

9.30 - 12.30

18/11/19

Q.P. Code - 42334

**Third Semester B.Sc. Degree Examination,
October/November 2019**

(CBCS Scheme)

Paper III - CHEMISTRY

Time : 3 Hours]

[Max. Marks : 90

Instructions to Candidates :

- 1) The question paper has Two Parts, Part A and Part B
- 2) Both the Parts should be answered
- 3) Write chemical equations wherever necessary.

PART - A

- I. Answer any **TEN** of the following questions. Each question carries **2** marks : **(10 × 2 = 20)**
1. Maximum of how many phases can co-exist at equilibrium in a one component system and why?
 2. State Nernst distribution law. Write any one application of it.
 3. What is abnormal transport number?
 4. Define specific conductance. How does it vary with dilution?
 5. What are reversible cells?
 6. What is Perkin's reaction?
 7. State Blanc's rule.
 8. Write the structures of Lactic acid and Citric acid.
 9. How are nitroalkanes prepared from alkyl halides?
 10. How do you convert benzene diazonium chloride to benzonitrile?
 11. Convert acetamide into methyl amine.
 12. Synthesis furan from furfural.

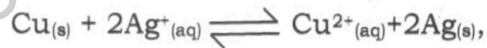
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PART – B

II. Answer any **SEVEN** of the following questions. Each question carries **10** marks :
(7 × 10 = 70)

13. (a) What are partially miscible liquid mixtures? Explain the variation of mutual solubility of phenol and water with temperature with the help of a graph.
(b) Write a note on azeotropes.
(c) Write the principle of steam distillation. What are its advantages?
(4 + 3 + 3)
14. (a) Draw the phase diagram of sulphur system and explain the curves and triple points in it.
(b) Describe the distillation of a binary mixture which shows a minimum in boiling point curves.
(c) Write the phase rule equation for two component systems. How does it differ from one component system?
(4 + 3 + 3)
15. (a) (i) Define phase and degrees of freedom.
(ii) Write Clausius – Clapeyron equation and what is its importance in phase equilibria?
(b) Define the terms eutectic temperature and eutectic composition by taking Ag – Pb system as an example.
(c) Explain the conductometric titration of a strong acid versus a weak base.
(4 + 3 + 3)
16. (a) How is transport number determined by Moving Boundary method?
(b) State Kohlrausch's Law of ionic conductances. Calculate the molar conductance of acetic acid at infinite dilution at 298 K given,
 $\lambda_{\infty}(\text{HCl}) = 42.6 \times 10^{-3} \Omega^{-1} \text{m}^2 \text{mol}^{-1}$
 $\lambda_{\infty}(\text{CH}_3\text{COONa}) = 9.1 \times 10^{-3} \Omega^{-1} \text{m}^2 \text{mol}^{-1}$
 $\lambda_{\infty}(\text{NaCl}) = 12.65 \times 10^{-3} \Omega^{-1} \text{m}^2 \text{mol}^{-1}$.
(c) Write a note on
(i) asymmetric effect
(ii) electrophoretic effect
(4 + 3 + 3)

17. (a) Calculate the equilibrium constant for the reaction

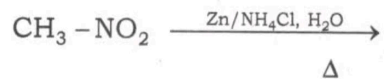


given that $E^{\circ}_{\text{Ag}^+/\text{Ag}} = 0.80\text{V}$ and $E^{\circ}_{\text{Cu}^{2+}/\text{Cu}} = 0.34\text{V}$

- (b) (i) What is electrochemical series?
(ii) What are concentration cells and mention different types of concentration cells?
- (c) Describe the construction and working of glass electrode. **(4 + 3 + 3)**
18. (a) Explain the mechanism of Cannizzaro's reaction.
(b) How does acetaldehyde react with the following?
(i) NaHSO_3
(ii) Hydroxylamine.
(c) Write the general reactions for the preparation of Ketones from
(i) Nitriles
(ii) Grignard reagents. **(4 + 3 + 3)**
19. (a) Discuss the effect of substituents on the acidity of aromatic carboxylic acids.
(b) Write the preparation of acid chlorides and acid anhydrides from carboxylic acids.
(c) Write the reactions for
(i) Alkaline hydrolysis of an ester.
(ii) Action of heat on oxalic acid. **(4 + 3 + 3)**
20. (a) Write the reactions of methyl amine and aniline with nitrous acid.
(b) What is coupling reaction? Give an example.
(c) How do you distinguish primary, secondary and tertiary amines by Hofmann's method? **(4 + 3 + 3)**

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21. (a) Complete the following reactions :



(b) Write any one method of preparation of diazomethane and any one synthetic application of diazomethane.

(c) Aromatic amines are weaker bases than aliphatic amines. Explain.

(4 + 3 + 3)

22. (a) How do thiophene and indole undergo nitration? Discuss.

(b) Discuss the aromaticity of Pyrrole.

(c) How is quinoline synthesized by Skraup method?

(4 + 3 + 3)

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Third Semester B.Sc. Degree Examination, October/November 2019

(Non-CBCS -Semester Scheme)

Paper III — CHEMISTRY

Time : 3 Hours]

[Max. Marks : 60

Instructions to Candidates :

- 1) The question paper has Two Parts. Both the Parts should be answered
- 2) Equations and structures are to be given wherever necessary.

PART – A

Answer any **SIX** of the following questions. Each question carries **2** marks : **(6 × 2 = 12)**

1. What is Joule-Thomson effect?
2. Distinguish between addition and condensation polymerization.
3. Describe vapour phase refining with a suitable example.
4. Write a note on aluminothermite process.
5. Name an important ore of nickel and give its composition.
6. What is esterification? Explain with equation.
7. Carboxylic acids are more acidic than phenols. Explain.
8. Define chemical potential.
9. State first law of thermodynamics and write its mathematical form.
10. Write Arrhenius equation and explain the terms.

PART – B

Answer any **EIGHT** of the following questions. Each question carries **6** marks : **(8 × 6 = 48)**

11. (a) Describe Linde's process for the liquefaction of air.
(b) Calculate the most probable velocity of CO₂ molecule at STP. **(4 + 2)**

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12. (a) Give four differences between thermosetting plastics and thermoplastics.
- (b) Define the terms
- (i) Critical temperature and
- (ii) Critical pressure. (4 + 2)
13. (a) Describe the determination of molecular weight of a polymer by intrinsic viscosity method.
- (b) What is vulcanization of rubber? Why is it necessary? (4 + 2)
14. (a) How do you account for
- (i) the colour of transition metal ions and
- (ii) variable oxidation states of 'd' block elements.
- (b) What are f-block elements? Give their general outer electronic configuration. (4 + 2)
15. (a) Discuss the cause and consequences of lanthanide contraction.
- (b) Explain Mond's process for the purification of nickel. (4 + 2)
16. (a) Describe the extraction of chromium from chromite.
- (b) What is Ellingham's diagram? Mention one application of it. (4 + 2)
17. (a) How will you prepare
- (i) ethanol from acetyl chloride and
- (ii) nitroglycerine from glycerol.
- (b) What happens when thioalcohols are treated with metallic sodium? Give an example. (4 + 2)
18. (a) Explain the mechanism of Kolbe's reaction.
- (b) Give any two uses of glycol. (4 + 2)
19. (a) (i) How do you obtain ethylene epoxide from ethane?
- (ii) Give the preparation of aldehydes from Grignard reagents.
- (b) What is Williamson's ether synthesis? Give an example. (4 + 2)

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20. (a) Derive Van't Hoff's reaction isotherm.
- (b) What is a spontaneous process? What is the criteria for spontaneity in terms of free energy? **(4 + 2)**
21. (a) Derive an expression for the rate constant of a second order reaction where $a = b$.
- (b) Standard free energy of a reaction at 310 K is 13.30 kJ. Calculate the equilibrium constant. **(4 + 2)**
22. (a) The rate constant of a I order reaction was found to be $1.4 \times 10^{-4} \text{ s}^{-1}$ at 308 K and $5.0 \times 10^{-4} \text{ s}^{-1}$ at 318 K. Calculate the activation energy for this reaction.
- (b) Describe Ostwald's isolation method of determining the order of a reaction. **(4 + 2)**
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III Semester B.Sc. Examination, November/December 2015
(Semester Scheme)
Paper – III : CHEMISTRY

Time : 3 Hours

Max. Marks : 60

- Instructions :** 1) The question paper has **two** Parts. Both the Parts should be answered.
2) Diagrams, equations and structures are to be given **wherever** necessary.

PART – A

Answer **any six** of the following. **Each** question carries **2** marks. (6×2 = 12)

1. i) Write the graphical representation of the distribution of molecular velocities of a gas at given temperature.
ii) What is the effect of temperature on the distribution of molecular velocities of a gas ?
2. What is condensation polymerization ? Give an example.
3. Explain the magnetic property of Ti^{4+} and Ti^{2+} ions with reasoning.
4. Which of the elements in 3d series exhibits maximum number of oxidation states ? Why ?
5. Write a note on purification of metals by zone refining method.
6. What are mercaptans ? Write their uses.
7. What is the action of periodic acid on vicinal glycols ? Write the equation.
8. Can we synthesize unsymmetrical ethers by dehydration of alcohols ? Justify your answer.
9. What is a spontaneous process ? Give an example.
10. Derive an expression for half life period of a second order reaction.

P.T.O.



PART - B

Answer **any eight** of the following. **Each** question carries **6** marks.

(8×6 = 48)

11. a) Explain briefly Linde's process of liquefaction of air.
- b) Calculate the most probable velocity of helium at 300 K.
($R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$). (4+2)
12. a) How do you determine the molecular weight of a polymer by intrinsic viscosity method?
- b) What is inversion temperature? How is it related to vander Waal's constants? (4+2)
13. a) How are the following prepared?
- i) Nylon - 6,6
- ii) Neoprene.
- b) Write the differences between thermosoftening and thermosetting polymers. (4+2)
14. a) Explain the following:
- i) Effect of Lanthanide contraction on atomic radii of 4d and 5d series of elements.
- ii) Formation of interstitial compounds by d-block elements.
- b) Name the d-block elements which are not considered as transition elements. Give the reason for the same. (4+2)
15. a) What are Ellingham's diagrams? Explain the use of Ellingham's diagrams in the reduction of ZnO and Cr_2O_3 .
- b) Write the general outer electronic configuration of d and f block elements. (4+2)
16. a) How is uranium extracted from pitchblende?
- b) Describe Mond's process of refining of nickel. (4+2)



17. a) With suitable examples, explain the two ways of classification of alcohols.
b) How are alcohols prepared from aldehydes? Write the general equation. (4+2)
18. a) Deduce Gibbs-Helmholtz equation.
b) What is the criteria for spontaneity and equilibrium of reactions in terms of free energy? (4+2)
19. a) Derive van't Hoff reaction isotherm.
b) Give any two statements of II Law of thermodynamics. (4+2)
20. a) Rate constant of a first order reaction is 0.0051 min^{-1} . If the reaction begins with 0.20 M concentration of the reactant, calculate (i) the concentration of the reactant that remains in the solution after 2 hours and (ii) $t_{1/2}$ of the reaction.
b) Write the differences between order and molecularity of a reaction. (4+2)
21. a) Derive an expression for the rate constant of a second order reaction, when $a = b$.
b) Write a note on auto oxidation of ethers. (4+2)
22. a) Write the mechanism of the reaction between phenol and chloroform in alkaline medium.
b) i) Write the general formula of Grignard reagents.
ii) Write the equation for the complete reaction between methyl magnesium iodide and formaldehyde. (3+3)
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Third Semester B.Sc. Degree Examination, November 2017

(CBCS Scheme)

Chemistry

Paper III – CHEMISTRY

Time : 3 Hours]

[Max. Marks : 90

Instructions to Candidates :

- 1) The question paper has two Parts, Part A and Part B.
- 2) Both the parts should be answered.

PART – A

Answer any **TEN** of the following questions. Each question carries **2** marks.

(10 × 2 = 20)

1. Write any two characteristics of ideal solutions.
2. What is condensed phase rule? Give its equation.
3. The conductance of an electrolyte solution was found to be 4.76 mS at 25°C. Calculate molar conductance of the solution at 25°C. Given cell constant = 88.0 m⁻¹.
4. Write any two advantages of conductometric titrations over volumetric titrations.
5. The EMF of Daniel cell is 1.10 V at 298 K. Calculate the free energy change for the cell reaction.
6. What are the limitations of glass electrode?
7. How do you prepare acetone from acetonitrile?
8. What happens when aldehyde is treated with Fehling's solution?
9. Among mono-chloro acetic acid and di-chloro acetic acid, which is more acidic and why?
10. How do you prepare nitro methane from (a) CH₃ Cl (b) CH₃ – NH₂?
11. What is carbylamine reaction?
12. Give equations for the conversion of Acetylene to (a) Thiophene (b) Pyrrole.

PART - B

Answer any **SEVEN** of the following questions. Each question carries **10** marks.
(7 × 10 = 70)

13. (a) Discuss the principle and procedure of steam distillation.
(b) Sketch and explain the boiling point composition curve of non-ideal solutions with negative deviation from Raoult's law.
(c) The distribution coefficient (K_D) of iodine between water and CCl_4 is $1/85$. Calculate the volume of CCl_4 required for 95% extraction of iodine from 100 ml of aqueous solution in a single stage extraction. **(4 + 3 + 3)**
14. (a) Construct and explain in detail the phase diagram of water system.
(b) Define (i) Phase (ii) Degrees of freedom.
(c) Vapour pressures of water at 95°C and 100°C are 634 mm and 760 mm respectively. Calculate the molar heat of vaporization of water. **(4 + 3 + 3)**
15. (a) Describe in detail the determination of ionic product of water by Kohlrausch's method.
(b) How does the specific and equivalent conductances of an electrolytic solution vary with dilution? Explain.
(c) Why do H^+ and OH^- ions have abnormally high ionic mobilities in aqueous solutions? Explain. **(4 + 3 + 3)**
16. (a) How do you prepare acetaldehyde from (i) Rosenmund's reaction (ii) Grignard reagent?
(b) Explain the reaction of acetone with (i) $\text{Ph NH}_2 \text{NH}_2$ (ii) Na HSO_3 .
(c) What is Wolf - Kishner reduction and give its importance in organic synthesis? **(4 + 3 + 3)**
17. (a) Giving equations, explain how do you convert acetic acid into (i) Ethyl acetate (ii) Acetamide.
(b) Discuss the reaction of tartaric acid with Fenton reagent.
(c) Discuss transesterification and ammonolysis of esters. **(4 + 3 + 3)**

18. (a) How do you convert Benzene diazonium chloride to (i) chlorobenzene (ii) P-hydroxy azobenzene?
- (b) Among methyl amine and aniline, which is more basic and why?
- (c) Explain how CH_2N_2 can be converted into (i) Methyl Ketone (ii) Methyl Ester. **(4 + 3 + 3)**
19. (a) Describe the principle and procedure for the determination of pH of a solution using standard hydrogen electrode.
- (b) Explain Fisher Indole Synthesis.
- (c) Write a note on Hofmann's Bromamide reaction. **(4 + 3 + 3)**
20. (a) State Nernst distribution law and mention any two applications.
- (b) Explain Reformatsky reaction with example.
- (c) How do you prepare cyclo propane from diazo compounds? **(4 + 3 + 3)**
21. (a) Discuss potentiometric titration of redox reaction.
- (b) Describe Pattison's process for the desilverisation of argento ferrous lead.
- (c) Compare the basicity of pyridine and pyrrole. **(4 + 3 + 3)**
22. (a) How Quinhydrone electrode is used to determine the pH of a solution?
- (b) Discuss Gabriel phthalimide synthesis.
- (c) Calculate the reduction potential of Zinc electrode when it is dipped in a solution of Zn SO_4 of 0.05 M at 298 K. Given standard reduction potential of Zinc is -0.76 V . **(4 + 3 + 3)**

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Third Semester B.Sc. Degree Examination, November 2017

(Semester Scheme)

Chemistry

Paper III – CHEMISTRY

Time : 3 Hours]

[Max. Marks : 60

Instructions to Candidates :

- 1) *The question paper has two Parts.*
- 2) *Both the parts should be answered.*
- 3) *Diagrams and equations are to be written wherever necessary.*

PART – A

Answer any **SIX** of the following questions. Each question carries **2** marks.

(6 × 2 = 12)

1. Define Inversion Temperature.
2. How C_{rms} , C_{av} and C_{mp} of a gas related?
3. Mention any two differences between organic and inorganic polymers.
4. Write any two consequences of Lanthanide contraction.
5. Mention the usefulness of Ellingham's diagram.
6. What are d – d transitions?
7. Write the possible isomers of an alcohol with molecular formula $C_4H_{10}O$ and name them.
8. Why phenols are acidic compared to alcohols?
9. Define activation energy.
10. State the third law of thermodynamics.

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PART – B

Answer any **EIGHT** of the following questions. Each question carries **6** marks.

(8 × 6 = 48)

11. (a) Derive an expression for most probable velocity of gaseous molecules from Maxwell distribution law.
- (b) Mention any two applications for each.
- (i) Polyurathanes
- (ii) Silicones **(4 + 2)**
12. (a) Explain how molecular weight of polymers is determined by viscosity method.
- (b) What are conducting polymers? Give an example. **(4 + 2)**
13. (a) How are the following polymers prepared?
- (i) Nylon 6, 6
- (ii) P.V.C.
- (b) Mention why $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ is coloured. **(4 + 2)**
14. (a) Discuss the magnetic properties of *d* and *f*- block elements.
- (b) What is electrolytic refining? Give an example. **(4 + 2)**
15. (a) Explain how Nickel is extracted from its sulfide ore.
- (b) What is Mac-Arthur Cyanide Process? Give its equation. **(4 + 2)**
16. (a) How Plutonium is extracted from spent nuclear fuel?
- (b) Why *f*- block elements do not form complexes? **(4 + 2)**
17. (a) How do you convert alcohols into (i) Esters (ii) Alkoxides? Explain the reactions involved?
- (b) What is Williamson's ether synthesis? **(4 + 2)**

18. (a) How do you distinguish between primary, secondary and tertiary alcohols?
(b) Give any two methods of preparation of Thiols. **(4 + 2)**
19. (a) What is a spontaneous process? Write the criteria for spontaneous process in terms of free energy.
(b) Calculate the decay constant of a radio active nuclide whose half-life period is 24.66 years. **(4 + 2)**
20. (a) A second order reaction is 25% completed in 63 minutes, when the initial concentration of the reactants are 0.15 M each. Calculate the rate constant and half life period of the reaction.
(b) State Nernst Heat Theorem. **(4 + 2)**
21. (a) What is liquefaction of gases? What is the condition for liquefaction of gases?
(b) Give an account of application of transition metals/compounds in catalysis. **(4 + 2)**
22. (a) Discuss any two synthetic application of Grignard reagent in organic synthesis.
(b) Write the principle of steady state approximation. **(4 + 2)**
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22334

III Semester B.Sc. Examination, Nov./Dec. 2014
(Semester Scheme)
CHEMISTRY
General Chemistry (Paper – III)

Time : 3 Hours

Max. Marks : 60

- Instructions:** 1) The question paper has **two** parts. **Both** the parts should be answered.
2) Diagrams and equations are to be given **wherever** necessary.

PART – A

Answer **any six** of the following questions. **Each** question carries **two** marks. (6×2=12)

1. What are heteropolymers ? Give an example.
2. Give four factors which affect the rate of a reaction.
3. Calculate the magnetic moment of Fe^{3+} ion. Atomic number of Fe = 26.
4. What is autooxidation of ethers ?
5. What is Mond's process of refining of metals ?
6. Mention two ores of chromium and write their composition.
7. Write the structure of any two chain isomers of the alcohol having the molecular formula $\text{C}_4\text{H}_9\text{OH}$.
8. How is Teflon synthesized ?
9. Calculate the most probable velocity of oxygen at 300 K.
10. State the third law of thermodynamics.

P.T.O.



PART – B

Answer any eight of the following questions. Each question carries six marks. (8×6=48)

11. a) Derive an expression for Van't Hoff Isochore. (4+2)
b) What is chemical potential ? (4+2)
12. a) How is critical temperature and critical pressure of a gas determined experimentally ? (4+2)
b) Define root mean square velocity of a gas. (4+2)
13. a) Describe the viscosity method for determining the molecular weight of a polymer. (4+2)
b) How is Buna-s manufactured ? (4+2)
14. a) How are Lanthanides separated by ion-exchange method ? (4+2)
b) Atomic sizes of Zirconium and Hafnium are almost same even though they belong to 4d and 5d series. Justify. (4+2)
15. a) Discuss the extraction of Uranium from Pitch Blende. (4+2)
b) What is Ellingham diagram ? Mention one of its application. (4+2)
16. a) i) Name the product of dehydrogenation of ethyl alcohol and isopropyl alcohol.
ii) Explain esterification with an example. (4+2)
b) How is glycerol obtained from oils and fats ? (4+2)
17. a) Starting from Grignard's reagent how do you prepare :
i) 2-propanol
ii) acetone (4+2)
b) How is diethyl ether prepared by Williamson's Ether Synthesis. (4+2)
18. a) Discuss the mechanism of Reimer Tieman reaction. (4+2)
b) Give the synthesis of
i) Ethyl mercaptan
ii) Alkyl Lithium cuprate. (4+2)



19. a) i) What is a spontaneous process? Write the criteria for spontaneous process in terms of free energy.
ii) State Nernst Heat Theorem.
- b) The equilibrium constant of a reaction at 298 K is 1.7×10^4 . Calculate the free energy change. (4+2)
- ~~20.~~ a) Using suitable example discuss the following:
i) Zero order reaction
ii) Pseudounimolecular reaction
- b) Explain activation energy with the help of energy profile diagram. (4+2)
- ~~21.~~ a) Write any three differences between organic and inorganic polymers.
- b) How is gold obtained from its native ore by cyanide process? (3+3)
- ~~22.~~ a) Derive an expression for a second order reaction $2A \rightarrow \text{Products}$.
- b) Write the principle of Steady State Approximation. (4+2)
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22334

III Semester B.Sc. Examination, Nov./Dec. 2016
(Semester Scheme)
CHEMISTRY (Paper – III)

Time : 3 Hours

Max. Marks : 60

- Instructions:** 1) The question paper has **two** Parts. Both the Parts should be answered.
2) Diagrams and equations are to be given **wherever** necessary.

PART – A

Answer **any six** of the following questions. **Each** question carries **two** marks.

(6×2=12)

1. Define mean free path. Write its mathematical expression.
2. A polymer sample is composed of equal number of species of molecular weight 10 kgmol^{-1} and 100 kgmol^{-1} . Calculate the number average molecular weight.
3. The aqueous solutions of Cu^{2+} ions are coloured, where as Cu^+ ions are colourless. Give reason.
4. With the help of Ellingham's diagram, explain the use of Aluminium to reduce chromic oxide.
5. Write the reactions involved in the refining of Nickel by Mond's process.
6. Identify the compounds 'X' and 'Y' in the following reaction
$$\text{CH}_3 - \text{CH}_2 - \text{OH} \xrightarrow{\text{Na}_2\text{Cr}_2\text{O}_7/\text{H}^+} \text{X} \xrightarrow{[\text{O}]} \text{Y}$$
7. How does ethyl bromide react with sodium ethoxide ? Name the reaction.
8. Enthalpy of fusion of ice is 6008 Jmol^{-1} at 273 K and one atmosphere pressure. Calculate the entropy change.
9. State the second law of themodynamics.
10. Define temperature co-efficient of a reaction, if the temperature co-efficient of a reaction is 2'. What does it signify ?

P.T.O.



PART – B

Answer **any eight** of the following questions. **Each** question carries **six** marks.

(8×6= 48)

11. a) Describe the determination of T_c and P_c of a gas by "Cagniard de La Tour" method.
b) Calculate the temperature at which the rms velocity of O_2 is same as rms velocity of SO_2 at $27^\circ C$. (4+2)
12. a) i) What are thermosetting polymers ? Give an example.
ii) How does HDPE prepared ? Give the equation.
b) Mention any two conditions required for the liquefaction of a gas. (4+2)
13. a) Describe the determination of molecular weight of a polymer by intrinsic viscosity method.
b) Write the partial structure of i) Buna – S and ii) Nylon – 6, 6. (4+2)
14. a) Account for the following.
i) d-block elements form interstitial compounds.
ii) transition metals/compounds are used as catalysts.
b) What are f-block elements ? Write their general outer electronic configuration. (4+2)
15. a) Discuss the ion-exchange method of separation of lanthanides.
b) Write the flow chart for the extraction of Uranium from pitchblende. (4+2)
16. a) Describe the extraction of thorium from monazite.
b) What is Ellingham's diagram ? Mention one application of it. (4+2)
17. a) Write the equation for the following conversions
i) Propene to propan-1-ol
ii) Ethyl iodide to ethanethial.
b) What is esterification reaction ? Write the general equation. (4+2)
18. a) Discuss the mechanism of Reimer-Tiemann reaction.
b) What is saponification reaction ? Write the general equation. (4+2)



19. a) i) Give the reaction for the preparation of diethylsulphide from sodium ethyl mercaptide.
ii) Write the structure of propyleneoxide.
- b) i) Give the preparation of acetaldehyde using methyl magnesium iodide.
ii) $R_2CuLi + R'X \xrightarrow[0^\circ C]{ether} R-R' + RCu + LiX$
Name the reaction. (3+3)
20. a) Derive Van't-Hoff reaction isotherm. Assuming that the reactants and products are in gaseous phase $aA_{(g)} + bB_{(g)} \rightleftharpoons cC_{(g)} + dD_{(g)}$.
- b) If a process is spontaneous at all temperature. How does the values of ΔG and ΔS vary? (4+2)
21. a) Derive an expression for the rate constant of a second order reaction, when the initial concentration of both the reactants are same.
- b) Standard free energy of a reaction at 300 K is 13.28 kJ. Calculate the equilibrium constant. (4+2)
22. a) A second order reaction is 10% completed in 30 minutes, when the initial concentration of the reactants are 0.1 M each. Calculate the rate constant and half-life period of the reaction.
- b) Write the Arrhenius equation. Explain the terms in it. (4+2)