FIRST YEAR PHARM D EXAMINATION

PHARMACEUTICAL ORGANIC CHEMISTRY

Q.P. CODE: 2877

QUESTION BANK

CHAPTER 1: STRUCTURE AND PHYSICAL PROPERTIES- 2 MARKS

1. Define polarity and dipole moment with examples.
2. What are protic and aprotic solvents? Give examples.
3. Explain Lewis theory of acids and bases.
4. Short note on intermolecular forces
5. Which is having more boiling point; Dimethyl ether or ethanol? Give reasons.
6. Why Carbon tetrachloride and methane have zero dipole moment?
7. Which molecule is polar and why? CH_3C1 and CH_4
8. Describe ketoenoltautomerism with example
9. Which of the following compounds would you predict to be able to form hydrogen bonding a) Ethanol b) Diethyl ether?
10. Define and classify hydrogen bond with example.
11. Define metamerism with example.
12. Define ionic and non ionic solutes giving examples.
13. Give example for structural isomer.
14. Define polarity with examples.
15. Explain why boiling point of water is more than ethanol and ethanol B.P is more than acetone.
16. Write stability of carbanion.

CHAPTER 2: NOMENCLATURE OF ALIPHATIC AND AROMATIC ORGANIC COMPOUNDS - 2 MARKS

1. Write the structure and IUPAC name of a)Formic acid b) Neopentane
2. Write the structure and IUPAC name of a) Isopropyl alcohol b) Ethyl acetoacetate
3. Write structure of cis and trans 2-butene.
4. Write the structure and IUPAC name of a) Acetic acid b) Formamide
5. Write the structure of a) 2-bromo 3-methyl hexane b) Methanol
6. Write the structure and IUPAC name of a) Acetone b) Diethyl ether
7. Write the structure and IUPAC name of a) Ethyl methyl ketone b) Diethyl ether
8. Write the structure of a) Ethyl acetate b) 1,3- butadiene
9. Write the structure and IUPAC name of a) Isobutane b) Dimethyl ketone
10. Write the structure and IUPAC name of: a) Ethyl alcohol b) Acetylene
11. Write the structures of: a) 2, 2-Dimethyl propane b) 3-Chloro pentanone.
12. Write the structure and IUPAC name of a) Acetaldehyde b) Acetone.
13. Write the structure of a) ortho- hydroxy benzoic acid b) 2-methyl cyclopentanone
14. Write the structure and IUPAC name of: a) Methyl formate b) Isopropyl alcohol.
15. Write the structures of: a) 3-methyl-2- butanone b) 2-Hexenal.
16. Write the structure and IUPAC name of: a) tert-Butyl chloride b) Formamide
17. Write the structure of Vinyl Bromide and allyl iodide
18. Write the structure of Methyl propionate and isobutene
19. Write the structures of the following
a. 1, 3 - Pentadiene b. Ethyl acetate
20. Write the structure and IUPAC names of a) Chloroform b)Acetic acid
21. Give the common name and IUPAC name of (i) HCOOH (ii) HCHO
22. Write the structure and IUPAC name of a)Formic acid b) Neopentane
23. Write the IUPAC name of Neopentane and Formaldehyde.
24. Write the structure and IUPAC name of: a) Ethyl alcohol b) Acetylene
25. Write the structure of Vinyl Bromide and Allyl iodide.(jan14)
26. Give the structures of (a) 2-Iodo 2-Propanol (b) Ethyl ethanoate.(sep12)
27. Write the IUPAC name of isobutene and neopentane.(feb/mar12)
28. Give the structures of i) 3-oxo 2-methyl pentanoic acid ii) 4-methyl but-2-en 6-yne.
29. Give the IUPAC names for following

30. Write the IUPAC names of acetic acid and acetone.
31. Give the common name and IUPAC name of (i) HCOOH (ii) HCHO
32. Name the following compounds(IUPAC): (i)$(CH_3)_4C$ (ii)CH_2=CH-CH_2-CHO

33. Give the structural formulae for a)3-Methyl-1-penten-4-yen b)5-Hydroxy-3-hexenal
34. Give the IUPAC names for a)H_2N-CH_2-CH_2-C-CH_2-OH b) CH_3-C-CH_2-CH-COOH
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CHAPTER 3: FREE RADICALS CHAIN REACTION – 5 MARKS

1. Describe chlorination of methane with mechanism and energy graph
2. What is free radical? Classify and give the order of stability.
3. Define and classify free radicals. Describe orientation and stability of free radicals.
4. Discuss free radicals chain reactions of alkanes with mechanism in detail. Add a note on stability of free radicals.
5. Explain the mechanism of free radical addition reaction with suitable example.
6. Discuss the mechanism involved in chlorination of methane.
7. Define free radicals. Classify free radicals. Explain stability and reactivity of free radicals.
8. Explain free radical substitution if alkanes with mechanism and reactivity of various alkanes towards this reaction.
9. Discuss free radicals chain reactions of alkanes with mechanism in detail. Add a note on stability of free radicals.
10. Discuss the orientation and reactivity of free radical additions to conjugated dienes.

CHAPTER 4: ALICYCLIC COMPOUNDS – 5 MARKS

1. Describe any five methods of preparation of cycloalkanes.
2. Explain Bayer's theory for stability of cycloalkanes.
3. Discuss the orbital picture of angle strain.
4. Write different methods of preparation of cycloalkanes.
5. What are cycloalkanes? Write any three methods of preparation.
6. Explain Bayer's strain theory. Write its limitations.
7. Write any four method of preparation of Cycloalkanes.
8. Discuss the stability of cycloalkanes.

CHAPTER 5: NUCLEOPHILIC ALIPHATIC SUBSTITUTION-10MARKS

1. What are nucleophilic aliphatic substitution reactions? Explain the mechanism, kinetics, factors affecting, stereochemistry for these reactions with example.

2. Explain Nucleophilic aliphatic substitution unimolecular reaction with a) Mechanism b)Kinetics c)Stereochemistry d)Substrate
3. Explain the alkaline hydrolysis of tertiary butyl chloride with mechanism, kinetics and stereochemistry.
4. What do you mean by S_N1 and S_N2 reactions? Explain the mechanism, kinetics and steriochemistry of S_N1 reaction.
5. Discuss SN2 Versus SN1 reactions with examples and mechanisms, kinetics, factors affecting.(JUN/JUL14)
6. What do you mean by SN1 and SN2 reactions? Explain the mechanism, kinetics and steriochemistry of SN1 reaction. (jan14)
7. Explain the alkaline hydrolysis of teritiary butyl chloride with mechanism with mechanism, kinetics and stereochemistry. (Sep12)
8. Explain the mechanism and stereochemistry of SN2 reactions. (feb/mar12)
9. What are SN1 and SN2 reactions? Explain their mechanism. Give an account on the various factors that influence by SN1 and SN2 reactions. (Aug/sep 12)
10. Discuss SN1 versus SN2 reactions with examples and mechanisms, kinetics, factors affecting. (Jun/jul14)
11. Discuss on reaction mechanism and kinetics of both the SN reaction. Elaborate the different factors on which SN reactions depend upon. (Jan 14)
12. Discuss the mechanism, kinetics and stereochemistry of SN2 reaction with suitable example. (Aug13)
13. Explain the mechanism, kinetics and stereochemistry of SN2 reaction. (feb/mar12)

CHAPTER 5: NUCLEOPHILIC ALIPHATIC SUBSTITUTION-5 MARKS

1. Discuss the mechanism, kinetics and stereochemistry of SN_1 reaction.
2. Explain the mechanism and stereochemistry of SN_2 reaction.
3. Explain kinetics and mechanism of SN_1 reaction by selecting an appropriate example.
4. Explain SN^2 reaction with emphasis on its mechanism and stereochemistry
5. Explain the effect of nucleophile in SN reactions.
6. Explain the effect of solvents in SN reactions.
7. Explain SN2 reaction with emphasis on its mechanism and stereochemistry. (Aug13)
8. Discuss the role of solvents in SN1 reaction. (Aug13)
9. Discuss the conditions that favor uni-molecular substitution over bimolecular substation in Alkyl halides. (mar13)
10. Write a note on elimination Vs substitution. (mar13)
11. Discuss the role of solvent in Sn1 and Sn2 reaction. (Sep12)
12. Compare SN1 and SN2 reactions. (feb/mar11)

CHAPTER 5: NUCLEOPHILIC ALIPHATIC SUBSTITUTION-2 MARKS

1. Role of nucleophiles on SN^1 & SN^2 reactions
2. Walden inversion
3. Write any two similarities and any two differences between SN1 and E1 reactions.
4. Which is stable, methyl carbocation or Tertiary butyl carbocation? Give reasons
5. Define nucleophile. Classify with examples

CHAPTER 6: ELIMINATION REACTION-10 MARKS

1. Explain the mechanism, orientation, stereochemistry and reactivity of E1 and E2 reaction with appropriate examples.
2. Write the kinetics, orientation and mechanism involved in E_1 and E_2 reactions.
3. Explain mechanisms, kinetics and stereochemistry involved in the dehydrohalogenation of alkyl halides by a base.
4. Write the kinetics, orientation and mechanism involved in E1 and E2 reactions.
5. Explain the mechanism and orientations in E2 reactions. (feb/mar11)
6.

CHAPTER 6: ELIMINATION REACTION-5 marks

1. Describe the mechanism of dehydration of alcohols.
2. Write the mechanism of E_2-reaction and E_1-reaction. (aug13)
3. Explain the mechanism of dehydrohalogenation of alkyl halide. (Mar13)
4. Write a note on dehydration of alcohols. (Sep12)
5. Explain: (Aug/sep 11)
6. Saytzeff's eliminations
7. Mechanism of nitration of benzene.
8. Explain the mechanism of dehydrohalogenation of alkyl halides.
9. Give the evidence for E2 mechanism. (Aug13)
10. Write a note on elimination Vs substitution. (mar13)
11. Explain the orientation and rearrangements involved in E1 reactions. (mar13)

12. Write a note on dehydration of alcohols. (Sep12)

13. Give the mechanism of dehydrohalogenationfo alkyl halides. (feb/mar12)

14. Explain dehydration of alcohol with examples. (feb/mar11)

15. Write a note on dehydration of alcohols. (feb/mar11)

16. Write a short note on dehydrohalogenation of alkyl halides. (feb/mar12)

CHAPTER 6: ELIMINATION REACTION-2 Marks

1. Explain the conditions which favor elimination over substitution.
2. State Saytzeff rule.
3. What are the products obtained on dehydrohalogenation of 2-chloro-2-methyl-butane?
4. Give four differences between E1 and E2 reaction. (Aug/sep 11)
5. Mechanism of E1 reaction. (feb/mar11)
6. Write the dehydro halogenations products of 1-bromo-2-methyl pentane and 2-bromohexane. (feb/mar11)

CHAPTER 7: ELECTROPHILIC AND FREE RADICAL ADDITION: -10 marks

1. Explain the mechanism, orientation and reactivity for the addition of hydrogen halides to alkenes.
2. Explain markonikov's and anti markonikov's addition with examples.
3. Discuss the following a) Markovnikov's rule.(jun/jul14)
4. Give structure of all alkenes expected from dehydrohalogenation by strong base of
5. 2-chloropentane

6. 1-chloro-2-methylbutance
7. 2-chloro-2-methylbutane
8. 1-chloro-2-methylbutane
9. Discuss the mechanism involved in
10. Addition of HBr to propene in presence if peroxides.
11. Chlorination of methane.
12. Explain elecrtophillic addition reactions to alkenes, giving examples. Write the general mechanism involved.
13. What is markonikov's rule? Give an account on the different reactions involving Markonikov's addition. Explain the mechanism, orientation and reactivity for the addition of hydrogen halides to alkenes.
14. Discuss Markovnikov's Rule. (Jun/jul14)
15. State Markovnikov's Rule. Give the mechanism involved in addition of HBr to an unsymmetrical alkene in presence and absence of peroxide.
16. a. Give an account on Markonikoy's and Anti Markonikoy's additions to alkenes, giving examples. (Aug13)
17. b. Explain the mechanism and orientation involved in the hydration of alkenes.
18. Explain the mechanism of peroxide initiated addition of hydrogen bromide. Discuss cycloaddition reactions. (feb/mar11)
19.
20.

CHAPTER 7: ELECTROPHILIC AND FREE RADICAL ADDITION: -5marks

1. What happens when propene is treated with HBr in the presence and in the absence of peroxide? Give the mechanisms.
2. What are cycloaddition reactions? Explain in detail.
3. Explain Diel's Alder reaction with example.
4. What is peroxide effect? Explain its mechanism.

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5. What is peroxide effect? Explain its mechanism.

CHAPTER 7: ELECTROPHILIC AND FREE RADICAL ADDITION: -2 marks

1. What is Diel's Alder reaction?
2. Define Markonikov's rule and give examples. (aug13)
3. Explain Markowniff's rule taking a suitable example. (Sep12)
4. Define and classify electrophiles with examples. (feb/mar12)
5. Define and classify electrophiles, give examples. (Aug/sep 11)

6. Discuss the mechanism involved in anti-Markownikoff's rule.
7. Explain Peroxide effect with examples and mechanism. (Aug13)
8. Which is more stable; trans-2-butene or cis-2-butene? Why? (Sep12)
9. Write a note on addition of carbenes to alkenes. (feb/mar12)
10. Write Diel's Alder reaction. (feb/mar11)

CHAPTER 8: Carbon-carbon double bond as substituents:- 2 MARKS

1. Explain allylicrearangement with example.
2. Give one example of free radical halogenation of alkenes.

CHAPTER 9: THEORY OF RESONANCE-10 MARKS

1. Explain 1,2 and 1,4 additions in conjugated dienes with mechanism. Add a note on effect of temperature.
2. Explain why 1, 3 – pentadiene is more stable than 1, 4-pentadiene

CHAPTER 9: THEORY OF RESONANCE-5 MARKS

1. Discuss the stability of allylcation or allyl radical.
2. Explain side chain halogenation in alkyl benzene. Add a note on benzyl radical.
3. Discuss side chain halogenation in alkyl benzene. Add a note on Resonance in benzyl radical
4. What is hyperconjugation? Discuss with example.
5. Discuss 1,2 and 1,4 additions with examples. (JUN/JUL14)
6. Define and give the mechanism of 1,2-addition and 1,4-addition reaction. (jan14)
7. Explain the stability of conjugated dienes. (mar13)
8. Explain why 1,3-pentadiene is more stable than 1,4-pentadiene.
9. Explain 1,2 and 1,4-addition reactions. (Sep12)
10. Write a short note on hyperconjugation. (Sep12)
11. Write one example of 1.4 addition

12. 1,2 addition and compare the formation rate and equilibrium.
13. Explain the concept of aromaticity and Huckel's rule. (Aug/sep 12)
14. What is meant by orientation in aromatic nucleus? Using resonance theory explain the orientation on nitrobenzene. (Aug/sep 11)
15. With the help of suitable examples explain the term hyperconjugation. (Aug/sep 11)
16. Discuss 1,2 and 1,4 additions with examples. (Jun/jul14)(aug13)
17. Explain the concept of aromaticefy and Huckel's rule with examples. (mar13)
18. Explain the stability of conjugated dienes. (Sep12)
19. Give the mechanism of 1,2-and 1,4-addition reaction. (Sep12)
20. Write a short note on dehydrohalogenation of alkyl halides. (feb/mar12)
21. Explain the stability and resonance hybride of allyl radical. (feb/mar12)
22. Explain the term Hybridization and Hyperconjugation with examples. (feb/mar11)

CHAPTER 10: ELECTROPHILIC AROMATIC SUBSTITUTION-10 MARKS

1. What are electrophilic aromatic substitution reactions? Explain the effect of substituents on orientation and reactivity on these reactions.
2. Why –NH2 group is activating and ortho para directing while –NO2 group is deactivating and meta directing? Explain.
3. Why chloro group is deactivating yet ortho para directing? Explain.
4. Discuss the following a) Mechanism of nitration. (jun/jul14)
5. Discuss the reaction and mechanism involved in following reactions; (Mar13)
6. Nitration
7. Sulphonation

8. What is electorphillic aromatic substitution reaction? Explain the effect of substituents with example. (Mar13)
9. Discuss the mechanism involved in
10. Chlorination of methane
11. Discuss Friedel Craft's alkylations with examples and mechanism. Mention any two of its limitations. (feb/mar12)
12. Discuss the mechanism of nitration. (Jun/jul14)
13. Discuss in electrophillic aromatic substitution in benzene with respect to activating and side chain haloganation of alkyl benzene.
14. Classify the substituents in electrophillic aromatic substitution reactions. Discuss the orientation and reactivity of :
15. Hyroxyl group In Benzene
16. Nitro group in benzene, in electrophillic aromatic substitution reaction.(Aug-13)
17. Write the mechanism involved in nitration of benzene. (Aug13)
18. State and explain Friedel Crafts alkylation with its limitations. Write a note on Friedel Crafts alkylation.
19. Classify the substituent groups based on orientation and reactivity.es
20. What is meant by orientation in aromatic nucleus? Using resonance theory explain the orientation on nitrobenzene. (Aug/sep 11)
21.

CHAPTER 10: ELECTROPHILIC AROMATIC SUBSTITUTION-5 MARKS

1. Discuss the mechanism involved in sulphonation of benzene.

2. Write mechanism of Friedel Craft's alkylation.

3. Explain the orientation in disubstituted benzenes.

4. Describe nitration of benzene with mechanism.
5. What is the effect of substituent groups on electrophillic aromatic substitution? (JUN/JUL14)
6. Write the mechanism for Friedal craft alkylation. Write its limitations. (jan14)
7. Write the mechanism of Friedal craft alkylation with example. (aug-13)
8. Write the mechanism of Friedal craft alkylation with mechanism. (mar13)
9. Discuss the mechanism of chlorination of methane. (Jun/jul14)
10. Discuss the mechanism involved in theory of nitration and sulphonation.
11. Discuss Friedel Craft's alkylation with its limitations. (Aug13)
12. Discuss the mechanism of Friedel-Craft's alkylations in benzene. What are their limitations? (mar13)
13. Discuss the stability of benzyl radical. (feb/mar12)
14. What activating and deactivating groups? Discuss the theory of reactivity in aromatic rings. (feb/mar12)
15. Explain the effect of substituents on electrophillic aromatic. (feb/mar12)
16. Give the mechanism of sulphonation and chlorination of benzene. (feb/mar11)
17. Explain the Friedal Craft's reaction with its limitations.
18. Describe the mechanism and conditions for the following reactions.
19. Describe Nitration of benzene
20. Describe Sulphonation of benzene

CHAPTER 11: CARBOXYLIC ACIDS- 5 MARKS

1. Why carboxylic acid are acidic in nature? Write the effect of electron withdrawing groups on acidity.

2. Describe acidity of carboxylic acids. Chloro acetic acid is more acidic than acetic acid. Give reason.

3. Explain ionisation of carboxylic acid and write the structure of carboxylate anion.

4. Write the conversion of acid to acid chloride, amide and ester.

5. Compare the acidity among formic acid, acetic acid and trichloroacetic acid.
6. Discuss Conversion of acidity to its various derivatives.(JUN/JUL14)

7. Write a note on effect of substituents on acidity of carboxylic acids.
8. Discuss the structure of carboxylate ion and acid acidity of carboxylic acids. (feb/mar12)
9. Write the preparation of various acid derivatives with examples. (Jan 14)
10. Write a note on effect of substituents on the acidity of carboxylic acids. (Aug13)
11. Write a note on the acidity of carboxylic acids. (mar13)
12. Explain the acidity of acids. (feb/mar12)
13. Explain esterification reaction with mechanism. (feb/mar12)
14. Explain the acidity of carboxylic acid and add a note on effect of substiuents. (feb/mar11)

CHAPTER 11: CARBOXYLIC ACIDS- 2 MARKS

1. Convert benzoic acid to methyl benzoate.
2. Write the resonance structures of carbonium ion. (mar13)
3. Addition of Grinard reagents to carbonyl compounds.
4. Esterification . (Sep12)
5. Conversion of acids to amides and anhydrides. (Jan 14)
6. How will you convert a carboxylic acid to an amide? (Aug13)
7. Give the characteristics of esterification reaction. Give an example.
8. Compare the acidity and acetic acid and chloroacetic acid. (feb/mar12)
9. Synthesize amides from acyl chlorides.
10.

CHAPTER 12: NUCLEOPHILIC ADDITION IN ALDEHYDES AND KETONES-5 MARKS

1. Discuss the mechanism involved in Perkin condensation
2. Explain the reaction mechanism of Aldol condensation.
3. Name the products of the reaction of methyl magnesium bromide with formaldehyde and acetaldehyde.
4. Discuss the mechanisms involved in Benzoin condensation
5. Discuss the nucleophilic addition reaction and write a note on reactivity of aldehydes & ketones towards this reaction
6. What is aldol condensation? Explain with examples. (JUN/JUL14)
7. Explain Claisen condensation with example. (aug13)
8. Explain Aldol condensation with example and mechanism. (mar13)
9. Explain Aldol and crossed Aldol condensation atoms with the mechanism. (Sep12)
10. Give the mechanism involved in the following reactions. (feb/mar12)
11. Cannizaro's reaction
12. Reformatsky's reaction.
13. Explain benzoin condensation giving its mechanism and applications. (feb/mar12)
14. Give the mechanism involved in :Benzoincondensation.CrossedCannizzaro's reaction.
15. What is aldol condensation? Explain with examples. (Jun/jul14)
16. Discuss the mechanism involved in Aldol and crossed Aldol condensation. (Jan 14)
17. Explain Perkin condensation mechanism. (Aug13)
18. Explain the mechanism of Cannizzaro and crossed Cannizzaro reaction with appropriate examples. (feb/mar12)
19. Explain Cannizzaro reaction with mechanism.

CHAPTER 12: NUCLEOPHILIC ADDITION IN ALDEHYDES AND KETONES-2 MARKS

1. Name the products of the reaction of ethyl magnesium bromide with propanaldehyde and acetaldehyde.
2. Reformatsky reaction.
3. Grignard reagents
4. Write the reaction involved in Cannixzzaro reaction. (JUN/JUL14)
5. Reformatsky reaction. (mar13)
6. What is crossed –Aldol condensation? Give one example. (feb/mar12)
7. What is the action of Grignard's reagent on acetone? Give the reaction. (feb/mar12)
8. Write the reaction involved in Cannizzaro reaction. (Jun/jul14)
9. Nomenclature of aldehydes. (Jan 14)
10. What is crossed Aldol condensation? Give the equation. (mar13)
11. How will you convert acetaldehyde to acetic acid. (feb/mar11)
12. Give one example for each: (feb/mar11)
13. Crossed cannizzaro's reaction
14. Crossed Aldol condensation.

CHAPTER 13: AMINES AND PHENOLS -10 MARKS

1. Discuss the effect of substituents on acidity of carboxylic acids. Write a note on how carboxylic acids are converted into their derivatives.
2. Discuss the mechanism of the following reactions A) RiemerTiemannReaction.B) Beckmann Rearrangement

CHAPTER 13: AMINES AND PHENOLS -2 MARKS

1. How will you convert phenol to salicylic acid? Write reactions.
2. Discuss acidity of phenols.
3. Explain the effect of substituents on acidity of phenols.
4. Ortho nitrophenol is more acidic than phenol. Comment.
5. Compare the acidity among formic acid, acetic acid and trichloroacetic acid.
6. Compare the basicity among ammonia, ethylamine, tertiary butylamine
7. Write the conversion of acid to ester. (aug13)
8. Explain acidity of phenols. (aug13)
9. Write Williamson synthesis. (aug13)
10. Explain Kolbe's reaction. (aug13)
11. What are primary and secondary amines? Give examples. (mar13)
12. Fries rearrangement.
13. Outline Sandmeyer's reaction. (mar13)
14. Diazocoupling reaction. (Sep12)
15. Write an note on Riemer- Tiemann's reaction. (feb/mar12)

16. Arrange the order of acid strength : phenol, o-cresol , o- Nitrophenol, 2,4dinitro phenol. (feb/mar12)

CHAPTER 14: BIMOLECULAR NUCLEOPHILIC AROMATIC SUBSTITUTION – 2 MARKS

1. Give one example of nucleophilic aromatic substitution.
2. Write comparison of aliphatic nucleophilic substitution with that ofaromatic.
3. Write an example for displacement reaction.

CHAPTER 15: OXIDATION REDUCTIONREACTION – 2 MARKS

1. Give one example of oxidation and reduction reaction.
2. Give one examples for oxidizing and reducing agents.
3. Define redox reaction. Give example.

CHAPTER 16: STUDY OF OFFICIAL COMPOUNDS: 2MARKS

1. Write the structure and uses of a)vanillin b)nitroglycerin
2. Give the structure and uses of a) Tartaric acid b)glyceryltrinitrate
3. Write the structure, uses of a)Lactic acid b)Dimercaprol
4. Structure and uses of a) SLS b) Mephenesin.
5. Preparation and uses of aspirin.