25901149 **Reg.No : .....**

Name : .....

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-UGP (HONOURS) REGULAR EXAMINATION March 2026

Fourth SEMESTER

Discipline Specific Core Course (DSC) - MG4DSCCHE200 - ORGANIC CHEMISTRY - 2

(2024 ADMISSION ONWARDS)

Duration: 1 Hour 30 minutes **Maximum Marks: 50**

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Multiple choice questions

Answer all questions

Each question carries **1** marks

1. Electron-withdrawing substituents on the benzene ring: [U] / [CO1]

   a). Decrease acidity b). Have no effect

   c). Increase acidity d). Destroy aromaticity

2. Which of the following aldehydes will undergo an self-aldol condensation? [A] / [CO2]

   a). Formaldehyde b). Butanal

   c). Benzaldehyde d). prop-2-en-1-al

3. Explain how the inductive effect of an electron-withdrawing substituent affect carboxylic acid acidity. [U] / [CO3]

   a). It destabilizes the conjugate base, reducing acidity b). It converts the acid into an ester

   c). It stabilizes the conjugate base by delocalizing negative charge, increasing acidity d). It has no effect on acidity

4. Ortho-nitrophenol is less soluble than para-nitrophenol due to: [A] / [CO1]

a). Intramolecular hydrogen bonding

b). Lower molecular weight

c). Steric effect

d). Lower acidity

5. Which of the following compounds has no α-hydrogen in aldehydes/ketones are acidic [A] / [CO2]

a). Acetaldehyde

b). Acetone

c). Benzaldehyde

d). Propanone

6. The nitro groups in picric acid are present at: [K] / [CO1]

a). 2,4,6-positions

b). 1,3,5-positions

c). 3,4,5-positions

d). 2,3,4-positions

7. What is the hybridization of carbonyl carbon changes after nucleophilic addition [K] / [CO2]

a). sp^2 b). sp^3 c). sp d). sp^3d

8. Identify the compound that is a dicarboxylic acid. [K] / [CO3]

a). Benzoic acid

b). Phthalic acid

c). Acetic acid

d). Salicylic acid

9. Which of the following is an amide? [U] / [CO3]

a). CH_3COOH

b). $CH_3COOC_2H_5$

c). CH_3CONH_2

d). CH_3COCl

10. Which alcohol will liberate hydrogen most rapidly with sodium? [A] / [CO1]

a).Methanol b).Ethanol c).Isopropanol d).tert-Butyl alcohol

[1x10 = 10]

Part B

Short Answer Questions

Answer any **4** questions

Each question carries **5** marks

11. Explain the biochemical pathway of ethanol metabolism, naming the enzymes involved and the intermediate products formed. Why is acetaldehyde considered toxic? [An] / [CO1]

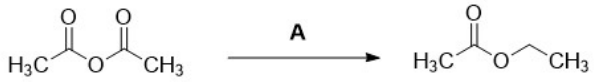
12. Write a note on the industrial uses of (a) formaldehyde (b) acetaldehyde [K] / [CO2]

13. Sketch the curved arrow mechanism for the following conversions
(a) Ethyl acetate to Acetic acid (b) Acetic acid to Ethyl acetate [A] / [CO3]

14. How are secondary alcohols prepared using Grignard reagents? Explain the mechanism of reaction, [A] / [CO1]

15. Write a note on reaction of phenyl hydrazine and hydrazine with ketone and aldehydes. [U] / [CO2]

16. Suggest suitable reagents. Sketch the curved arrow mechanism. [A] / [CO3]

1. 

2. 

[5x4 = 20]

Part C

Short Essay Questions

Answer any **2** questions

Each question carries **10** marks

17. Explain the orientation and reactivity of phenol in electrophilic substitution reactions. [An] / [CO1]

18. Draw the curved arrow mechanism of following reactions. [K] / [CO2]
a) Benzoin condensation b) Cannizaro reaction. Discuss the salient features of the mechanisms.

19. [K] / [CO3]
Illustrate the detailed curved-arrow mechanisms for:
(i) the conversion of a carboxylic acid into an acid chloride, and
(ii) the conversion of a carboxylic acid into an acid anhydride.

Clearly highlight the key mechanistic features involved in each transformation.

20. A compound **A** on reaction with acidic $KMnO_4$ yields compound **B**. **B** reacts with $SOCl_2$ to give compound **C**, which reacts with CH_2N_2 in ether, followed by reaciton with Ag_2O produces $C_6H_5CH_2COOH$. Identify **A**, **B** and **C**. Give the name of the reaction. What is the rearragnement involved? Illustrate the mechanism. [An] / [CO3]

[10x2 = 20]