Reg. No. | | | | | | | | | | |

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

FIFTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER DEGREE EXAMINATIONS, DECEMBER - 2019

SUBJECT: CONTROL SYSTEM COMPONENTS [ICE 3105]

TIME: 3 HOURS MAX. MARKS: 50

Instructions to candidates :*Answer ALL questions and missing data may be suitably assumed.*

1A. What is servomechanism? Explain with an example.

1B. Describe the working of a field controlled DC servo motor with a neat diagram.

1C. Explain synchro system operation with necessary diagrams.

(2+4+4)

2A. How Hybrid stepper motor is different from permanent magnet type and variable reluctance type stepper motor?

2B. Explain the torque vs. angle characteristics of a stepper motor with necessary waveforms.

2C. Draw the instrument line symbols for the following. 1. Pneumatic signal 2. Electric Signal 3. Capillary tube 4. Software or data link 5. Mechanical link 6. Sonic signal

(4+3+3)

3A. Design a pneumatic lift system with UP and DOWN functions using valves.

3B. What is valve flow coefficient? How is it important in valve sizing? Explain with example.

3C. What is rangeability of a valve? Explain how rangeability varies with valve characteristics.

(3+4+3)

4A. Draw the sketch of relay type controller and describe its working.

4B. Classify the Followers based on its motion. Explain each type with neat diagram.

4C. Explain the working of balanced vane pump with the help of a neat diagram.

(3+3+4)

5A. Explain the construction and working of gerotor pump.

5B. Describe the different types of gyroscopes and their field of application.

5C. Define the following for a gyroscope. 1. Angular velocity of precession 2. Axis of precession 3. Precessional angular motion.

(3+4+3)

****