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(FOR THE CANDIDATES ADMITTED  
DURING THE ACADEMIC YEAR 2021 ONLY)

SUB CODE **21UCY613**  
REG.NO. :

**N.G.M. COLLEGE (AUTONOMOUS) : POLLACHI**  
**END-OF-SEMESTER EXAMINATIONS: MAY 2024**

**B.Sc CHEMISTRY**  
**SEMESTER:VI**

**MAXIMUM MARKS: 70**  
**TIME : 3 HOURS**

**PART - III**

**CHEMICAL KINETICS AND QUANTUM MECHANICS**

**SECTION - A (10 X 1 = 10 MARKS)**

**ANSWER THE FOLLOWING QUESTIONS.(K1)**

1. If a reaction's rate is represented as rate =  $A [A]^2 [B]$ , the reaction's order will be \_\_\_\_\_  
(a) 2 (b) 3 (c) 1 (d) 0.
2. A reaction's rate constant is determined by \_\_\_\_\_  
(a) temperature of the reaction (b) extent of the reaction  
(c) initial concentration of the reactants (d) the time of completion of reaction
3. Enzymes that catalyze the transfer of atom or group between two molecules is known as \_\_\_\_\_  
a) oxidoreductases b) transferases c) ligases d) isomerase
4. Fluorescence occurs when transition is \_\_\_\_\_  
a) Triplet-Triplet b) Singlet-singlet c) Triplet-singlet d) All of these
5. Total number of nodes for 3d orbital is \_\_\_\_\_  
a) 3 b) 2 c) 1 d) 0

**ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES (K2)**

6. The number of molecules of the reactants involved in a single stage of the reaction indicates---
7. The order of reactions is determined by
8. The factor that influences a heterogeneous catalyst's activity is
9. The substances which initiate a photochemical reaction but itself does not undergo any chemical change is called
10. According to the Aufbau's principle, which orbital should be filled first?

**(CONTD .... 2)**

**SECTION – B****(5 X 4 = 20 MARKS)****ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)**

11. a) Describe rate laws and rate equation.  
(OR)  
b) Derive the expression for  $t_{1/2}$  for first order reaction.
12. a) What is the difference between order and molecularity of a chemical reaction?  
(OR)  
b) Compile Lindemann theory of unimolecular reactions.
13. a) Infer the theories of homogeneous and heterogeneous reactions.  
(OR)  
b) Derive Michaelis Menten equation.
14. a) Discuss the laws of photochemistry.  
(OR)  
b) Compare between thermal and photochemical reactions.
15. a) Sketch a diagram with a neat explanation on Normalization wave functions.  
(OR)  
b) State postulates of quantum mechanics.

**SECTION - C****(4 X 10 = 40 MARKS)****ANSWER ANY FOUR OUT OF SIX QUESTIONS****(16<sup>th</sup> QUESTION IS COMPULSORY AND ANSWER ANY THREE QUESTIONS  
(FROM Qn. No: 17 to 21) (K4 / K5)**

16. Explain Voltammetry. Discuss the different types of voltametric techniques.
17. Elaborate about what the factors that are influencing chemical reactions.
18. Derive the Arrhenius equation.
19. Make a note on any two types of adsorption isotherms.
20. Discuss the Quantum yield.
21. Give an account of operators.

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