

Name:  
Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2021

Course: Pharmaceutical Organic Chemistry I

Semester: II

Program: B. Pharm.

Time: 03 hrs.

Course Code: BP202T

Max. Marks: 75

Instructions: All the sections are compulsory.

SECTION A

S. No.	CO		Marks
		<b>Answer all the questions. (MCQs / True or false or relevant)</b>	<b>20</b>
1.	CO2	<b>Which of the following statements is false?</b> a) S <sub>N</sub> 1 reaction is unimolecular and S <sub>N</sub> 2 is bimolecular b) S <sub>N</sub> 1 reaction is bimolecular and S <sub>N</sub> 2 is unimolecular c) Both a and b d) None of the above	<b>1</b>
2.	CO4	<b>Lucas reagent is</b> a) NaCl + ZnCl <sub>2</sub> b) HCl + ZnCl <sub>2</sub> c) KCl + ZnCl <sub>2</sub> d) None of the above	<b>1</b>
3.	CO2	<b>The mechanism of dehydration of an alcohol to alkene involve the formation of</b> a) Carbocations      b) Carbonium ion c) Free radical      d) None of these	<b>1</b>
4.	CO2	<b>Formaldehyde condenses with phenol to give</b> a) Metaformaldehyde      b) Bakelite c) Urotropine      d) None of these	<b>1</b>
5.	CO2	<b>Addition of Hydrogen cyanide with aldehyde is the example of</b> a) Nucleophilic addition      b) Nucleophilic substitution c) Electrophilic addition      d) Electrophilic substitution	<b>1</b>
6.	CO2	<b>Picric acid is obtained from the nitration of</b> a) Salicylic acid      b) Benzoic acid c) Oxalic acid      d) Citric acid	<b>1</b>
7.	CO3	<b>Amines are soluble in water due to the formation of</b> a) Covalent bond      b) Hydrogen bond c) Metallic bond      d) Ionic bond	<b>1</b>
8.	CO1	<b>α-hydroxypropionic acid is</b> a) Lactic acid      b) Citric acid c) Tartaric acid      d) Oxalic acid	<b>1</b>
9.	CO3	<b>Which of the following compounds gives aldol condensation?</b> a) Benzaldehyde      b) Acetaldehyde c) Formaldehyde      d) Chloral hydrate	<b>1</b>

10.	CO4	<p><b>Which of the following will give a negative test when treated with bromine in carbon tetrachloride?</b></p> <p>a) Pentene                      b) Pentane c) Pentyne                      d) None of the above</p>	1
11.	CO3	<p><b>Which of the following statements is FALSE regarding the reaction between Cl<sub>2</sub> and C<sub>2</sub>H<sub>6</sub>?</b></p> <p>a) It is a substitution reaction. b) The reaction will give a single product of C<sub>2</sub>H<sub>5</sub>Cl. c) The reaction mechanism involves free radicals. d) None of these.</p>	1
12.	CO1	<p><b>For which of the compounds below are cis-trans isomers possible?</b></p> <p style="text-align: center;"> <math>\text{CH}_3\text{CH}=\text{CH}_2</math>                      <math>\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_3</math>                      <math>\text{CH}_3\text{CH}=\text{CHCH}_3</math>  (1)    (2)    (3) </p> <p>a) only 2                      b) both 1 and 2 c) both 2 and 3                      d) None of these</p>	1
13.	CO3	<p><b>Why is an amine salt more soluble in water than the corresponding free amine?</b></p> <p>a) It is ionic, therefore more soluble than covalent compounds with the same structure. b) It has a higher molecular weight than the corresponding amine. c) The negative charge on the nitrogen atom increases water solubility d) All amines are insoluble in water</p>	1
14.	CO2	<p><b>Aspirin is synthesized from</b></p> <p>a) Formic acid                      b) Benzoic acid c) Salicylic acid                      d) All of these</p>	1
15.	CO1	<p><b>The substituent in the chain is named by replacing the “ane” in the alkanes by _____.</b></p> <p>a) ene                                      b) ic c) one                                      d) yl</p>	1
16.	CO1	<p><b>Cis-trans isomerism in alkenes is due to</b></p> <p>a) chiral carbon b) free rotation about single bond c) free rotation about double bond d) restricted rotation about double bond</p>	1
17.	CO3	<p><b>Which of the following metals is used as a catalyst in the catalytic hydrogenation of both alkenes and alkynes?</b></p> <p>a) Palladium                      b) Iron c) Magnesium                      d) Copper</p>	1
18.	CO2	<p><b>Why is sodium borohydride an important reagent in reducing a ketone?</b></p> <p>a) It is good for hydrolysis type reactions b) It is a good source of the hydride ion c) It can act as a base d) It can act as a free radical initiator.</p>	1

19.	CO3	Compound 'A' undergoes formation of cyanohydrins which on hydrolysis gives lactic acid ( $\text{CH}_3\text{CHOHCOOH}$ ). Therefore, compound 'A' is _____. a) Formaldehyde                      b) Acetaldehyde c) Acetone                                d) Benzaldehyde	1
20.	CO1	An organic compound X is oxidized by using acidified $\text{K}_2\text{Cr}_2\text{O}_7$ . The product obtained reacts with phenyl hydrazine but does not answer silver mirror test. The possible structure of X is _____. a) $(\text{CH}_3)_2\text{CHOH}$ b) $\text{CH}_3\text{CHO}$ c) $\text{CH}_3\text{CH}_2\text{OH}$ d) $\text{CH}_3(\text{CO})\text{CH}_3$	1

### SECTION B

Answer any two questions of the following.

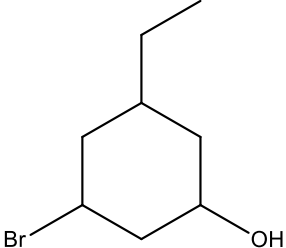
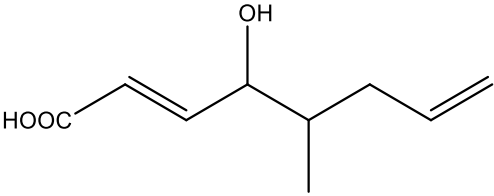
20

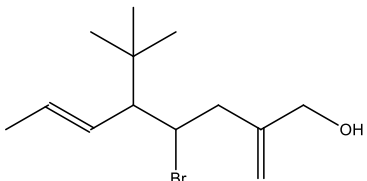
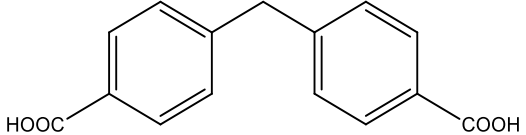
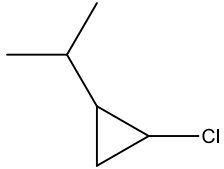
1.	CO4	a) "The treatment of alkyl chlorides with aqueous KOH leads to the formation of alcohols but in the presence of alcoholic KOH, alkenes are major products"- Explain. b) Primary alkyl halide $\text{C}_4\text{H}_9\text{Br}$ (A) reacted with alcoholic KOH to give compound (B). Compound (B) is reacted with HBr to give (C) which is an isomer of (A). When (A) is reacted with sodium metal it gives compound (D), $\text{C}_8\text{H}_{18}$ which is different from the compound formed when n-butyl bromide is reacted with sodium. Give the structural formula of (A) and write the equations for all the reactions. c) Why is the solubility of haloalkanes in water very low?	(3+5+2) = 10
2.	CO3	a) Write down the unsaturation test of alkenes. b) How can you determine the position of double bonds in alkenes? c) What do you mean by Markovnikov Rule and anti-Markovnikov rule? Explain it with examples	(3+2+5) = 10
3.	CO1, CO2	a) "Carboxylic acid is more acidic than phenol" – Justify it. b) Why does carboxylic acid have a higher boiling point than alcohol? c) Write down the structure and use of lactic acid and tartaric acid.	(4+3+3) = 10

### SECTION C

Answer any seven questions of the following.

35

1.	CO1	Write down the IUPAC name for the following a)  b) 	(1X5) = 5
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		<p>c)</p>  <p>d)</p>  <p>e)</p> 	
2.	<b>CO2</b>	Explain the $S_N2$ nucleophilic substitution reaction of alkyl halide with an example and draw its energy profile graph.	<b>5</b>
3.	<b>CO3</b>	Define the term Basicity constant. Explain the basicity of amine.	<b>(1+4) = 5</b>
4.	<b>CO2</b>	<p>a) Write down the different process of nucleophilic addition reaction for carbonyl groups.</p> <p>b) Why aldehydes are more reactive than carbonyl groups?</p>	<b>(3+2) = 5</b>
5.	<b>CO1</b>	<p>a) What do you mean by Trivial Nomenclature System?</p> <p>b) Write down the drawbacks of the Trivial Nomenclature System.</p> <p>c) Explain the role of “prefix” and “suffix” in IUPAC nomenclature system.</p>	<b>(1+2+2) = 5</b>
6.	<b>CO4</b>	Discuss diverse chemical tests to distinguish different classes of alcohols?	<b>5</b>
7.	<b>CO4</b>	Illustrate qualitative tests for amide and ester.	<b>(2.5+2.5) = 5</b>
8.	<b>CO3</b>	Discuss the general method of preparations of aldehydes and ketones.	<b>(2.5+2.5) = 5</b>
9.	<b>CO2</b>	Write a short note on Benzoin condensation.	<b>5</b>
		<b>Total</b>	<b>75</b>