

Con. 5441-09.

B.E. (ETRX) Sem VIII

SP-6836

(3 Hours)

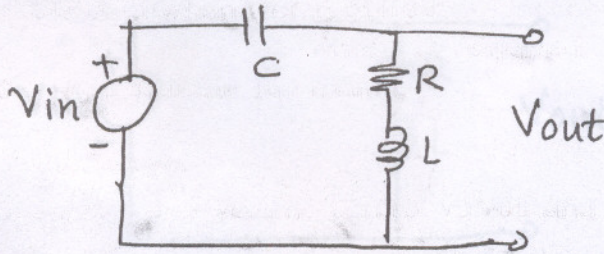
[Total Marks : 100

22/12/09

Mechatronics

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions out of remaining **six** questions.
 (3) Assume **suitable** data whenever **required**.
 (4) Illustrate answers with **sketches** wherever **required**.
 (5) **Figures** to the **right** indicate **full** marks.

1. Answer any **four** of the following :- 20
- Give different types of volume control valves and explain in brief.
 - What is mechatronics ? Which are the key elements of mechatronics ?
 - Give the list of gear types and draw any two diagrams of gears.
 - Why PI controller is called industrial controller ?
 - Draw ladder diagram of
 If start switch is pressed Motor 1, Motor 2, Motor 3 start.
 If stop switch is pressed after 10 sec. Motor 1 stop then after 10 sec. Motor 2 stop then after 10 sec. Motor 3 stop.
2. (a) Explain in detail Mechatronics design process diagram, operation and importance. 12
 (b) Compute the block diagram representation for the following electrical circuits 8
 shown in **figure**.



3. (a) Explain various properties of sensors. 10
 (b) Explain construction and operation of brushless DC motor. 10
4. (a) What is adaptive control system ? Compare the performance of different types of adaptive control system. 10
 (b) Explain major components of data acquisition and control system. 10
5. (a) Draw the block diagram of PLC and explain each block in detail. Also explain selection procedure and features of PLC. 8
 (b) Draw the ladder diagram for the following :- 12
 If start switch is pressed after 10 sec. Motor M1 start then after 10 sec. Motor M2 start but Motor M1 stop then after 10 sec. Motor M3 start but Motor M2 stop. Then after 10 sec Motor M1 start but Motor M3 stop.

6. (a) Explain P, PI, PD, PID controller with the help of circuit diagram. Also draw the output waveforms for step input and ramp input. **12**
- (b) What are the applications of fiber optic devices in mechatronics. **8**
7. Write a note on :- **20**
- (a) Stepper motor
 - (b) Various tunings methods of PID
 - (c) Neural Network
 - (d) Fluid power circuit.
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