All Board-2018

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. ▶ $CH_3COONa \xrightarrow[\Delta]{NaOH\ (CaO)}$ 'X' $\longrightarrow$ $\boxed{H_2}$

$\xrightarrow{N_2}$ 'Y' $\xrightarrow[ii.\ \Delta]{i.\ CO_2}$ 'Z',

a. What is r.m.s velocity? 1

b. Benzene is an aromatic compound — Explain. 2

c. Write the principle of the industrial production of 'Z' with equation. 3

d. Will there any effect on the environment by excess use of 'Z'? Give argument in favour of your answer. 4

2. ★ (i) $E°A^{2+}(aq)/A(s) = +0.20$ volt.

(ii) $E°B^{2+}(aq)/B(s) = -0.62$ volt

(iii) $E°X^{2+}(aq)/X(s) = -0.80$ volt

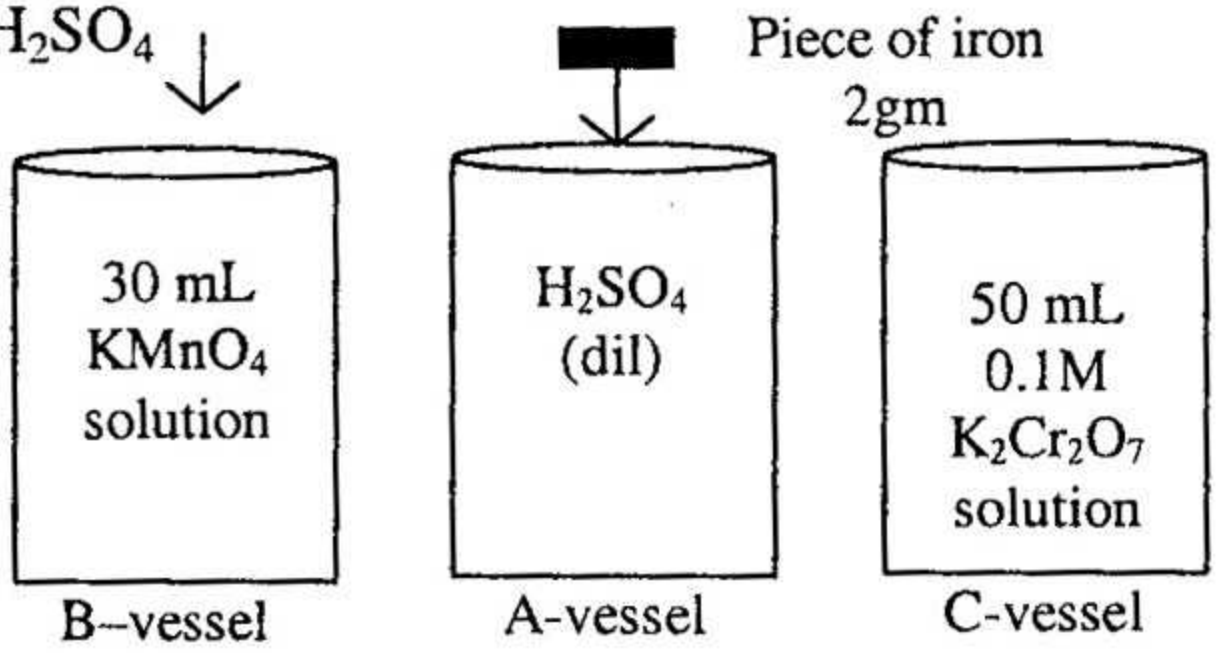
a. What is chiral carbon? 1

b. Why $KMnO_4$ is called secondary standard substance? 2

c. Determine the electromotive force of the cell consists of number (i) and (ii) half cells. 3

d. In which vessel made by the 'A' and 'X' metal, the solution of B^{2+} ion will be preserved? Give mathematical logic. 4

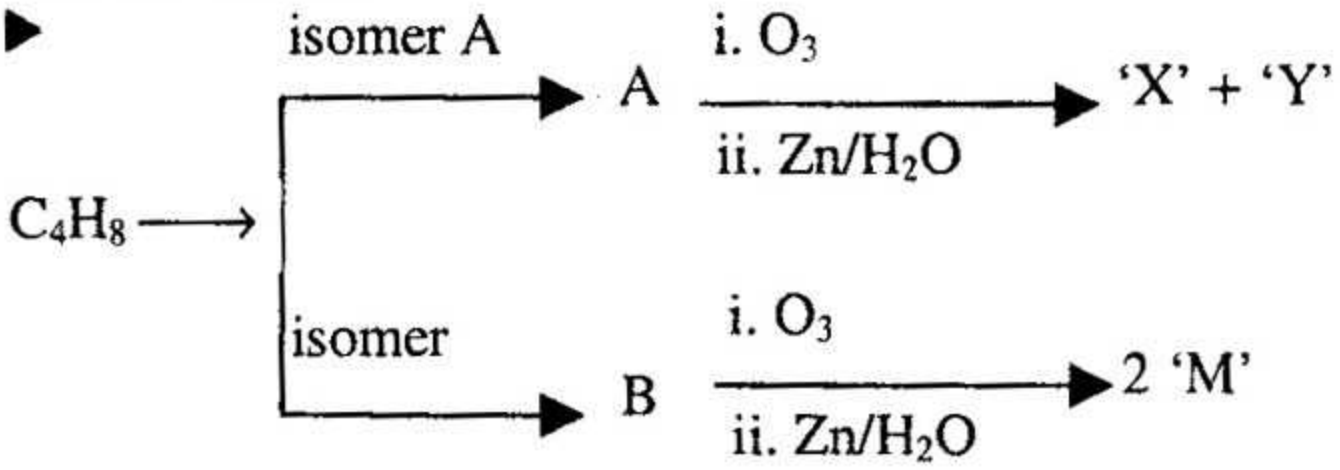
3. ▶



[The solution of A-Vessel is completely oxidized by the solution of C-vessel.]

a. What is conjugate acid? 1
b. Why ETP is used in industry? 2
c. Balance the Redox reaction by ion-electron method that occurred when H_2S is passed through the solution of B-vessel. 3
d. Analyze mathematically the purity of iron which added in the A-vessel. 4

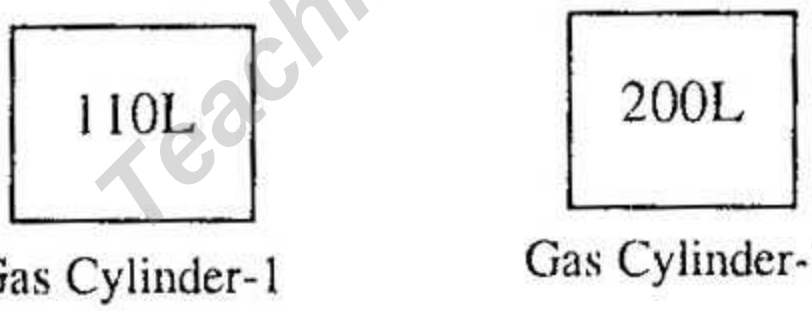
4. ▶



['X' forms white precipitate with Tollen's reagent but 'Y' does not form]

a. Write down the Beer-Lambert law. 1
b. Electrolysis is a Redox reaction — Explain. 2
c. 'M' is less reactive than 'X' in the nuclephilic addition reaction—Explain. 3
d. Analyze the possibility of exhibiting geometrical isomerism of 'A' and 'B'. 4

5. ▶



Gas Cylinder-1 Gas Cylinder-2

[Cylinder-1 can tolerate 200 atm pressure at 27°C and Cylinder-2 can tolerate 50 atm pressure at 37°C.]

a. Write Faraday's first law of electrolysis. 1
b. "Semimolar solution is a standard solution" — Explain. 2
c. How much gm CH_4 gas can be contained by cylinder-1 at temperature and pressure mentioned in the stem? 3
d. Which cylinder is more suitable for carrying gas? Analyze mathematically. 4

6. ★

Titration No.	Acid	Base
1	A (strong)	B (weak)
2	X (weak)	(diprotic strong base)

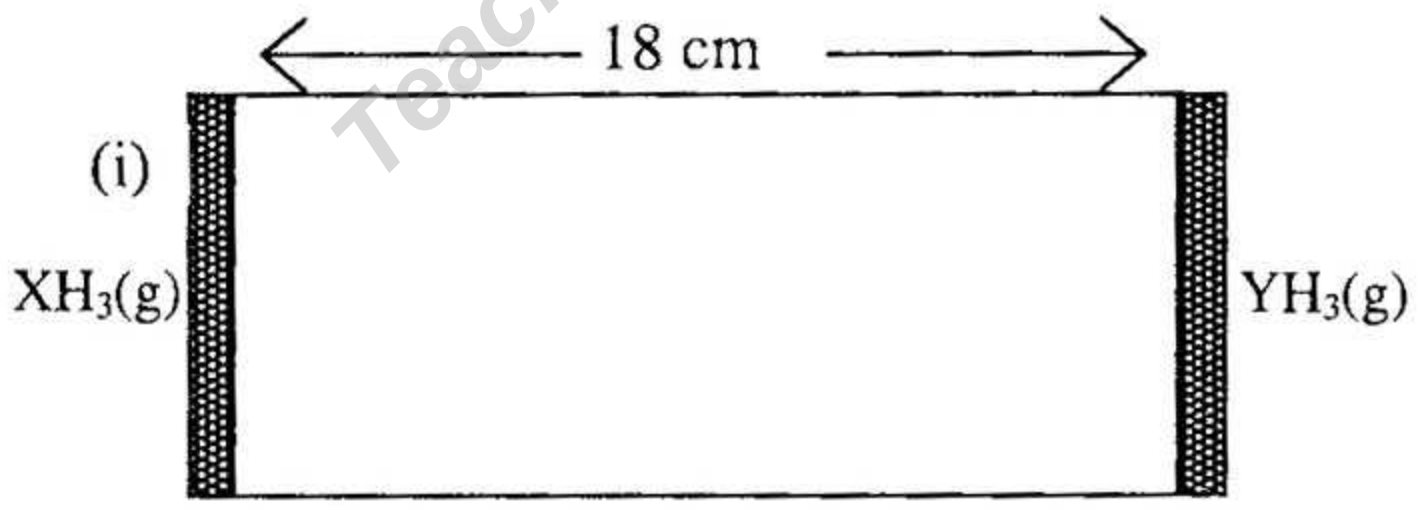
Indicator	pH range for color change
P	3.0–6.5
Q	6.6-9.2
R	8.3–10.0

a. What is carbocation? 1
b. Alkyne-1 is acidic— Explain. 2
c. Calculate the pH of 'Y' solution when the concentration is 0.05M. 3
d. Which indicator of the stem is suitable for titration-1? Give logic in favour of your answer. 4

7. ▶ (i) $(CH_3)_3CX$ + dilute base (aq) ⟶ 'A'
(ii) CH_3CH_2X + strong base (aq) ⟶ 'B'

a. What is Tautomerism? 1
b. 'Joule-Thomson Effect' is not effective for H_2 gas at room temperature — Why? 2
c. Write the difference between 'A' and 'B' compound with reaction. 3
d. Analyze whether the reaction mechanism of the reactions in the stem is same or not. 4

8.



(ii) XH_3 + monobasic acid → salt
[Atomic number of 'X' and 'Y' are 5 and 7 respectively.]

a. Write the structural formula of paracetamol. 1
b. Alcohol is soluble in water—Explain. 2
c. Calculate the distance at which two gases are mixed with each other. 3
d. By which concept, the compounds of the stem could be identified as an acid and base? Analyze. 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 one of the following compounds is more reactive in electrophilic addition reaction?**
   ⓐ Butene ⓑ Pentyne-1
   ⓒ Pentyne-2 ⓓ Butane

2. **Which one of the following values is the indicator of polluted water?**
   ⓐ PH value is within 6.4—7.4
   ⓑ Value of DO is 6mg/L
   ⓒ Value of BOD is 2mg/L
   ⓓ Value of COD is 100mg/L

3. ✪ **For the differentiation between Aldhyde and Ketone usable things are —**
   i. Tollen's reagent
   ii. IR-Spectra
   iii. 2,4-DNPH
   Which one is correct?
   ⓐ i ⓑ i and ii
   ⓒ i and iii ⓓ i, ii and iii

4. **5g Na_2CO_3 is dissolved in 100g solvent. How the concentration of the solution can be expressed?**
   ⓐ % (w/v) ⓑ % (v/w)
   ⓒ % (w/w) ⓓ % (v/v)

5. **If 0.1A current is passed through the M(III) Sulphate solution 1.0 g M is deposited on cathode. (Atomic mass of metal M = 40). How many time will be required to deposit 1.0 g metal M?**
   ⓐ 20 s ⓑ 1206 s
   ⓒ 24,125 s ⓓ 72,375 s

6. **In which cases electricity does not produce?**
   ⓐ Electrolytic cell
   ⓑ Lead-storage cell
   ⓒ Lithium-ion battery
   ⓓ Galvanic cell

Read the following stem and then answer the next two questions : —

$Zn(s) + FeSO_4(aq) \rightarrow ZnSO_4(aq) + Fe(s)$

$Zn(s)\ Zn^{2+}(aq) = +0.76\ V\ Fe(s)$

$Fe^{2+}(aq) = +0.44V$

7. **What is cell potential according to stem?**
   ⓐ − 0.42 V ⓑ − 1.20 V
   ⓒ + 0.42 V ⓓ + 1.20 V
   N.B. Correct answer is 0.32 Volt.

8. **The correct information for the reaction of the stem are —**
   i. zinc solution can be kept in iron pot
   ii. iron solution can be kept in zinc pot
   iii. the cell reaction will be spontaneous
   Which one is correct?
   ⓐ i ⓑ ii
   ⓒ i and iii ⓓ i, ii and iii

9. ✪ **What is the principle of oxidation-reduction titration if the number of moles of oxidant and reductant are respectively x and y, volumes are V_0 and V_R and the concentra-tions are M_0 and M_R?**
   ⓐ $x\ V_0\ M_R = yV_RM_0$
   ⓑ $y\ V_0\ M_0 = xV_RM_R$
   ⓒ $x\ V_0\ M_0 = yV_RM_R$
   ⓓ $yV_0M_R = xV_RM_0$

10. **The atoms present in heterocyclic compounds are —**
    i. Carbon
    ii. Sulphur
    iii. Oxygen
    Which one is correct?
    ⓐ i and ii ⓑ i and iii
    ⓒ ii and iii ⓓ i, ii and iii

11. **Which one is reduced in lead-storage cell?**
    ⓐ Pb ⓑ PbO
    ⓒ $PbSO_4$ ⓓ PbO_2

12. **Which one of the following reagents is used to detect phenolic – OH?**
    ⓐ Feric chloride
    ⓑ Metalic sodium
    ⓒ Lucas-reagent
    ⓓ Sodium bicarbonate

13. **Which one of the following processes is applied to decrease the carbon-chain?**
ⓐ Wurtz reaction
ⓑ Decarboxylation reaction
ⓒ Wurtz-Fitting reaction
ⓓ Carbylamine reaction

14. ✪ **Which one of the following is the formula of China-clay?**
ⓐ $3Al_2O_3.\ 2SiO_2$
ⓑ $Na_2O.Al_2O_3.6SiO_2$
ⓒ $CaO.Al_2O_3.\ 6SiO_2$
ⓓ $Al_2O_3.\ 2SiO_2.2H_2O$

15. **In which cases volume changes with temperature?**
ⓐ Boyle's law
ⓑ Charles's law
ⓒ Dalton's law of partial pressure
ⓓ Graham's diffusion law

16. **What is the mass of one Nitrogen molecules?**
ⓐ 2.32×10^{-16} kg
ⓑ 2.32×10^{-23} kg
ⓒ 4.65×10^{-26} kg
ⓓ 4.65×10^{-23} kg

17. **(i) $HCl + HCO_3^- = H_2CO_3 + Cl^-$**
(ii) $HCO_3^- + H_2O = H_3O^+ + CO_3^{2-}$
Which one of the following is amphoteric substance according to stem?
ⓐ HCl ⓑ H_2O
ⓒ HCO_3^- ⓓ CO_3^{2-}

18. **Which one of the following is Lewis acid?**
ⓐ NH_3 ⓑ $AlCl_3$
ⓒ H_2O ⓓ C_2H_4

19. **Which one of the following compounds contain 'nitrile' functional group?**
ⓐ CH_3NH_2 ⓑ CCl_3NO_2
ⓒ CH_3CN ⓓ NH_4CNO

20. **Which one of the following acts as an indicator to determine the amount of iron (II) ion by the standard $KMnO_4$ solution?**
ⓐ Potassium per-manganate
ⓑ Methyl orange
ⓒ Phenolphthalein
ⓓ Iron (II) solution

21. **Which one of the followings is the Arjelesius substance?**
ⓐ Lime-stone ⓑ Lime
ⓒ Gypsum ⓓ Alumina

22. **What will be the mass of KOH in 0.025 M KOH solution?**
ⓐ 1.0g
ⓑ 1.4 g
ⓒ 10.0 g
ⓓ 14.0 g

23. **Which one of the followings cannot be removed by FGD plant?**
ⓐ SO_x ⓑ NO_x
ⓒ CO_2 ⓓ CO

Read the following stem and them answer the next two questions : —

$CH_3 - CH_2 - CH_2 - CH\ (Br) - CH_3 + KOH\ (alc) \rightarrow \boxed{A} + H_2O + KBr.$

24. ✪ **Compound 'A' related to the stem—**
i. shows geometrical isomerism
ii. obeys Marconikov's rule
iii. decolourises the bromine solution
Which one is correct?
ⓐ i and ii ⓑ i and iii
ⓒ ii and iii ⓓ i, ii and iii

25. ✪ **The reaction mentioned in the stem is of which type?**
ⓐ Electrophilic addition reaction
ⓑ Unimolecular nucleophilic substitution reaction
ⓒ Bi-molecular nucleophilic substitution reaction
ⓓ Elimination reaction

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	ⓓ		

7. N.B. The correct answer will be 0.32 V.