UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, July 2020

Course: Organic. Chemistry.I **Semester : II**
Course Code: CHEM1005 **Time: 3 hrs**
Programme: B.Sc. H Chemistry **Max. Marks:**
Instructions: Section A questions carry 2 marks each. The weightage of questions in section B is mentioned against them.

B.Sc. Organic Chemistry MCQ's PART-A (30x2=60)

1. Which of the following is an alkane which can exhibit optical activity?
a) Neopentane
b) Isopentane
c) 3–Methylpentane
d) 3–Methylhexane

Ans: d

2. Which of the following compounds can exhibit geometrical isomerism?
a) 1-Hexene
b) 2-Methyl-2-Pentene
c) 3-methyl-1-pentene
d) 2-Hexene

Ans:d

3. A solution of 0.1 g/mL of a pure R enantiomer in a 1.0 dm (i.e., 10 cm) polarimeter rotates plane polarized light by +4.8°. What is the rotation observed on this solution in a 2 dm polarimeter?
a) +2.4°
b) +4.8°
c) +19°
d) +9.6°

Ans:d

4. Which of the following groups has the highest priority according to the Cahn-Ingold-Prelog sequence rules?
a) CH_3
b) CH_2Cl
c) CH_2OH
d) CHO

Ans: b

5. Which of these is a comparatively insignificant factor affecting the magnitude of specific optical rotation?
a) Concentration of the substance of interest
b) Purity of the sample

c) Temperature of the measurement
d) Length of the sample tube

Ans: c

6. Which of the following statements regarding optical rotation is not true?
a) All R enantiomers are dextrorotatory
b) All (+) enantiomers are laevorotatory
c) All (-) enantiomers rotate plane polarized light in a counter clockwise direction
d) (+) and (-) enantiomers rotate plane polarized light in opposite directions

Ans:c

7. Which of the following is the definition of chirality?
a) The superimposability of an object on its mirror image
b) A molecule with a mirror image
c) The non-superimposability an object on its mirror image
d) A molecule that has a carbon atom with four different substituents

Ans: c

8. Which of the following is the definition of a pair of diastereomers?
a) A pair of stereoisomers each of which has two chirality centers
b) Any pair of stereoisomers
c) A pair of stereoisomers that are not mirror images of one another
d) A pair of stereoisomers that are non-superimposable mirror images of one another

Ans: c

9. Which of the following is rate determining step in electrophilic substitution reaction?
a) Generation of electrophile
b) Attack by an electrophilic reagent on benzene ring
c) Formation of product
d) All of the mentioned

Ans: b

10.Which of the following act as catalysis in the nitration of benzene?
a) Conc. HCl
b) Dil. HCl
c) Conc. H_2SO_4
d) Dil. H_2SO_4

Ans : c

11. A deactivating substituent group directs _____
a) Ortho position
b) Para position
c) Both ortho and para positions
d) Meta position

Ans: d

12. Which of the following is ortho-para directing group?
a) –$NHCOCH_3$
b) –NO_2
c) –CN
d) –CHO

Ans: a

13. Identify the incorrect statement regarding aromaticity
a) It is the extra stability possessed by a molecule
b) p-orbitals must be planar and overlap
c) Cyclic delocalization takes place
d) It does not follow Huckel's rule

Ans: d

14. Which of the following is not true about the five membered rings?
a) Five membered rings are more stable than 4 membered rings
b) Five membered rings are more stable than 6 membered rings
c) Five membered rings are more stable than 7 membered rings
d) Five membered rings are more stable than 8 membered rings

Ans: b

15. Why would a compound be anti-aromatic?

a) If a compound has a 4n number of pi electrons, it will be anti-aromatic.

b) If a compound fits Huckel s Rule.

c) If a compound cannot escape being planar and has 4n number of pi electrons.

d) If a compound has an odd number of atoms in its ring structure.

Ans: c

16. Which among the following is strongest acid

a. phenol

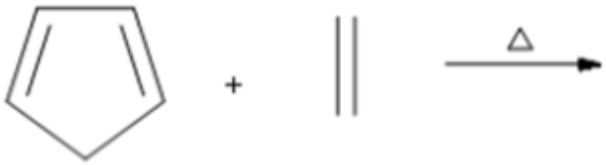
b. 2,4,6-trinitrophenol

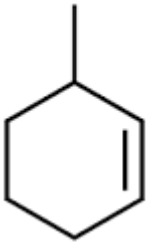
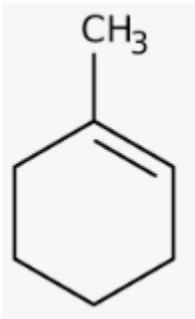
c. 2-nitrophenol

d. 2,4-dinitrophenol

17. Which is most basic among the following
   a. H_2O
   b. CH_3OH
   c. CH_3OCH_3
   d. C_6H_5OH

18. Which effect is responsible for the o,p-directing nature of toluene
    a. Inductive effect
    b. Electromeric effect
    c. Hyperconjugation
    d. Inductive and Electromeric effect
19. What product will be formed on reaction of HBr on CH3-CH=CH2 in the presence of hydrogen peroxide
    a. n-propylbromide
    b. iso-propylbromide
    c. n-hexane
    d. iso-hexane
20. Which product will be formed by the following reaction

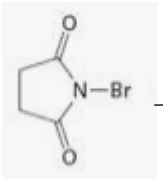


    a.  (a-correct ans)
    b. 
    c. 
    d. 

21. Which of the following compounds will react with Na

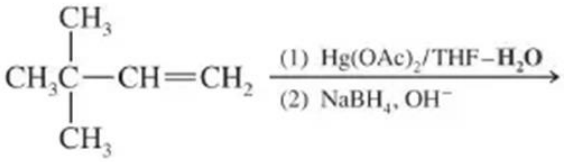
a. $CH_3CH_2C{\equiv}CCH_2CH_3$
b. $CH_3CH_2CH_2C{\equiv}CCH_3$
c. $CH_3CH_2CH_2CH_2C{\equiv}CH$
d. $CH_3C{\equiv}C\text{-}CH_2CH{\equiv}CHCH_3$

22. Mention the main product formed by the reaction of

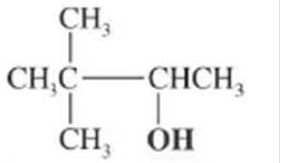
$CH_3CH_2CH_2CH{=}CH_2$ + 

a. Pentane-1,2-dibromide
b. 1-bromo-1-pentene
c. 2-bromo-1-pentene
d. 3-bromo-1-pentene

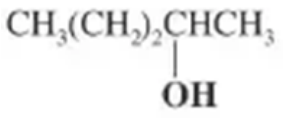
23. Predict the main product in the following reaction

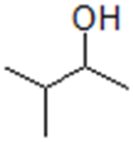


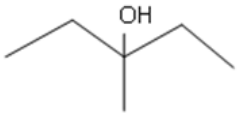
3,3-Dimethyl-1-butene

a. 

3,3-Dimethyl-2-butanol

b. 

c. 

d. 

24. How many conformations are there for ethane
    a. 6
    b. 10
    c. 120
    d. Infinite
25. Saytzeff Rule is used for
    a. Addition reactions
    b. Substitution reactions
    c. Elimination reactions
    d. Rearrangement reactions
26. An alkene on reductive ozonolysis gave two moles of acetaldehyde. The alkene was
    a. 1-butene
    b. 2-butene
    c. 1-pentene
    d. 2-pentene
27. Which main type of reactions alkenes undergo
    a. Electrophilic addition reactions
    b. Nucleophilic addition reactions
    c. Electrophilic substitution reactions
    d. Nucleophilic substitution reactions
28. Which is an example of conjugated diene
    a. CH_3-CH_2-CH=CH=CH_2
    b. CH_3-CH=CH-CH=CH_2
    c. CH_2=CH-CH_2-CH=CH_2
    d. CH_2=CH-CH_2-CH_2-CH=CH-CH_3
29. Which reagents are used to form diols
    a. Alkaline $KMnO_4$ solution
    b. OsO_4
    c. B_2H_6/H_3PO_4
    d. H_2O/H^+

30. Which among the following groups have all electrophiles
    a. CH_3^+, NO_2^+, SO_3, H_2O
    b. CH_3^+, $AlCl_3$, BF_3, SO_3H^+
    c. CH_3^+, NO_2^+, H_2O, CH_3OH
    d. CH_3^+, SO_3, NO_2^+, $AlCl_3$

PART-B (Subjective test) **40 marks** **Duration 24 hours**

Instruction:

All students have to attempt all the subjective questions. There are two ways to attempt this section:

1. You can write your answer on word file and then converted into PDF and upload on the blackboard.
2. You can write your answer on A4 sheet, take a picture and then converted into PDF and upload on the blackboard.

Assignment Questions:

Q1	Discuss the difference between Friedel Craft alkylation and Friedel Craft acylation.	10 marks	CO3
Q2	Discuss the aromaticity in seven and eight membered rings?	10 marks	CO3
Q3	Conversions: a. Ethylene to benzene b. Ethane to Ethylene c. Ethane to Methane d. Propyne to 2-butyne	10 marks	CO2
Q4	Discuss the mechanism of: a. Oxymercuration-demercuration reaction b. Hydroboration reaction	10 marks	CO3.