

4. A stepper motor has a step angle of  $2.5^\circ$ , determine a. resolution b. Number of steps per shaft to make 25 revolution c. shaft speed if starting stepping frequency is 3600 pulse/sec.

Given data

$$\text{Step angle, } \xi = 2.5^\circ$$

1.52 Stepper Motor

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Stepping frequency = 3600 pulse/sec

To find

- i. Resolution (Z)
- ii. Number of steps to make 25 revolution and
- iii. Shaft speed

Solution

$$\text{i. Resolution } Z = \frac{360^\circ}{\xi} = \frac{360^\circ}{2.5^\circ}$$

$$= 144 \text{ steps/revolution}$$

$$\text{ii. Number of steps for 25 revolution} = 25 \times 144 = 3600 \text{ steps}$$

$$\text{iii. Stepping frequency } f = 3600 \text{ pulse/ sec}$$

$$\text{Step/angle/pulse} = 2.5^\circ$$

$$\begin{aligned} \text{Angular displacement/sec} &= 3600 \times 2.5 \\ &= 9600 \text{ angle/sec} \end{aligned}$$

$$\text{Revolution/sec} = \frac{9600}{360} = 25 \text{ revolution/sec}$$

$$\text{Shaft speed} = 25 \times 60 = 1500 \text{ rpm}$$