THE AMERICAN COLLEGE, MADURAI

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

Re-accredited (2nd Cycle) by NAAC with Grade "A", CGPA – 3.46 on a 4-point scale

Backlog Arrear Examination, March 2021

CHE 2424   **ORGANIC & PHYSICAL CHEMISTRY-II**   Time: 3 hours

Max:75 Marks

(Answer any Five Questions)   **(5x15 = 75)**

1. Explain with mechanism   (a) Cannizaro reaction (b) Mannich reaction

    (c) Claisen-Schmidt reaction d) Clemmensen e) Bayer-Villiger   (15)

2   Carry out the following conversions   (15)

    (a) Urea to Barbituric acid (b) Keten to Methanamine (c) Ethylene to succinnic acid

    (d) Malonic acid to fumaric acid (e) Ethylacetoacetate to anitipyrine.

3. (a) Give mechanism for carbylamines reaction   (7)

    (b) Give the utility of diazonium salts.   (8)

4. (a) Explain with block diagram, a typical emission spectrophotometer.   (5)

    (b) Using the energy level expression and the selection rules draw an energy level

        diagram and the spectral transition for microwave spectrum of a rigid diatomic rotor

        and the apparent of the spectrum.   (10)

5. (a) With selection rule, explain the pure rotational Raman spectra of linear molecule.   (5)

    (b) State and explain Franck-Condon principle.   (10)

6. (a)   State rule of mutual exclusion. Explain how it is used to predict the centre of

        symmetry of CO_2 molecule.   (10)

    (b) Comment on the pure rotational Raman spectra of O_2, H_2 and CO_2.   (5)

7. (a) Predict the hybridization of ammonia using character table.   (10)

    (b) Distinguish between reducible and irreducible representation.   (5)

CHARACTER TABLE

C_{3v}	E	$2C_3$	$3\sigma_v$		
A_1	1	1	1	z	x^2+y^2, z^2
A_2	1	1	-1	R_z	
E	2	-1	0	(x,y), (R_x, R_y)	(x^2-y^2, xy), (xz, yx)

C_{2v}	E	C_2	$\sigma_v(xz)$	$\sigma_v(yz)$		
A_1	1	1	1	1	z	x^2, y^2, z^2
A_2	1	1	-1	-1	R_z	xy
B_1	1	-1	1	-1	x, R_y	xz
B_2	1	-1	-1	1	y, R_x	yz