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M – 6693

Reg. No.

Name :



Seventh Semester B.Tech. Degree Examination, December 2021

08.702 : MECHATRONICS (MPU)

(2008 Scheme)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries 4 marks.

1. Explain the advantages of Hydraulic actuators over pneumatic ones.
2. Define closed loop system. Explain with a neat diagram an example of open loop control system.
3. Distinguish between Photoelectric and Hall effect sensors.
4. Explain the working principle of thermistor.
5. What do you mean by first order system?
6. What is the main use of stepper motor?
7. What are the advantages of antifriction guideways?
8. Distinguish between Magnetic and optical proximity sensors.
9. Compare PLC and general purpose computers.
10. Explain the histogram analysis technique of image processing.

(10 × 4 = 40 Marks)

P.T.O.



PART – B

Answer **one** questions from **each** Module.

Module – I

11. (a) What do you mean understand by the term 'Mechatronics'? Is mechatronics the same as electronic engineering plus Mechanical engineering? 8
- (b) Explain the working of incremental and absolute optical encoders. Why grey code is used in coding absolute encoders? 12

OR

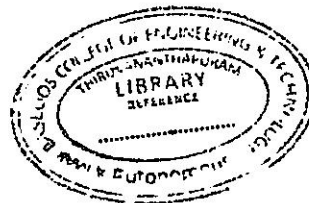
12. (a) How pressure control valves are classified Explain with a neat sketch, a pressure relief valve 8
- (b) How does MEMS gyroscope work? Define coriolis force and Coriolis acceleration. Discuss the compensation techniques used in the process of fabricating the gyroscope. Explain the meaning of DSA. 12

Module – II

13. (a) Explain the basic design factors involved in the design of a machine structure. 8
- (b) Explain the two methods of I/O processing. Enumerate the sequence followed by a PLC when carrying out a program. 12

OR

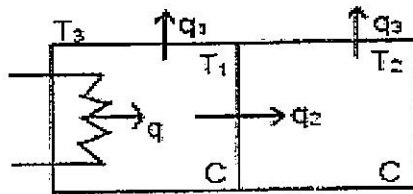
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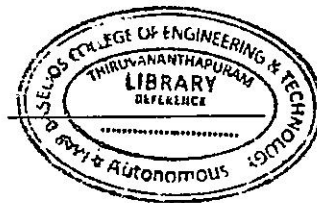


14. (a) Compare the difference of roller and ball screws. 8
- (b) The figure below shows a thermal system involving two compartments, with one containing a heater. If the heater is T_1 , the temperature of the other compartment T_2 and the temperature of the compartments T_3 , develop equations describing how the temperatures T_1 and T_2 will vary with time. All the walls of the containers have the same resistance and negligible capacitance. The two containers have the same capacitance C . 12



Module – III

15. (a) With a neat sketch, explain the principle and operation of a vidicon camera tube for robotic vision. 6
- (b) Explain the mechatronics design of an automatic car park system. 14
- OR
16. (a) With a neat sketch explain ultrasonic range finder. 6
- (b) Explain the working of a Hybrid stepper motor with neat sketches. Also explain the terms pull-in torque, pull-out torque and slew range 14



(3 × 20 = 60 Marks)

