Tutorial Sheet No-2
Measurement Science & Techniques (UES034)

Q1For the examples shown in Fig. 1 and Fig.2 explain the following:

(i) Desired input

(ii) Interfering input

(iii) Modifying input

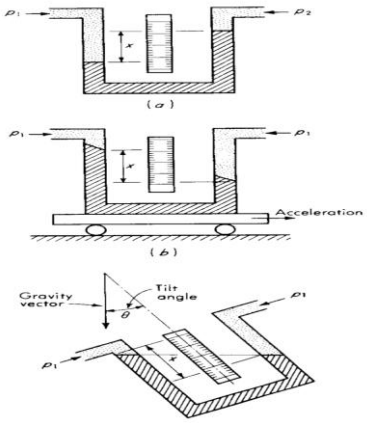


Fig.1

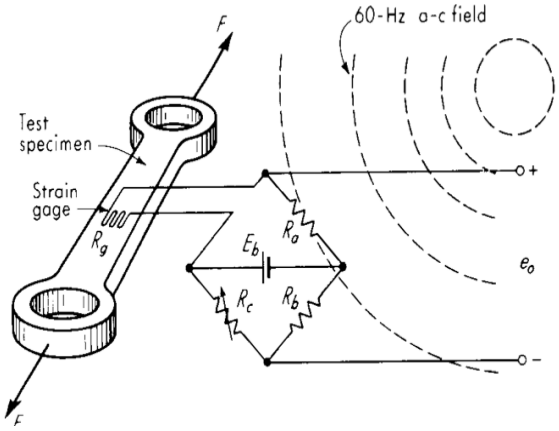
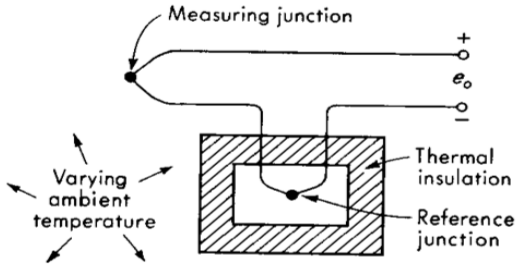
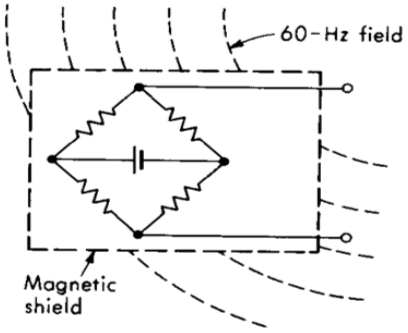


Fig.2

Q2 In a measurement system, the open loop transfer function is 10 and increases by 10 % due to interfering input. If a closed loop system is adopted wherein the feedback system has a transfer function of 100. What will be the change in output in case of open loop and in closed loop system.

Q3Explain the methods of input and output filtering for the two examples shown below:



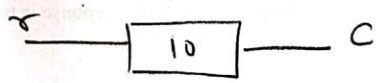


Q4 Explain the method of opposing inputs and the method of inherent insensitivity with the help of suitable example.

Solutions

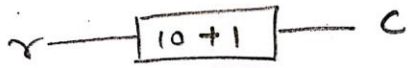
Q2

Open loop system



$\frac{C}{r}$ = output = 10

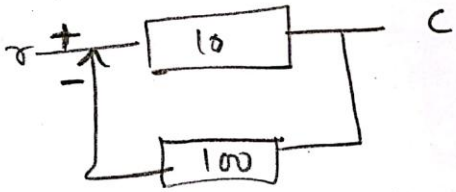
Due to interfering input it increases by 10%.



$\frac{C}{r} = 11$

Change in output = $\frac{11-10}{10} \times 100 = \frac{1}{10} \times 100 = 10\%$

Closed loop system



$\frac{C}{r} = \frac{10}{1+100\times10} = \frac{10}{1001} = 0.009$ —(1)

Due to interfering input

$\frac{C}{r} = \frac{11}{1+100\times11} = \frac{11}{1+1100} = \frac{11}{1101} = 0.009$ —(2)

Comparing (1) and (2) Change in negligible almost