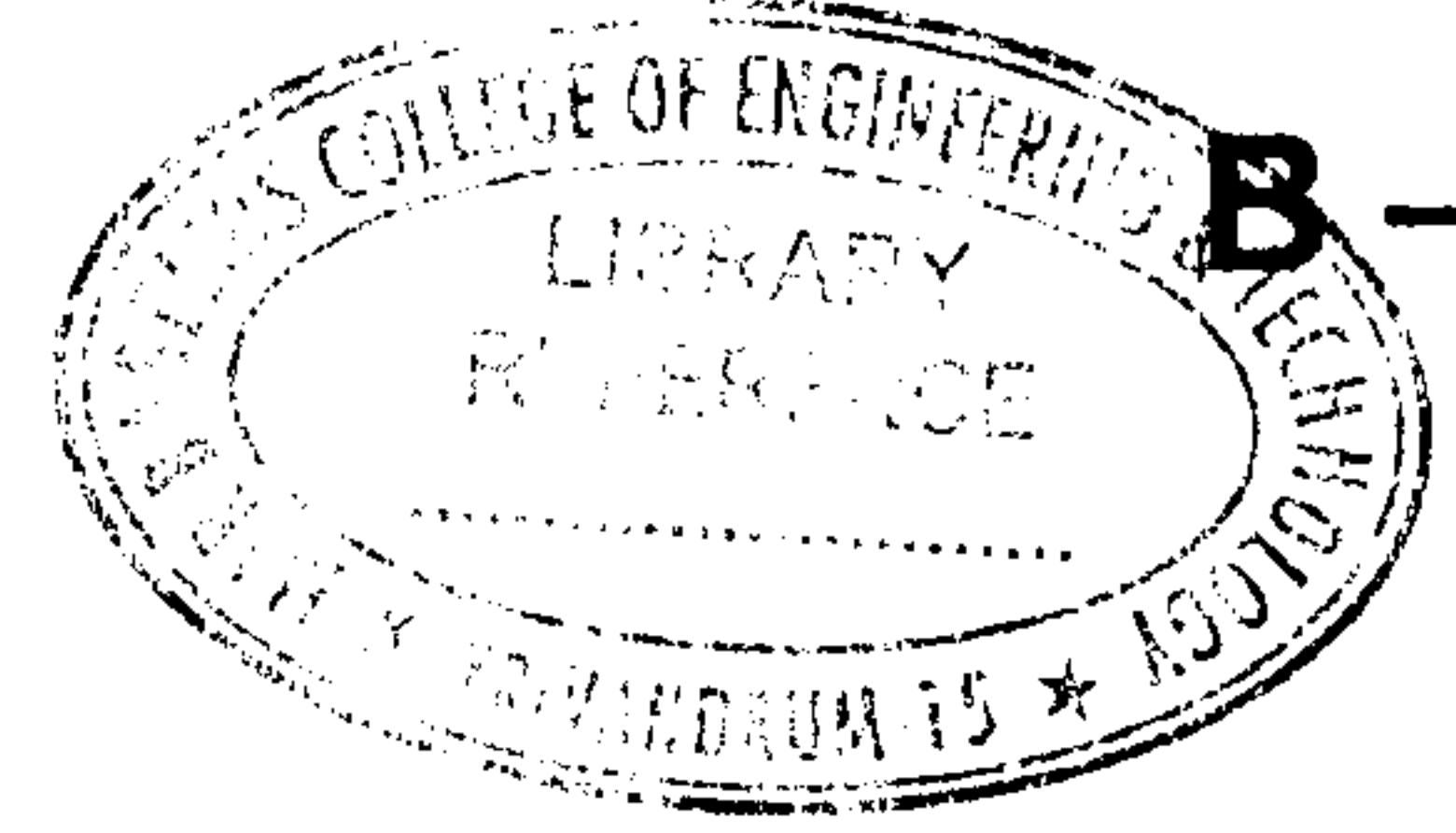




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B – 3443

Reg. No. :

Name :

**Seventh Semester B.Tech. Degree Examination, December 2016
(2013 Scheme)
13.702 : MECHATRONICS (MPSU)**

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **2** marks.

1. Write one method of characterizing non-linearity error for sensors.
2. Briefly explain any one type of flow sensor.
3. Differentiate the features of incremental and absolute encoder.
4. What are cushioning and damping in pneumatic circuits ?
5. Sketch the standard representation of a lever operated 4/3 direction control valve.
6. Present the feature of a positive resist in MEMS fabrication.
7. Suggest a method to avoid 'stick-slip' in friction LM guide ways.
8. What is 'latch' in PLC program ? Represent latch in a sample PLC program.
9. What is meant by triangulation method of range sensing ?
10. Write a note on image thresholding. **(10x2=20 Marks)**

PART – B

Answer **one complete** question from **each** Module. **Each** question carries **20** marks.

Module – 1

11. a) Describe the use of eddy current and capacitance for proximity sensing.
b) Prepare a comparative report on the working of resolver and synchro.

OR

12. a) Illustrate the configuration of gray coded absolute encoder.
b) Describe the features and applications of Acoustic Emission (AE) sensing system.

P.T.O.



Module – 2

13. a) Illustrate the functioning of a hydraulic power supply system.
b) Develop a pneumatic circuit to operate two cylinders in sequence. Explain its working.

OR

14. a) Describe LIGA process in MEMS fabrication.
b) Illustrate the working of piezo-resistive MEMS pressure sensor.

Module – 3

15. a) Describe the design aspects of the structure of CNC machines by considering various loads acting on it.
b) Compare the features of hydrostatic and hydrodynamic bearings.

OR

16. a) Develop a PLC ladder program to glow three lights in sequence with a delay of 10 seconds in between. The circuit has only one switch to control the lighting sequence.
b) Develop a mathematical model for a typical mechanical system considering the basic building blocks.

Module – 4

17. a) Describe the functioning of a permanent magnet stepper motor.
b) Explain the working of CCD Camera.

OR

18. List the typical sensors used in automobile engine management system. Write the functioning of each sensor and the system.

(4×20=80 Marks)

