M.Tech. 1st Semester (MAE) CBCS Scheme

Examination, December–2018

MECHATRONICS AND PRODUCT DESIGN

Paper– MTMA21C2

Time allowed : 3 hours]   [Maximum marks : 100

Note: *Question No. 1 is Compulsory. Remaining out of eight solve in such a way that at least **one** question is attempted from each section.*

1. Explain the following: 5×4=20

    (a) Define flip-flop system and its types.

    (b) Explain Potentiometer sensor with example.

    (c) What are the optical encoders?

    (d) Explain signal conditioning processes.

Section–A

2. Explain the basics aspects of a micro-processor based system that can be used to control the focusing and exposure of an automatic camera.   20

3. Explain the JK and SR flip flop with diagram.   20

Section–B

4. Derive a system which will allow a door to opened only when the correct combination of four push buttons is pressed, any incorrect combination sounding an alarm.   20

5. Derive differential equations for a d.c. generator. The generator may be assumed to have a constant magnetic field. The armature circuit having both resistance and inductance in series with the load.   20

Section–C

6. Explain the first order system with suitable example and diagram.   20

7. Define interfacing. Explain A-D and D-A convertors with diagram.   20

Section–D

8. Derive Differential equation of Hydraulic mechanical systems. http://www.HaryanaPapers.com   20

9. Derive the differential equation relating the pressure 'p' to a diaphragm actuator to the displacement 'x' of the stem.   20