PHYSICS

1) c) 20N

2) Mass of man = 50kg
Acceleration = 9.8 m/s²
Force of rope pulling the roof:-
= m × a
= 50 × 9.8
= 490 N

3) Total mass = mass of man + mass of rope
Mass of man = 50kg
mass of rope = 5kg
Total mass = 50kg + 5kg
= 55kg
Acceleration = 10 m/s²
Force of rope pulling the roof
= m × a
= 55 × 10 = 550 N.

4) a) Mass of pendulum = 50g = $\frac{50}{1000}$ = 0.05 kg

Acceleration of elevator going up = $1.2 m/s^2$

Tension in the string

$= T = m(g+a)$

$= T = 0.05(1.2+9.8)$

$= T = \frac{5}{100}$ [11)

$= T = 0.55 N$

b) Acceleration (retardation) of elevator going up = $1.2 m/s^2$

Tension in the string

$= T = m(g-a)$

$= T = \frac{5}{100}$ [9.8 − 1.2)

$= T = \frac{5}{100} \times 8.6$

$= \frac{43}{100} = 0.43 N$

c) Mass of pendulum = 0.05 kg
Acceleration = 0 m/s² [uniform velocity]
Hence tension on string
= N = m × g
= N = 0.05 × 10
= 0.5 N

d) Mass of pendulum = 0.05 kg
Acceleration of pendulum while coming down
= 1.2 m/s²
Tension on string
= T = m(g - a)
= T = 0.05 × (9.0 - 1.2)
= T = 0.05 × (9.8 - 1.2)
= 0.05 × (8.6)
= $\frac{5 \times 8.6}{100}$ = $\frac{43}{100}$ = 0.43 N

e) Mass of pendulum = 0.05 kg
Deceleration of elevator while coming down
= 1.2 m/s²
Tension on string =
= T = M(g + a)
= T = 0.05(9.8 + 1.2) = 0.05 × 11
= T = 0.55 N

f) Mass of pendulum = 0.05 kg

Acceleration = 0 [goes down with con^n velocity]

Tension on string

$= T = m \times g$

$= 0.05 \times 9.8$

$= \frac{5}{100} \times \frac{98}{10}$

$= \frac{490}{1000} = 0.49\,N = 0.5\,N$

5) a) climbs up with an acceleration of $6\ m/s^2$.