

Chapter 11 Exercise 11A

Q. 1. (i) $\frac{40}{20} = 2$ rads

(ii) $\frac{100}{20} = 5$ rads

(iii) $\frac{15}{20} = 0.75$ rads

(iv) $\frac{11}{20} = 0.55$ rads

Q. 2. (i) $5 \times 3 = 15$ cm

(ii) $5 \times 0.8 = 4$ cm

(iii) $5 \times 1.2 = 6$ cm

(iv) $5 \times 1.7 = 8.5$ cm

Q. 3. $r = \frac{14}{3.5} = 4$ cm

Q. 4. $r = \frac{2.07}{1.8} = 1.15$ cm

Q. 5. Angular speed = $\frac{18}{10} = 1.8$ rads/sec

Q. 6. $r = \frac{7}{4} = 1.75$ cm

Q. 7. In 60 seconds it turns 45 times.
In 1 second it turns $\frac{3}{4}$ times
 $= \frac{3}{4}(2\pi)$ rads/sec = 4.7 rads/sec

Q. 8. In 1 second it turns through 10 radians.
In 60 seconds it turns through 600 radians.
600 radians = $\frac{600}{2\pi}$

full turns = $\frac{600}{2(3.142)} = 95$

$v = 10(0.4) = 4$ m/s

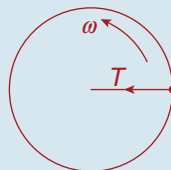
Q. 9. 200ω — 1 min
 $= 200(2\pi)$ rad — 60 s
 $= \frac{200(2\pi)}{60}$ rad — 1 s
 $= 20.94$ rad/s

Q. 10. 570ω — 1 min
 $= 570(2\pi)$ rad — 60 s
 $= \frac{570(2\pi)}{60}$ rad — 1 s
 $\Rightarrow \omega = 19\pi$ rad/s
now, $v = r\omega$
 $\Rightarrow v = 0.06(19\pi) = 3.58$ m/s

Exercise 11B

Q. 1. $T = \frac{mv^2}{r}$
 $= \frac{8(25)}{2}$
 $= 100$ N

Q. 2.

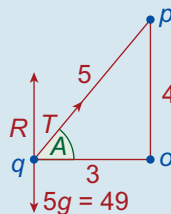


$r = \frac{1}{8}$, $m = 7$, $\omega = 4$ rad/s

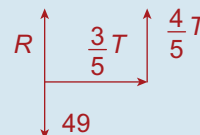
NZL: $\Sigma F = ma$

$\Rightarrow \leftarrow T = m\omega^2 r$
 $= 7(4)^2 \frac{1}{8}$
 $\Rightarrow T = 14$ N

Q. 3. Forces



Resolved



(i) $|pq|^2 = |op|^2 + |oq|^2$
 $\Rightarrow 25 = 16 + |oq|^2$
 $\Rightarrow |oq| = 3$ m

(ii) ① $R + \frac{4}{5}T = 49$

② $F_c = \frac{mv^2}{r}$
 $\Rightarrow \frac{3}{5}T = \frac{5(3)^2}{3}$

$\Rightarrow T = 25$ N

(iii) ① $\Rightarrow R + \frac{4}{5}(25) = 49$

$\Rightarrow R = 29$ N