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NPTEL

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## Unit 11 - Week 10

### Course outline

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Lecture 25: Flapper - Nozzle

Lecture 26: Problems and Solutions on Industrial Instrumentation

Quiz : Week 10: Assignment on flapper nozzle

Assignment solution

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### Week 10: Assignment on flapper nozzle

1) 2 points  
For a flapper-nozzle system, if the flapper is tightly attached to the nozzle, then the output pressure ( $P_o$ ) of the nozzle back chamber can be expressed in terms of supply pressure ( ) as-

- (a) Output Pressure = (Supply Pressure)/2
- (b) Output Pressure = Supply Pressure
- (c) Output Pressure = 2\*(Supply Pressure)
- (d) Zero

**Accepted Answers:**

(b) Output Pressure = Supply Pressure

2) Typical supply pressure for the flapper-nozzle system is- 2 points

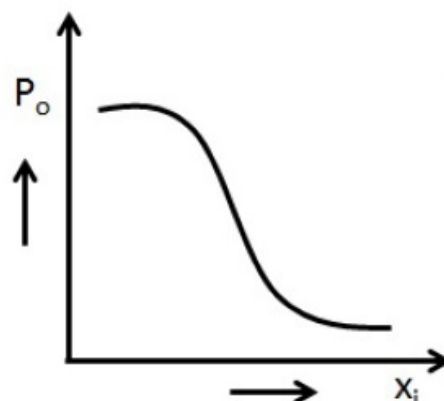
- (a) 15-30 Psi
- (b) 15-30 Ksc
- (c) 3-15 Ksc
- (d) 3-15 Psi

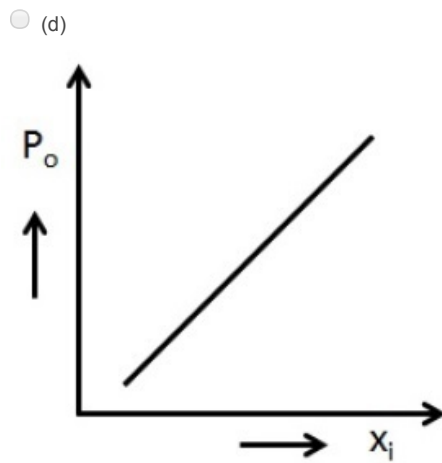
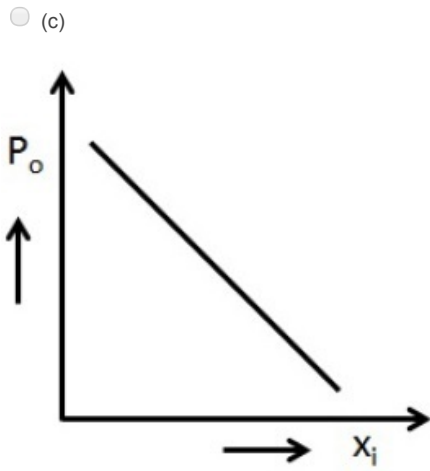
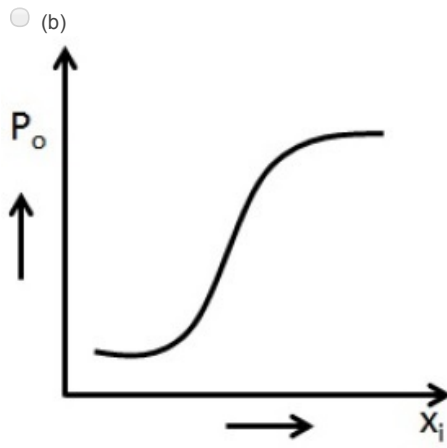
**Accepted Answers:**

(a) 15-30 Psi

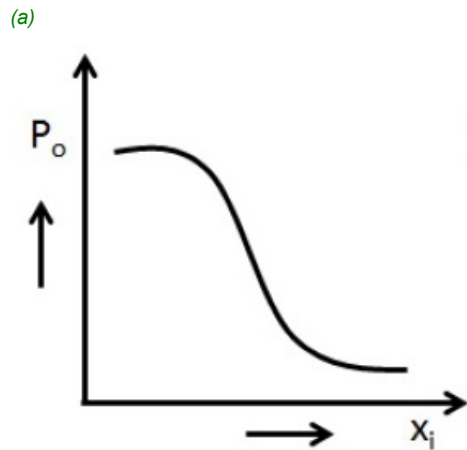
3) 2 points  
Transfer characteristic for the flapper nozzle (direct-acting) system can be best represented by- ( $P_o$  – output pressure of the system,  $x_i$  – distance between the flapper and nozzle)

- (a)





Accepted Answers:

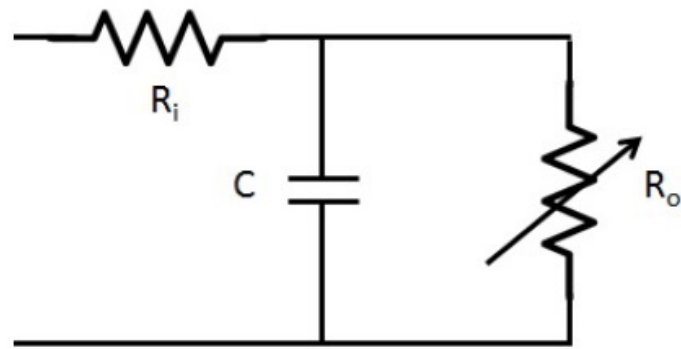


4)

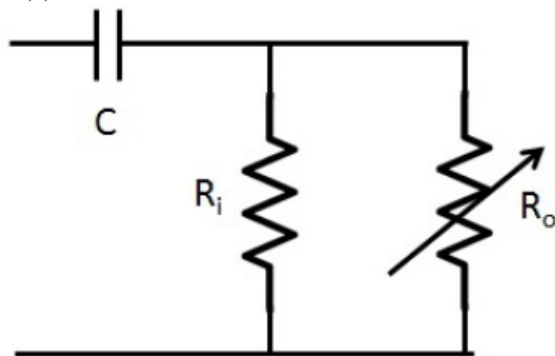
2 points

Electrical equivalent of flapper-nozzle is- ( $R_i$ -Fixed restriction, C- Capacity i.e., volume of th system,  $R_o$ - variable restriction)

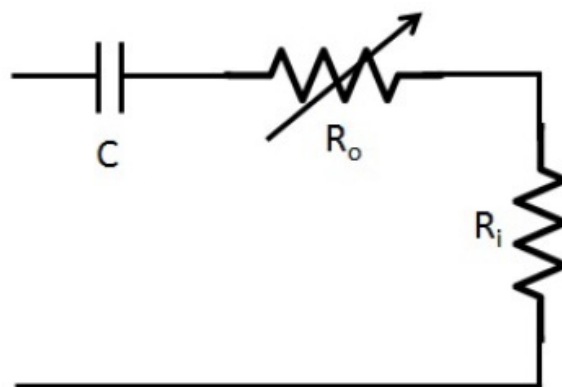
(a)



(b)

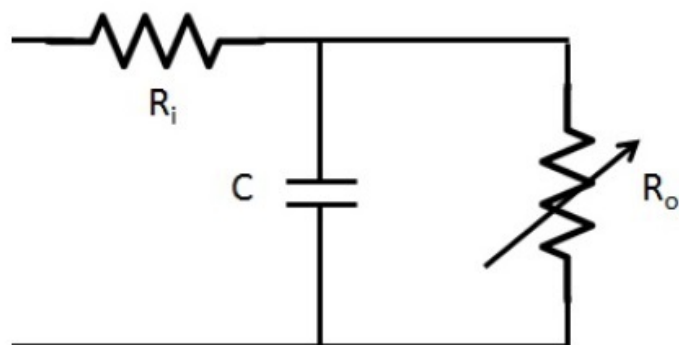


(c)



Accepted Answers:

(a)



5)

2 points

An I to P (current-to-pressure) converter (direct acting) based on a flapper-nozzle system converts standard current signal into an equivalent standard pressure signal. Determine the conversion constants  $m$  and  $c$ . (hint: use the relation  $y = m \cdot x + c$ , and find the constants  $m$  and  $c$ )

- (a)  $m = 0.75 \text{ Psi/mA}$ ,  $c = 0.75 \text{ Psi}$
- (b)  $m = 1.5 \text{ Psi/mA}$ ,  $c = 0.75 \text{ Psi}$
- (c)  $m = 0.75 \text{ Psi/mA}$ ,  $c = 0 \text{ Psi}$
- (d)  $m = 0 \text{ Psi/mA}$ ,  $c = 0.75 \text{ Psi}$

**Accepted Answers:**

(c)  $m = 0.75 \text{ Psi/mA}$ ,  $c = 0 \text{ Psi}$

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