Sem. VIII / INST (CBGS) I. S. D. / 30.05.16

Instrument & System Design

Q.P. Code : 733401

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question **No. 1** is **compulsory.**
(2) Attempt **any three** out of remaining questions.
(3) Assume suitable data if required and state it clearly.

1. Answer the following:- **(Any Four)**
   (a) State True/False and hence justify- "Man-Machine interaction forms a closed loop". **5**
   (b) Explain the physical significance of piping geometry factor in valve sizing. **5**
   (c) Define Reliability and explain the terms MTTF, MTBF and MTTR. **5**
   (d) Explain GA drawing. **5**
   (e) List the methods of thermocouple calibration. Give name of the most accurate method and justify it. **5**

2. (a) Size a control valve for the following:- **10**
   Fluid; Dry saturated steam
   Flow rate: 6000 lb/hr
   Upstream pressure: 50 psig
   Downstream pressure: 55.7 psia
   Pipe Diameter: 4" sch 40
   Valve style: Globe valve
   $C_d = 13$, $X_T = 0.75$.
   (b) Write a short note on system engineering. **10**

3. (a) Draw a typical control room layout diagram and explain the guidelines used to design the same. **10**
   (b) Explain IP standards used for enclosure design. **10**

4. (a) Discuss the factors to be considered while designing transducer. **10**
   (b) Draw and explain Bath tub curve with its significance. **10**

TURN OVER

5. (a) Find the predicted SPL at 1.2 meter downstream of the valve and 3 feet horizontally from the pipe surface it - **10**

Upstream pressure = 125 psia
Downstream, pressure = 65 psia
Pipe diameter = 2"sch 40 (O.D = 2.735")
Thickness = 0.154"
$X_T = 0.7$, $C_V = 35$.
Insulation one inch thermal (4dB/inch)
Location: open area 30" above ground.

(b) Write a short note on - Grounding and shielding. **10**

6. (a) Explain illeffects of cavitation with remedies to reduce it. **10**

(b) Size a control valve for the following:- **10**

Fluid: water, flow rate = 1600 gpm
Upstream pressure: 27.9 psig
Downstream pressure: 34.7 psia
Valve style: 60^0 Butterfly Valve, Cd =17

Course: B.E. (Sem - VIII) (CBSGS) (All Branches)

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Correction

Q 6 (a) read as ".....reduce it" instead of ".....refuce it"

Q 6 (b) add Pipe diameter = 8" sch 40

Date and Time 30/05/2016 11:25 AM

M.V. Jaklave
30/05/16
11.32 AM
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Vaibhavi
30/5/16.
11.40 am.
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