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Solution 46
Mass of body = 1 kg
g = 10 m/s^2

Mass of body = 1 kg
g = 10 m/s^2
PE = mgh = 1 x 10 x h = 10 x h
KE = $\frac{1}{2}mv^2 = \frac{1}{2} \times 1 \times v^2 = \frac{v^2}{2}$
i. At h = 5 m; v = 0 m/s
PE = 10 x 5 = 50 J
KE = 0 J
Total energy = PE + KE = 50 J
ii. At h = 3.2 m; v = 6 m/s
PE = 10 x 3.2 = 32 J
KE = $\frac{6^2}{2}$ = 18 J
Total energy = PE + KE = 32+ 18 = 50 J
iii. At h = 0 m; v = 10 m/s
PE = 0 J
KE = $\frac{10^2}{2}$ = 50 J
Total energy = PE + KE = 50 J
The total energy in all three cases is constant. This proves the law of conservation of energy

Solution 47
Since from point A total energy = PE + KE = 80 J
And according to the law of conservation of energy Total energy remains constant
a) PE = 0
Total energy = PE + KE = 80 J
KE = 80 J PE = 80 J
b) At point B KE = 48 J
Total energy = PE + KE = 80 J
PE = 80 J KE = 80 - 48 = 32 J
c) Law of conservation of energy
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Solution 48
No. of steps = 28
Height of each step = 28 cm
Total height = 20 x 28 = 560 cm = 5.6 m
Mass of student = 55 kg
g = 9.8 m/s^2
time = 5.4 s
Work done = m x g x h = 55 x 9.8 x 5.6 = 3018.4 J

No. of steps = 28
Height of each step = 28 cm
Total height = 20 x 28 = 560 cm = 5.6 m
Mass of student = 55 kg
g = 9.8 m/s^2
time = 5.4 s
Work done = m x g x h = 55 x 9.8 x 5.6 = 3018.4 J
Power = $\frac{\text{work done}}{\text{time}} = \frac{3018.4}{5.4}$ = 559 W

Solution 49
Weight of box = 100 N
Height = 1.5 m
work done = m x g x h = 100 x 1.5 = 150 J
potential energy = m x g x h= 100 x 1.5 = 150 J
iii. weight of 4 boxes = 400 N
time = 1 minute = 60 s
work done = 400 x 1.5 = 600 J

Weight of box = 100 N
Height = 1.5 m
i. work done = m x g x h = 100 x 1.5 = 150 J
ii. potential energy = m x g x h= 100 x 1.5 = 150 J
iii. weight of 4 boxes = 400 N
time = 1 minute = 60 s
work done = 400 x 1.5 = 600 J

$$\text{power} = \frac{\text{work done}}{\text{time}} = \frac{600}{60} = 10\,\text{W}$$

Solution 50
a) Electrical energy to sound energy
b) Sound energy to electrical energy
c) Electrical energy to light (and heat) energy
d) Chemical energy to electrical energy to light energy(and heat energy)

********** END **********