

EET 263 Homework #11 Joe Munoz 30 Mar 24
Ch 10 problems 1-8

1. output pulse = 62 Hz = $62 \frac{\text{rev}}{\text{s}} \cdot \frac{60\text{s}}{1\text{min}} = \boxed{3720 \text{ rpm}}$

2. output 1 $\frac{\text{rev}}{\text{pulse}}$ / 3.75s $\cdot \frac{60\text{s}}{1\text{min}} = \boxed{16 \text{ RPM}}$

3. 3600 pulse inc encoder
output = 2.5 kHz

A). resolution = $\frac{360^\circ}{3600} = \boxed{.1^\circ \text{ resolution}}$

B) $\frac{2500 \frac{\text{Pulse}}{\text{Sec}}}{3600 \frac{\text{Pulses}}{\text{rev}}} = .694 \text{ rev/s} \cdot \frac{60\text{s}}{1\text{min}} = \boxed{41.67 \text{ RPM}}$

4. $\frac{8000}{360^\circ} = \frac{x}{135^\circ}$ $x = \frac{8000 \cdot 135^\circ}{360^\circ} = \boxed{3000 \text{ pulses}}$

5. 8 bit encoder 10000111₂

A) $\frac{360}{2^8} = 1.40625^\circ \text{ of resolution}$

B) $10000111_2 = 135_{10}$

$2^7 + 2^2 + 2^1 + 2^0$
 $128 + 4 + 2 + 1$

$135 \cdot 1.40625^\circ = \boxed{189.84^\circ}$

6. $\frac{360^\circ}{2^{10}} = .3515625^\circ \text{ of resolution}$

$137_8 = 1 \times 8^2 + 3 \times 8^1 + 7 \times 8^0 = 95_{10}$
 $64 + 24 + 7$

$95 \cdot .3515625^\circ = \boxed{33.398^\circ}$

7. $\frac{360^\circ}{2^{10}} = .3515625^\circ$ of resolution

$$\begin{array}{cccccccccc} 0 & 1 & 0 & 0 & 0 & 1 & 1 & 0 & 1 & 1 & 1 & 0 \\ 1 & 1 & 1 & 1 & 0 & 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 9 & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 & 0 & & \end{array}$$

$$2^9 + 2^8 + 2^7 + 2^6 + 2^4 + 2^3 + 2^1 = 986_{10}$$

$$.3515625^\circ \cdot 986 = \boxed{346.64^\circ}$$

8. $16'' = 10v$

Output 3.55v

$$\frac{16''}{10v} = \frac{X}{3.55v}$$

$$X = \frac{16'' \cdot 3.55v}{10v} = \boxed{5.68''}$$