Series.	K I	R II	M III	**G IV**

Summer fields

Code No.-1/1/1

Roll No.									

Candidate must write the Code No. on the title page of the answer book.

- Please check that this question paper contains 3 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 26 questions.
- Please write down the Serial Number of the question before attempting it.

FIRST TERM EXAMINATION 2016-17
SUBJECT CODE- 043

Time allowed: 3Hours **Maximum Marks: 70**

General Instructions:

1. All the questions are compulsory.
2. Question numbers 1 to 5 are very short answer questions and carry 1 mark each.
3. Question numbers 6 to 10 are short answer questions and carry 2 marks each.
4. Question numbers 11 to 22 are also short answer questions and carry 3 marks each.
5. Question number 23 is a value based question carrying 4 marks.
6. Question numbers 24 to 26 are long answer questions and carry 5 marks each.
7. Use log tables if necessary, use of calculators is not allowed.

Q1. Conductivity of silicon increases on doping with phosphorus. Why?

Q2.Why are medicines more effective in colloidal form?

Q3. Name the type of cell which was used in Apollo space programme for providing electrical power. What is the advantage of this cell over ordinary cells?

Q4. Give the IUPAC name of $CH_3CH(OH)CHO$

Q5.Which has the highest freezing point?

(i)1 M glucose (ii) 1 M NaCl (iii) 1 M $CaCl_2$ (iv) 1 M AlF_3

Q6. A first order reaction takes 100 minutes for completion of 60% of the reaction. Find the time when 90% of the reaction will be completed.

Q7. The boiling point of benzene is 353.23 K. When 1.80 g of non volatile solute was dissolved in 90 g of benzene, the boiling point raised to 354.11 K. Calculate the molar mass of the solute. (K_b for benzene is 2.53 K kg/mol)

Q8. Give a chemical test to distinguish between primary, secondary and tertiary amines? (equations also)

Q9(i)What type of stoichiometric defect is shown by KCl and why?

(ii)What are amorphous solids? Give an example.

(iii)What type of substances would make better permanent magnets, ferromagnetic or ferrimagnetic? Why?

Q10.Explain the following terms giving a suitable example for each (any 2):

(i)Elastomers (ii) Condensation polymers (iii) Homopolymers

Q11.At 298 K the saturated vapour pressure of water is 3.165 kPa. Find the saturated vapour pressure of 5% aqueous solution of urea at the same temperature. (Molar mass of urea = 60g/mol)

Q12.(i) How will you convert benzoyl chloride to benzaldehyde in a single step? What is the name given to this reaction?

(ii)Complete the reaction:

$CH_3CH{=}CHCH_2CH_2CN \xrightarrow{\text{(i) } AlH(iBu)_2 \text{ (ii) } H_2O}$

Q13. Arrange the following in increasing order of their basic strength:

(i) $C_2H_5NH_2$, $C_6H_5NH_2$, NH_3, $C_6H_5CH_2NH_2$ and $(C_2H_5)_2NH$

(ii) $C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$, $C_6H_5NH_2$

(iii) CH_3NH_2, $(CH_3)_2NH$, $(CH_3)_3N$, $C_6H_5NH_2$, $C_6H_5CH_2NH_2$.

Q14.(i)In reference to Freundlich adsorption isotherm, write the expression for adsorption of gases on solids in the form of an equation.

(ii)Write an important characteristic of lyophilic sols.

(iii)Based on type of particles of dispersed phase, give one example each of associated colloid and multimolecular colloid.

Q15.Give the mechanism of acid catalyzed hydration of alkenes.

Q16. The activation energy of a reaction is 75.24 kJ/mol in absence of a catalyst and 50.14 kJ/mol with a catalyst. How many times will the rate of reaction increase in the presence of the catalyst if the reaction proceeds at 298K?

Q17. How will you convert: (any 3)

(i) Ethanoic acid into methanamine

(ii) Hexanenitrile into 1-aminopentane

(iii) Methanol to ethanoic acid

(iv) Ethanamine into methanamine

Q18. The density of copper is 8.95 g/cm^3. It has fcc structure. What is the radius of copper atom? (Atomic mass of Cu = 63.5 g/mol, $N_A = 6.02 \times 10^{23}\ mol^{-1}$)

Q19.Answer the following:

(i)Why aryl halides cannot be prepared by reaction of phenol with HCl in presence of anhy $ZnCl_2$?

(ii)What is a racemic mixture?

(iii)Of the two bromoderivatives $C_6H_5CH(CH_3)Br$ and $(C_6H_5)_2CHBr$ which one is more reactive in S_N^1 substitution reaction and why?

Q20.Write the name and structure of the monomers of the following polymers:

(i)Nylon 6 (ii)Novalac (iii)Buna N

Q21.Give reasons for the following observations:

(i)Physisorption decreases with increase in temperature

(ii)Addition of alum purifies water

(iii)Brownian motion provides stability to the colloidal solution

Q22.Calculate the cell potential E at 298 K for the cell

Fe/Fe^{2+} (0.001 M) // H^+ (0.01 M) / H_2 (g) (1 bar)/Pt(s) (Given $E^\circ(Fe^{2+}/Fe) = -0.44$ V)

Q23.Salman owns a refrigeration plants. He ordered a ban on use of freons for refrigeration purposes. This decision of his was applauded by the government.

(i)What are freons?

(ii)Why did Salman order a ban on use of freons in refrigerants?

(iii)State any two values exhibited by Salman.

Q24. (i) Write the reactions of Williamson synthesis of 2-ethoxy-3-methylpentane starting from ethanol and 3-methylpentan-2-ol.

(ii) Predict the products of the following reactions:

(a) $CH_3-CH_2-CH_2-O-CH_3+HBr \longrightarrow$

(b) $(CH_3)_3OC_2H_5 + HI \longrightarrow$

(iii) Give two reactions that show the acidic nature of phenol. Compare acidity of phenol with that of ethanol.

OR

(i)Write the product of reaction of phenol with bromine water.

(ii) Predict the products of the following reactions:

(a) $C_6H_5-CH_2-O-C_6H_5 + HI \longrightarrow$

(b) $HO-CH_2-CH_2(CH_3)_2CH_3 + SOCl_2 \longrightarrow$

(iii) Explain using resonance structures, how does the –OH group attached to a carbon of benzene ring activate it towards electrophilic substitution? Also explain the directive influence of phenol.

Q25. .(i) Calculate ΔG° for the reaction :

$$Mg(s) + Cu^{2+}(aq) \longrightarrow Mg^{2+}(aq) + Cu(s)$$

Given $E^\circ cell = 2.71V$, $1\ F = 96500\ C/mol$

(ii)Resistance of a conductivity cell filled with 0.1 mol/L KCl solution is 100 Ω. If the resistance of the same cell when filled with 0.02 mol/L KCl solution is 520 Ω, calculate the conductivity and molar conductivity of 0.02 mol/L KCl solution. The conductivity of 0.1 mol/L KCl solution is $1.29 \times 10^{-2}\ \Omega^{-1}cm^{-1}$.

OR

(i)State Faraday's first law of electrolysis. How much charge in Coloumb is required for reduction of Cu^{2+} to Cu?

(ii) State Kohlrausch law. Calculate the molar conductivity at infinite dilution for acetic acid. Given that the molar conductivities at infinite dilution for HCl, NaCl and CH_3COONa are 426, 126 and 91 Scm^2mol^{-1} respectively.

Q26.(i) Would you expect benzaldehyde to be more reactive or less reactive towards nucleophilic addition reactions than propanal? Explain your answer.

(ii) Write chemical reactions to affect the following transformations:

(a) Butan-1-ol to butanoic acid

(b) Benzyl alcohol to phenylethanoic acid

(iii)Write the aldol condensation reaction between ethanal and propanal giving IUPAC names of all products formed.

OR

An organic compound (A) with molecular formula C_8H_8O forms an orange-red precipitate with 2,4-DNP reagent and gives yellow precipitate on heating with iodine in the presence of sodium hydroxide. It neither reduces Tollens' or Fehlings' reagent, nor does it decolourise bromine water or Baeyer's reagent. On drastic oxidation with chromic acid, it gives a carboxylic acid (B) havin molecular formula $C_7H_6O_2$. Identify the compounds (A) and (B) and explain the reactions involved