Total No. of Questions – [6] Total No. of Printed Pages:2

G.R. No.	

Paper Code - U239 - 155 (ESE.

DECEMBER 2019/20 ENDSEM
S. Y. B.TECH. (Mechanical) (SEMESTER – III)
COURSE NAME: Instrumentation and Control
COURSE CODE: MEUA21185
(PATTERN 2018)

Time: [2 Hours] [Max. Marks: 50]

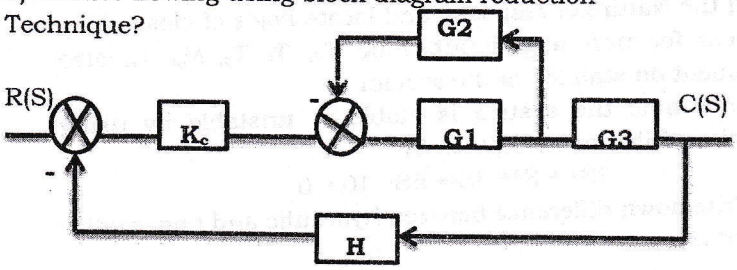
(*) Instructions to candidates:
1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of scientific calculator is allowed.
4) Assume suitable data where ever required.

Q.1) Attempt any **one**
a) Explain hall effect sensor with neat diagram? [4]
b) Differentiate thermocouple and thermistor? [4]

Q.2) Attempt any **one**
a) Define lenz law? Explain Fleming's left hand rule in detail? [4]
b) Explain servo motor with the help of neat diagram [4]

Q.3) Attempt any **one**
a) Draw and explain ARM core based processor? [6]
b) What is sampling? Explain types of sampling? [6]

Q.4) Attempt any **one**
a) i) Derive the transfer function for PI controller and represent using block diagram? [6]
ii) Reduce flowing using block diagram reduction Technique? [4]

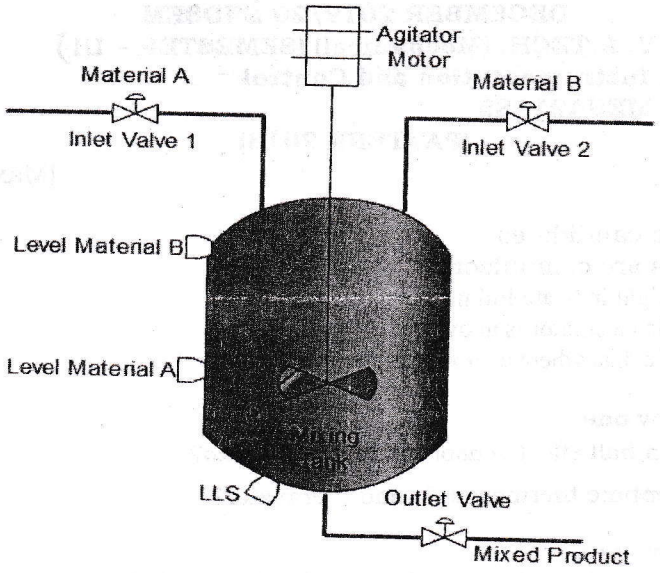


b) i) Differentiate close loop and open loop control system? [6]
ii) Derive transfer function equation for PD control system? [4]

Q.5) Attempt any **one**
a) Draw ladder logic [7]
Press start button to start conveyor, each box is counted with proximity switch. All the 1000 no of boxes are to be collected in a container after collecting container has to move with the help of pump.

ii) Define latching? Explain the concept of latching by taking motor example [6]

b) i) Draw ladder logic for fallowing process shown in fig? [7]



ii) Draw a ladder logic for cutting machine
Process: When we press start button lubricant should flow, after 25 second the cutter should start. [6]

Q.6) Attempt any **one**

a) i)open loop transfer function of a unity feedback system [13]

$$G(S) = \frac{4}{S(S+1)}$$

Find the Nature of response and locate Poles of closed loop system for unit step input. Find T_d, T_r, T_p, M_p, T_s. also comment on stability of the system

b) i) Determine the system is stable or unstable by using Routh stability criterion? For TF [7]

$$2S^4 + S^3 + 3S^2 + 5S + 10 = 0$$

ii) Write down difference between hydraulic and pneumatic system? [6]