2063
M.E. (Mechanical Engineering)
Second Semester
Elective - II
MME-205(f): Mechatronics

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, selecting atleast two questions from each Part. All questions carry equal marks.

x-x-x

Part-A

1. You are offered a choice of an incremental shaft encoder or an absolute shaft encoder for the measurement of an angular displacement. What is the principal difference between the results that can be obtained by these methods?

2. A DC motor is required to have (a) a high torque at low speeds for the movement of large loads, (b) a torque which is almost constant regardless of speed. Suggest suitable forms of motor for both cases with reasoning.

3. Explain the principals of operation and control for permanent magnet stepper motor.

4. By examining the following mechanisms, explain the number of DoF for (a) wind screen wiper (b) human knee.

Part-B

5. How are the logic functions obtained by combination of switches? Write the ladder programs for AND, OR & NAND.

6. What is the principal of 3D rapid prototyping? Explain with sketch the FDM printing.

7. Draw ladder rungs representing (a) two switches are normally open and both have to be closed for a motor to operate (b) either of two, normally open, switches have to be closed for a coil to be energized and operate an actuator

8. Present mechatronic solution of possible design for a pick and place robot for an automatic car parking.

x-x-x