BE/Sem VIII/ CBGS/INST/DEC 2016 | Instrument & System Design

16-12-2016

Q. P. Code : 733403

(3 Hours) **Marks : 80**

Note : 1) Question **1 compulsory**
2) Solve **any 3** out of the remaining **5** questions

1. Solve **any 4** 20
   a) Explain piping geometry factor.
   b) Explain the wire method of thermocouple.
   c) Discuss the following terms related to reliability: MTTR and MTBF
   d) Define ergonomics. How ergonomics is applied in designing control panel?
   e) Explain flashing with its pressure profile diagram.

2. a) Water at 15° C is flowing through 12 inch standard weight pipe (D= 12") at a rate of 2800gpm. It is proposed that a standard 60° opening Butterfly valve be used for control. Find size required, if P_1 is computed to be 72.2psia and P_2 is 64.1psia. Assume valve with C_d=17. 10
   b) Explain with diagrams methods of reducing control valve noise. 10

3. a) Find the expected sound pressure level at the location of the observer under the following conditions 10
   Valve type- Cage guided Globe valve
   x_T = 0.75, C_V= 34, P_1=114.5 psia, P_2= 54.5 psia
   D= 2" sch 40 (O.D = 2.375")
   t = 0.154" Location – open area 3feet above ground, 3 feet away from observer
   b) Explain phases in electronic product design. 10

4. a) Explain choked flow condition and expansion factor for gases. 10
   b) Find valve size for the following conditions 10
   Fluid - Benzene with fine non abrasive solids
   G = 0.88
   Q = 450 gpm
   P_1 = 80 psia
   P_2 = 71 psia
   T_1 = 528° R
   D = 6 inch schedule 40
   Valve is characterized ball with C_d=25

5. Write short note on
   a) Grounding and shielding of an electronic product 10
   b) Types of control panels. 10

6. a) Explain the general selection criteria for transducers. 10
   b) Explain with diagram remedies to avoid cavitation. 10
