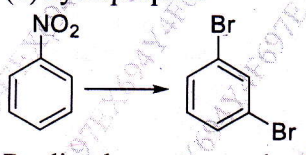
S. Y. B. Pharm
Sem-III
Semester Exam
26/03/2025
ATKT

Duration: 3:00 hours **Total Marks: 75**

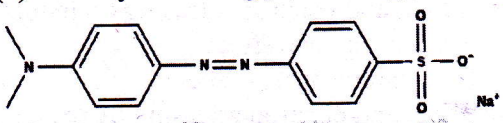
N. B. 1. All questions are compulsory
2. Figure to the right indicate full marks.

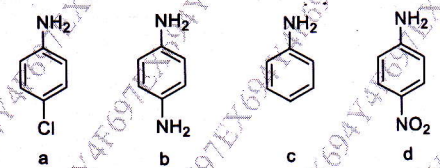
Q.I Choose the correct option for the multiple's choice-based questions. 20 Marks

1. Halogens are _____
   (a) electron withdrawing by resonance effect and electron releasing by inductive effect
   (b) electron releasing by both inductive and resonance effect
   (c) electron withdrawing by both inductive and resonance effect
   (d) electron withdrawing by inductive effect and electron releasing by resonance effect
2. Phthalein test is used as an identification test for _____
   (a) Carboxylic acids
   (b) Amines
   (c) Phenols
   (d) Aromatic compounds
3. In the butterfly conformation of cyclobutane _____strain is relieved to some extent but _____ strain increases.
   (a) angle; tortional
   (b) trans-annular; tortional
   (c) torsional; angle
   (d)torsional; trans-annular
4. Coulson and Moffitt's modification suggested that cyclopropane has _____bonds
   (a) Hybrid of sigma and pi
   (b) banana bonds
   (c) Ionic
   (d) All axial
5. 2-Methyl-1,3-dibromopropane upon treatment with zinc in presence of ethanol gives _____.
   (a) Methyl cyclopropane
   (b) 1-Methylcyclopropane
   (c) 2-Methylcyclopropene
   (d)Cyclopropane
6. 

   Predict the correct order for the given conversion.
   I. Bromination using CuBr
   II. Nitration of nitrobenzene
   III. Diazotization using cold, aq. HONO
   IV. Reduction of -NO_2 using Sn/HCl

   (a) ii --> iv --> iii --> i
   (b) iii --> i --> ii --> iv
   (c) i --> ii --> iv --> iii
   (d) iv --> i --> ii --> iii

7. Identify the electrophile involved in Sulphonation of benzene
   (a) SO^{3+}
   (b) SO^{2+}
   (c) SO^{3}
   (d) HSO^{3-}
8. $NHCOCH_3$ is a _____ group in electrophilic aromatic substitution reaction.
   (a) Deactivating
   (b) Moderately activating
   (c) Strongly activating
   (d) Weakly activating
9. 

   The above molecule can be synthesized using
   (a) Hoffmann degradation of amides
   (b) Reimer Tiemann reaction
   (c) Elbs reaction
   (d) Coupling reaction of diazonium compounds
10. 

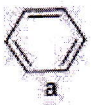
    Identify the strongest base amongst the following above structure.
    (a) a
    (b) b
    (c) c
    (d) d
11. Benzoic acid can be synthesized by _____.
    (a) Oxidation of toluene
    (b) Carbonylation of benzaldehyde
    (c) Reduction of benzaldehyde
    (d) Hydrolysis of Salicylic acid
12. 1,4 Naphthoquinone can be obtained by oxidizing naphthalene with _____.
    (a) Vanadium pentoxide
    (b) Acidic KMnO4
    (c) conc. H_2SO_4/ $HgSO_4$
    (d) Chromic acid
13. Bromine reacts with phenanthrene to form _____.
    (a) 9,10-Dibromo phenanthrene
    (b) 1,4-Dibromo phenanthrene
    (c) 1,8-Dibromo phenanthrene
    (d) 2,4-Dibromo phenanthrene

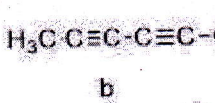
14. Chlorination of 1-naphthol gives _____ as a major product.
    (a) 2-Chloro-1-naphthol
    (b) 3-Chloro-1-naphthol
    (c) 4-Chloro-1-naphthol
    (d) 1-Chloro-2-naphthol
15. Anthracene upon treatment with dimethyl formamide and $POCl_3$ gives _____.
    (a) 9-formyl anthracene
    (b) 9,10-diformyl anthracene
    (c) 1-formyl anthracene
    (d) 1,4-diformyl anthracene
16. _____ reaction is reversible in nature.
    (a) Nitration
    (b) Sulphonation
    (c) Halogenation
    (d) Diazotization
17. Which of the following is not a cause of rancidity of fats and oils?
    (a) Oxidation
    (b) Hydrolysis
    (c) Microbial contamination
    (d) Refrigerator
18. Acetyl value is a measure of number of _____ groups present in fats and oils.
    (a) Acetyl
    (b) Hydroxyl
    (c) Methyl
    (d) Carboxylic acid
19. Compare the physical appearance of the given oils based on the given iodine values:
    Oil A : 245 and oil B : 2-20
    (a) Oil A would be liquid oil while oil B would be semisolid
    (b) Oil A would be semisolid while oil B would be liquid oil
    (c) Both oil A and oil B would be semisolid
    (d) Both oil A and oil B would be liquid oils
20. Adulteration in butter can be easily determined by determing the following value.60
    (a) Iodine Value
    (b) Saponification number
    (c) Reichert-Meissl Value
    (d) Acetyl value

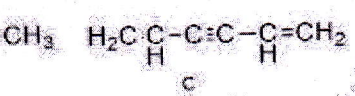
QII Attempt **any two** **20 Marks**

1. a) Identify the most reactive substrate from the following towards electrophilic aromatic substitution: benzene, benzaldehyde, toluene, nitrobenzene. Depict the mechanism of nitration of the same.
   b) Give any two methods of synthesis of phenols.
   Predict the product of reaction of phenol with the following:
   i. NaOH
   ii. C_2H_5I/ aq. NaOH
   iii. $CHCl_3$/ aq. NaOH

2. Arrange the following in increasing order of aromaticity: anthracene, benzene, phenanthrene, naphthalene; Depict resonance in phenanthrene; Discuss the Diels-Alder reaction of anthracene. Define and discuss saponification value and iodine value for fats and oils. Justify why linseed oil is a suitable component of paints and varnishes.
With the help of suitable cycloalkane discuss the merits and limitations of Bayers strain theory.

3.  a

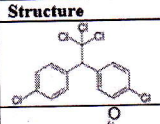
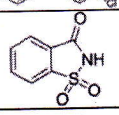
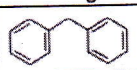
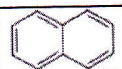
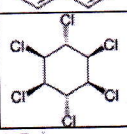
 b

 c

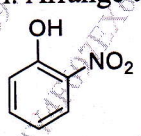
Suggest suitable evidence to validate the structure of benzene from the following pairs:
i. a and b
ii. a and c
Draw the molecular orbital picture of benzene. Explain why benzene undergoes substitution reactions instead of addition reactions.

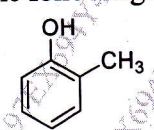
QIII Attempt **any seven** of the following nine questions **35 Marks**

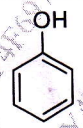
1. Identify the given below structures and enlist any one use

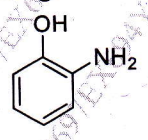
Sr. No.	Structure	Name	Use
1.			
2.			
3.			
4.			
5.			

2. Depict the detailed mechanism for any two of the following reaction:
i. Kolbe reaction
ii. Hofmann bromamide degradation
iii. Diazotization reaction
3. i. Arrange the following in the increasing order of acidity and justify.

 i

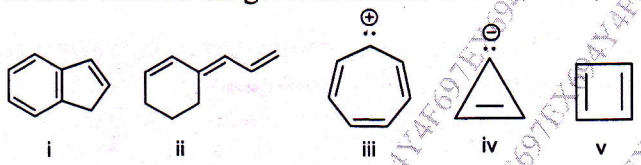
 ii

 iii

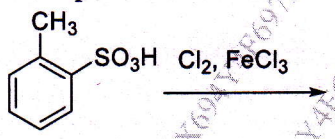
 iv

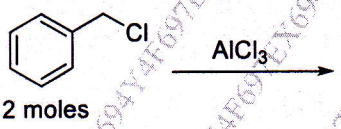
ii. Predict the suitable reagents and reaction conditions to convert benzoic acid to benzamid and ethyl benzoate.
4. Discuss the problems associated with Friedel Crafts alkylation and discuss suitable alternative to overcome the limitations.

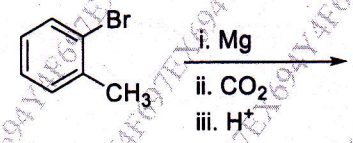
5. Predict whether the given structures are aromatic, anti-aromatic or non-aromatic. Justify.



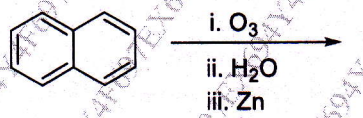
6. Predict the products of the following reactions **(Any 5):**

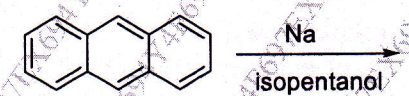
i 

ii 

iii 

iv Acetone + Aniline $\xrightarrow{NaBH_3CN}$

v 

vi. 

7. Draw the least stable and the most stable conformation of cyclohexane.
Attempt following conversions

i. Cyclobutane + Cl_2 $\xrightarrow{UV\ Light}$

ii. Cyclopropane $\xrightarrow{Ni,\ H_2,\ 80°C}$

iii. Cyclopropane $\xrightarrow{conc.\ H_2SO_4}$

8. Discuss any two of the following reactions:
i. Haworth synthesis of anthracene
ii. Pschorr synthesis
iii. Hydrolysis of nitriles

9. Define acid value for fats and oils. Elaborate on hydrogenation and saponification reactions with the help of suitable substrates.
