

Total No. of Questions – [8]

Total No. of Printed Pages 2

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| G.R. No. |  |
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Paper code - U228-155 (ESE)

**MAY 2019/ENDSEM**

**S. Y. B. TECH. (Mechanical Engineering) (SEMESTER - II)**

**COURSE NAME: Mechatronics**

**COURSE CODE: MEUA22175**

**(PATTERN 2017)**

Time: [2 Hours]

[Max. Marks: 50]

**(\*) Instructions to candidates:**

- 1) Answer Q.1, Q.2, Q.3, Q.4, Q.5 OR Q.6, Q.7 OR Q.8
- 2) Figures to the right indicate full marks.
- 3) Use of scientific calculator is allowed
- 4) Use suitable data where ever required

Q.1) a) Explain Hall effect sensor with the help of neat sketch? [6]  
**OR**

b) Explain different dynamic characteristics of measurement system? [6]

Q.2) a) Write different mechanical aspects of motor selection? [6]  
**OR**

b) Explain 3-phase induction motor with the help of neat diagram? [6]

Q.3) a) Classify signal communication and explain them? [6]  
**OR**

b) Explain block diagram reduction technique rules? [6]

Q.4) a) Explain PI controller with block diagram and its effect? [4]  
**OR**

b) Write down Stepwise Procedure for Manual Tuning of PID controller? [4]

Q.5) a) Draw ladder logic for traffic light control [6]  
Condition: Red light on for 30 sec then off

Yellow light on for 15 sec then off

Green light on for 60 sec and repeat

- b) Explain the concept of latching with example? [4]
- c) Draw ladder logic for NAND and NOR gates? [4]

**OR**

- Q.6) a) Draw ladder logic for bottle filling plant and explain? [6]
- b) Draw a ladder logic for cutting machine [4]
- Process: When we press start button lubricant should flow, after 25 second the cutter should start.
- c) Explain architecture of PLC with neat diagram? [4]

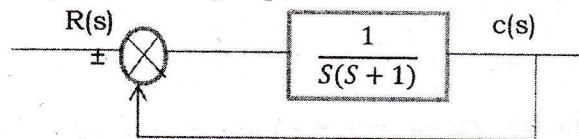
- Q.7) a) Find transfer function for mechanical system with spring and damper system with  $m=1\text{kg}$   $d=0.5$  and  $k=2$  also locate poles on s-plane? [6]
- b) Find the value of zeta and report the kind of response expected? [4]

$$G(S) = \frac{12}{S^2 + 8S + 12}$$

- c) Explain Routh Hurwitz criterion? [4]

**OR**

- Q.8) a) Determine  $T_d$ ,  $T_r$ ,  $T_p$  when a control system shown in fig [6] subjected to step input?



- b) Define hydraulic and pneumatic systems with examples? [4]
- c) Explain mechatronics system design with flow chart? [4]