



QP CODE: 24000598

24000598

Reg No : .....

Name : .....

**B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE EXAMINATIONS,  
MARCH 2024**

**Sixth Semester**

**CORE COURSE - CH6CRT10 - ORGANIC CHEMISTRY - IV**

Common for B.Sc Chemistry Model I, B.Sc Chemistry Model II Industrial Chemistry & B.Sc  
Chemistry Model III Petrochemicals

2017 Admission Onwards

BFD3D4AE

Time: 3 Hours

Max. Marks : 60

**Part A**

*Answer any ten questions.*

*Each question carries 1 mark.*

1. what is the name of the trans isomer of citral ? what is its structure ?
2. What are derived lipids? give examples?
3. Give example of a simple fatty acid present in oils and fats.
4. Mention the physiological importance of cholesterol.
5. Write the name of the C-terminal residue in the given tripeptide: Gly-Ala-Phe.
6. Give any two examples for proteins with  $\alpha$ -helix structure.
7. What are prosthetic groups?
8. What are super molecules.?
9. Give an example for a photochemical reaction.
10. The UV spectrum of acetone shows two peaks at (i)  $\lambda_{\max} = 280 \text{ nm}$ ,  $\epsilon_{\max} = 15$  and (ii)  $\lambda_{\max} = 190 \text{ nm}$ ,  $\epsilon_{\max} = 100$ . Identify the electronic transition responsible for both peaks.
11. In the case of stilbene, for which isomer  $\pi$  to  $\pi^*$  transition occurs at a higher wavelength and higher extinction coefficient and why?
12. An organic compound with molecular formula  $\text{C}_5\text{H}_{12}$  exhibits only one signal in their  $^1\text{H}$  NMR. Identify the compound and give its structural formula.

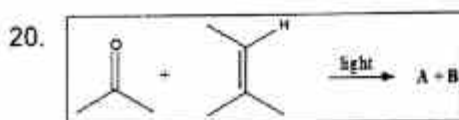
(10×1=10)



### Part B

Answer any **six** questions.  
Each question carries **5** marks.

13. What are the general classification methods of alkaloids?
14. Explain the chemistry of removing dirt by soaps?
15. Write the structure and biochemical functions of Vitamin B6.
16. Discuss in brief any one method used for the C-terminal amino acid determination in proteins.
17. Write the differences between DNA and RNA.
18. Write a note on enzyme inhibitors
19. Explain molecular recognition in DNA



(a) Draw the mechanism. (b) Predict the products **A** and **B**.

- B.**
21. An organic compound with molecular formula  $C_6H_{12}O$  exhibits following spectral data : IR:  $1715\text{ cm}^{-1}$  .  $^1\text{H NMR}$  data :  $\delta = 1.0$  (9H,singlet);  $2.0$  (3H,singlet). Identify the An organic compound with molecular formula  $C_4H_8O$  exhibits following spectral data : UV:  $\lambda_{\text{max}} = 275\text{nm}$ ,  $\epsilon_{\text{max}} = 17$ ; IR:  $2941\text{-}2857(\text{m})$ ,  $1715(\text{s})$ ,  $1460(\text{m})\text{ cm}^{-1}$ .  $^1\text{H NMR}$  data :  $\delta = 2.42$  (2H, quartet);  $2.12$  (3H,singlet);  $1.07$  (3H, triplet). Determine the structure of the compound.

(6×5=30)


### Part C

Answer any **two** questions.  
Each question carries **10** marks.

22. Explain the vulcanization technique? What structural changes can be made to natural rubber by this technique?
23. Write a note on the physical and chemical properties of amino acids.
24. Write a note on the important functions of nucleic acids.
25. (i) Define chemical shift. Explain various the various factors which affects chemical shift.  
(ii) How would you distinguish acetaldehyde and acetone using  $^1\text{H NMR}$  spectroscopy.

(2×10=20)



  
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അദ്ധ്യക്ഷൻ, കോളേജ് ഓഫ് സയൻസ്  
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**B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE EXAMINATIONS, MARCH 2024**

**Sixth Semester**

**CORE COURSE - CH6CRT11 - PHYSICAL CHEMISTRY - III**

Common for B.Sc Chemistry Model I, B.Sc Chemistry Model II Industrial Chemistry & B.Sc  
Chemistry Model III Petrochemicals

2017 Admission Onwards

902D19CF

Time: 3 Hours

Max. Marks : 60

**Part A**

*Answer any ten questions.*

*Each question carries 1 mark.*

1. Explain the terms system and surroundings as commonly used in Thermodynamics.
2. Give the expressions for heat capacity at constant volume and heat capacity at constant pressure.
3. Give the statement of the First Law of thermodynamics.
4. How is Gibbs energy related to temperature and entropy ?
5. Give the Gibbs-Helmholtz equation.
6. What is a buffer solution?
7. Give the conjugate acid and conjugate base of  $\text{OH}^-$  ion.
8. A one component system has two phases in contact with each other. What will be its degree of freedom?
9. Explain the term 'incongruent melting point'
10. Distinguish between homogeneous catalysis and heterogeneous catalysis. Give an example for each.
11. What happens to the rate of a reaction with increase in temperature?
12. What is meant by a catalytic poison?

(10×1=10)



**Part B**

*Answer any six questions.*

*Each question carries 5 marks.*

13. Explain any two methods for the liquifaction of gases.
14. Derive an expression for the work done in a reversible isothermal expansion of an ideal gas.
15. Derive relationship between heat of reaction at constant pressure and that at constant volume.
16. 14 grams of  $N_2$  at 290 atm are compressed adiabatically from 8 to 5 litres. Calculate the final temperature and the work done on the gas. Assume  $C_p = 7/2 R$ .
17. Describe Carnot's cycle. Derive an expression for the efficiency a reversible heat engine working between temperatures  $T_1$  and  $T_2$  ( $T_2 > T_1$ ).
18.  $K_p$  for a reaction at 327 K and 347 K are  $1 \times 10^{-12}$  and  $5 \times 10^{-12}$  respectively. Assuming  $\Delta H$  to be constant in the above temperature range, calculate  $\Delta H$ .
19. Explain the terms levelling solvents and differentiating solvents with a suitable examples.
20. Calculate the pH of (a) 0.01 N  $H_2SO_4$  and (b) 0.02 M  $H_2SO_4$ .
21. Explain chain reactions and parallel reactions with a suitable example.

(6×5=30)

**Part C**

*Answer any two questions.*

*Each question carries 10 marks.*

22. What is Joule - Thomson effect? Justify that during this process, enthalpy of the system remains constant. Derive the expression for Joule - Thomson coefficient. Explain its values for ideal gases and real gases.
23. State and explain the Third law of thermodynamics. How is it found useful in determining the absolute entropies of solid, liquid and gaseous systems ?
24. Discuss the phase diagram of a simple eutectic system with reference to lead-silver system. Explain its relevance with the pattinson's process.
25. Discuss the Lindemann theory of unimolecular reactions with special reference to the use of steady state approximation.

(2×10=20)

(നിൻസിപ്പാൾ)

ബിരുദ ക്യാമ്പസിലെ കോളേജ് ഹോൾ വിഭാഗം  
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