

Duration: 03 Hrs.

Total Marks: 80

Note:

- 1) Q. No 1 is compulsory.
- 2) Attempt any THREE questions from Q No 2 to Q No 6.
- 3) Assume suitable Data wherever necessary.

Q.1. Answer any Four.

(20)

- a) Explain piping geometry factor with its significance in control valve sizing.
- b) Explain ergonomics in brief.
- c) Explain Cavitation with pressure profile diagram.
- d) Explain IP classifications.
- e) Prove that expansion factor is  $2/3$  for choked flow.

Q.2.

- a) Explain Control Room Design Criteria. (10)
- b) Explain bath tub curve with its significance. (10)

Q.3.

- a) Write short note on System engineering. (10)
- b) What are different methods used to increase reliability of the System. (10)

Q.4.

- a) Discuss different methods for abatement of noise in Control valves (10)
- b) Design a  $C_v$  for control valve with following application: (10)

$P_1=169.6$  psia ,  $P_2=20$  psia ,  $P_{vp}=20$  psia ,  $C_d=6.5$  ,  $F_L=0.73$  , Pipe Size= 3"sch 40  
 $w=2,10,000$  lb/hr , sp. weight. ( $\gamma_1$ )= $1/0.01683$  lb/ft<sup>3</sup> ,  $P_c=3200$  psia.

Q.5.

a) Explain different guidelines for grounding and shielding of equipments. (10)

b) Design a  $C_v$  for following application: (10)

Fluid= Saturated Steam,  $w=63000$  lb/hr,  $P_1=235$ psia,  $P_2=215$ psia, Pipe size= 6"sch 40,

$C_d=27$ ,  $X_T=0.25$ .

Q.6.

a) Explain absolute method of Thermocouple calibration. (10)

b) Explain control room design and layout. (10)

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