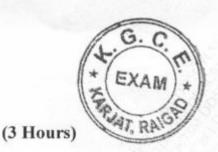
MAY 2017 /30-05-17



Q.P.Code: 016371

[Total Marks: 80]

Note- Question 1 compulsory and solve any 3 out of the remaining 5 questions

Q1. Solve any 4

[20marks]

- a) What is maximum flow for gases, explain with a graph of pressure drop ratio (x) versus flow rate (w).
- b) What is absolute calibration method? Give an example.
- c) Explain the concept and need of redundancy in product design
- d) Define ergonomics. What is its purpose?
- e) Explain control valve actuator selection criteria.

Q2.

a) A valve is required to meet the following condition-

[10marks]

Fluid - CO₂

k=1.28

Z = 0.8

pipe diameter D=3"sch 40

T=548°R

Q=4,00,000 scfh

 $x_T = 0.75$

 $P_1 = 557.7$ psia $P_2 = 414.7$ psia

 $C_d = 14$ Find the correct valve size.

b) Explain the guidelines for design of Control room layout and environment design. [10marks]

Q3.

a) Size a valve to pass 6000 lb/hr of Dry Saturated steam flowing in a 4 inch schedule 40 pipe $P_1=50$ psig. $P_2 = 41 psig$

k= 1.4

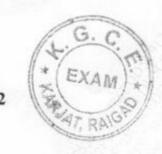
Valve selected is Globe valve with $x_T = 0.75$ and $C_d = 13$

[10marks]

b) Explain the design criteria of Thermocouple.

[10marks]

TURN OVER



Q.P.Code: 016371

[10marks]

[10marks]

Q4.

a) Explain the general selection criteria for transducers.

b) Check if the given actuator works satisfactorily

Type:

FTO

Packing:

Teflon V-ring

 $K_h =$

-0.16 for opening

-1.0for closing

Seat diameter: 0.5 inches

Fluid pressure: 40 – 20 psig for opening

i. 50 - 10 psig

for closing

Diagram area: 69" square

Spring rate available:

275 / 370 / 460

Air pressure:

3-15 psig

Q5. Write short note on

a) Phases of Electronic product design

[10marks]

b) System engineering.

[10marks]

Q6.

a) Explain the concept of Reliability with the terms MTTF, MTTR and MTBF

[10marks]

b) Explain with methods of reducing control valve noise.

[10marks]