

2062

B.E. (Mechanical Engineering)

Eighth Semester

MEC-801: Mechatronics

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- a) Why are directional control valves used?
- b) Why can't the derivative control action be used alone?
- c) What is the advantage of using a microcontroller in place of a mechanical controller?
- d) A d.c. motor is required to have a high torque at low speeds for the movement of large loads. Suggest suitable forms of motor.
- e) What is hydraulic resistance and hydraulic capacitance? (5x2)

**UNIT - I**

II. Explain the following in detail with the help of a neat sketch:

- a) Directional control valves
- b) Pressure control valves
- c) Process control valves
- d) Rotary actuators

(4x2½)

III. A hydraulic cylinder is to be used to move a work-piece in a manufacturing operation through a distance of 50 mm in 10 s. A force of 10 kN is required to move the work-piece. Determine the required working pressure and hydraulic liquid flow rate if a cylinder with a piston diameter of 100 mm is available. (10)

IV. Using a neat sketch of a circuit diagram, explain the electronic proportional integral derivative (PID) controller. (10)

P.T.O.

(2)

**UNIT - II**

- V. Explain interfacing A to D and D to A conversion fundamentals. (10)
- VI. Explain the mechatronic system design with regards to microprocessor based timed switch. (10)
- VII. Giving complete details, explain the microprocessor 8085 architecture using a schematic diagram. (10)

*x-x-x*