Reg. No.

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL A Constituent Institution of Manipal University

SEVENTH SEMESTER B.TECH (INSTRUMENTATION & CONTROL ENGG.) **END SEMESTER EXAMINATIONS, DEC-2017**

SUBJECT: CONTROL SYSTEM COMPONENTS [ICE 3105]

Time: 3 Hours

MAX. MARKS: 50

3

3

3

4

3

3

2

Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitably assumed.
- With necessary sketch explain the working of a servo motor with potentiometer as 1A. 3 feedback senor used for position control. Draw the schematic of an armature controlled DC servo motor and explain its working. 1B. 4
- 1C. Explain the working of a Resolver with neat diagram.
- 2A. Consider a 2-phase, 4 stator pole, permanent magnet stepper motor and tabulate the 3 logic sequence for 180° counter clockwise rotation.
- For the Fig. Q2B, calculate the final position of TR and individual stator voltages of TX, 2B. 4 TDX, and TR, if TX rotor is at 45° CCW and TDX rotor is at 30°CCW. 3
- **2C.** What is zeroing of synchros? Explain all the methods with necessary figures
- 3A. Illustrate the working of a three-way (diverter and mixer) valve with an example.
- Draw the sketch of a control valve and list its components. 3B.
- 3C. Discuss the methods used to eliminate cavitation and flashing.
- 4A. Draw the schematic of an electronic valve positioner and explain its working.
- 4B. Write a note on the different terms used in cams and followers. Explain with necessary 4 sketch. 3
- 4C. Explain the working of a non-bleed type relay controller with figure.
- **5A.** Explain the working of a Gerotor pump with neat sketch.
- **5B.** Write a note on control valve sizing.
- 5 5C. Derive the expression for total angular acceleration of a disc in a gyroscope with necessary vector diagrams.

