Ex 5X 3A.

① $WD = 0.7 \times 1.2 = 0.84$ J

② $55 = F \times 10 \qquad F = 5.5N$

③ $WD = 20 \times 9.8 \times 3 = 588$ J

④ $WD = 2 \times 9.8 \times 8 = 157$ J

⑤ $WD = 12 \times 25 = 300$ J

⑥ $23500 = 200 \times 9.8 \times S \qquad S = 12m$

⑦ $WD = 25 \cos 35 \times 20 = 410$ J

⑧

$a = 0 \qquad D = S \times t = 7 \times 2 = 14m$

$F = \mu R_n = 0.4 \times 5 \times 9.8 = 19.6$ N
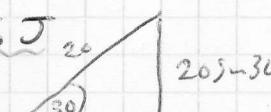
$\therefore WD = 19.6 \times 14 = 274$ J

⑨ $147 = F \times 12 \quad \therefore \quad F = 12.25N$
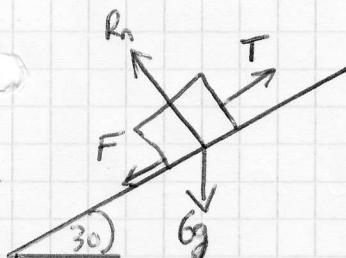
$F = \mu R_n \qquad + R_n = 5g$

$\therefore \quad M = \dfrac{12.25}{5g} = 0.25$

⑩ $WD = 70 \times 9.8 \times 35 = 24000$ J.

⑪ WD against grav $= 2 \times 9.8 \times 20 \sin 30 = 196$ J

$20 \sin 30$

⑫ $WD = 30 \times 9.8 \times 35 \sin 40 = 567$ J

⑬

$a = 0$

$T - F - 6g \sin 30 = 0 \quad ①$

$R_n - 6g \cos 30 = 0 \quad ②$

$F = \mu R_n \quad ③$
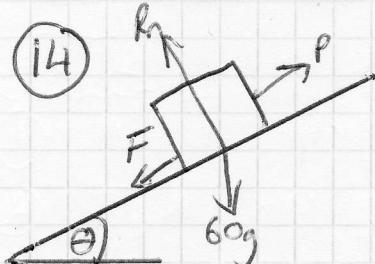
$F = \mu R_n = \mu 6g \cos 30$
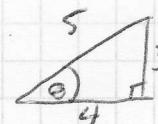
$∴ ③ \quad F = 0.2 \times 6g \cos 30 = 10.2N$

Now WD against friction $= \dfrac{10.2}{10.2} \times 15 = 153$ J

WD against gravity $= 6g \times 15 \sin 30 = 441$ J.

(14)

$Tan\theta = \frac{3}{4}$
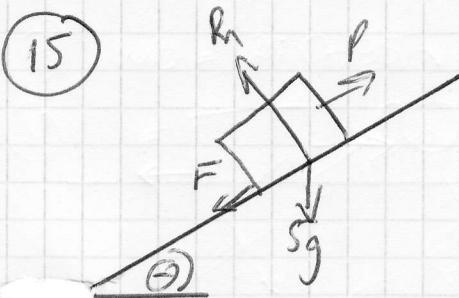
(a) $F = \mu R_n$

$R_n = 60g\,Cos\theta = 60g \cdot \frac{4}{5} = 48g$

$\therefore F = \frac{1}{4} \times 48g = 12g = \cancel{88.2N} \underline{118\,N}$

(b) WD v's fric $= 118 \times 40 = \underline{4700\,J}$

(c) WD v's grav $= 60g \times 40 Sin\theta = 60g \times 40 \times \frac{3}{5} = \underline{14100\,J}$

(15)

$F = \mu R_n = \frac{1}{3} R_n$

$R_n = 5g\,Cos\theta = 5g \cdot \frac{4}{5} = 4g$

$\therefore F = \frac{4}{3}g\,N$
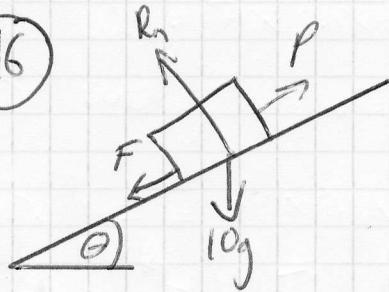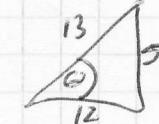
WD v's fric $= \frac{4}{3}g \times 15 = 20g = \underline{196\,J}$

WD v's grav $= 5g \times 15 Sin\theta = 5g \times 15 \times \frac{3}{5} = \underline{441\,J}$

$\therefore$ Total WD $= 196 + 441 = \underline{637\,J}$

(16)

$R_n = 10g\,Cos\theta = 10g \times \frac{12}{13}$

$\cancel{200 = F \times 5}$

$\cancel{\therefore F = 40}$

Now $\cancel{\mu = \frac{40}{10g \times \frac{12}{13}}}$

Total WD $= 200\,J$

WD v's grav $= 10g \times 5 Sin\theta$

$= 10g \times 5 \times \frac{5}{13} = 188.5\,J$

$\therefore$ WD v's fric $= 200 - 188.5 = 11.5\,J$

hence $\quad 11.5 = F \times 5$

$F = 2.3\,N$

$\therefore \quad \mu = \frac{2.3}{10g \times \frac{12}{13}} = \underline{0.0255}$