A compound from compound B. 3
d. Which of the compounds between A and B is more suitable for fish preservation? Analyse. 4

Chemistry: First Paper

Subject Code | 1 | 7 | 6 |

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. What is the basicity of H_3PO_2?

ⓐ 1 ⓑ 2
ⓒ 3 ⓓ 4

2. What is MSDS?

ⓐ Material Safety Data Scale
ⓑ Material Safety Data Sheet
ⓒ Manual Service Data Sheet
ⓓ Manual Safety Data Scale

3. ✪ Minimum volume that can be measured by burette —

i. $0.1\ cm^3$
ii. $0.1 \times 10^{-3}\ dm^3$
iii. $0.1 \times 10^{-6}\ m^3$

Which one is correct?

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

4. 50 mL of 0.175 M HCOOH ($K_a = 1.8 \times 10^{-4}$) solution is added to 50 mL 0.09 M NaOH. What is the pH of the solution?

ⓐ 10.2305 ⓑ 5.9673
ⓒ 5.6957 ⓓ 3.7695

5. Unit of reaction rate —

ⓐ $mol\ L^{-1}s$ ⓑ $L\ mol^{-1}s^{-1}$
ⓒ $mol\ L^{-1}s^{-1}$ ⓓ $L^2\ mol^{-2}s^{-2}$

6. Used to prepare cleaning mixture —

i. $K_2Cr_2O_7$ ii. H_2SO_4
iii. H_2O

Which one is correct?

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

7. In semi micro analysis, H_2S is replaced by —

ⓐ NH_4CNS ⓑ Na_2S
ⓒ CH_3CSNH_2 ⓓ CH_3CSCI

8. ✪ Applicable to R_f value —

i. ratio of distances covered by solute & solvent
ii. ratio of distances covered by solvent and salute
iii. the value is less than 1

Which one is correct?

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

9. sp^3 hybridisation occurs in —

i. BF_3 ii. BH_4^-
iii. H_2O

Which one is correct?

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

10. Bohr's model is applicable to–

ⓐ H^+ ⓑ He^+
ⓒ Li^+ ⓓ Be^{2+}

11. Mixture of flour in water is called —

ⓐ solution ⓑ colloid
ⓒ coagulation
ⓓ suspension

12. The best chromatographic method for the separation of components for the mixture of amino acids and carbohydrates is —

ⓐ column ⓑ paper
ⓒ thin layer ⓓ gas

Give answers to question no. 13 and 14 acoording to stem:

Alkali is added to a salt solution. At first a white curly precipitate is formed which is soluble in excess alkali. On addition of $NH_4Cl(s)$ & heating, the precipitate reappears.

13. Which ion is identified by the stem's information?

ⓐ Al^{3+} ⓑ Zn^{2+}
ⓒ Ca^{2+} ⓓ Ba^{2+}

14. **Which is the correct set of quantum number for the outermost electron of the basic element according to stem?**

ⓐ $3, 0, 0, -\frac{1}{2}$ ⓑ $3, 2, -2, -\frac{1}{2}$

ⓒ $3, 1, -1, -\frac{1}{2}$ ⓓ $3, 2, -1, -\frac{1}{2}$

15. **Which is the correct order of unpaired electron numbers?**

ⓐ $Mn^{2+} > Fe^{2+} > Cr^{3+}$

ⓑ $Mn^{2+} > Cr^{3+} > Fe^{2+}$

ⓒ $Fe^{2+} > Cr^{3+} > Mn^{2+}$

ⓓ $Cr^{3+} > Mn^{2+} > Fe^{2+}$

16. **How many periods were there in Mendeleev's periodic table?**

ⓐ 5 ⓑ 7

ⓒ 9 ⓓ 12

17. **Types of bonds in the molecular structure copper sulphate —**

ⓐ 4 ⓑ 3

ⓒ 2 ⓓ 1

18. **What type of hybridisation occurs in Fe of XeF_2?**

ⓐ sp ⓑ sp^2d

ⓒ sp^3d^2 ⓓ sp^3d

19. **Which order is correct for ionisation potential?**

ⓐ $O < N < B < Be$

ⓑ $N < O < Be < B$

ⓒ $Be < B < O < N$

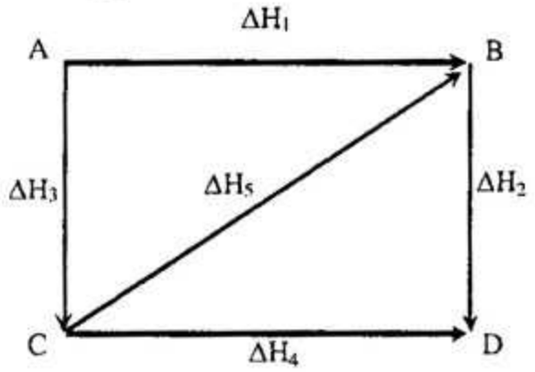
ⓓ $B < Be < O < N$

20. **Which of the following has the highest melting point and boiling point?**

ⓐ $CaCl_2$ ⓑ $FeCl_2$

ⓒ $CuCl_2$ ⓓ $ZnCl_2$

Answer to question no. 21 according to the stem:



21. **Applicable to the stem —**

i. $\Delta H_3 + \Delta H_4 = \Delta H_1 + \Delta H_2$

ii. $\Delta H_1 = \Delta H_3 + \Delta H_5$

iii. $\Delta H_4 = \Delta H_5 + \Delta H_2$

Which one is correct?

ⓐ i & ii ⓑ ii & iii

ⓒ i & iii ⓓ i, ii & iii

22. **The main component of vanishing cream —**

ⓐ caustic potash

ⓑ stearic acid

ⓒ olive oil ⓓ carbitol

23. **Which enzyme is used for the hydrolysis of sucrose to produce malt vinegar?**

ⓐ Diastase

ⓑ Zymase

ⓒ Maltase

ⓓ Invertase

24. **What is the pH of ethanoic acid ($K_a = 1.8 \times 10^{-5}$)?**

ⓐ 2.872 ⓑ 11.128

ⓒ 11.281 ⓓ 11.821

25. **Which of the aqueous solution of the following oxides has a pH greater than 7.0?**

ⓐ B_2O_3 ⓑ BeO

ⓒ P_2O_5 ⓓ Cl_2O_7

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	ⓑ		