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Solution 46
Mass of body = 1 \text{ kg}
g = 10 \text{ m/s}^2
 Mass of body = 1 kg
 g = 10 \text{ m/s}^2
 PE = mgh = 1 \times 10 \times h = 10 \times h
 KE = \frac{1}{2} mv<sup>2</sup> = \frac{1}{2} × 1 × v<sup>2</sup> = \frac{v^2}{2}
i. At h = 5 m; v = 0 m/s
 PE = 10 x 5 = 50 J
 KE = 0J
 Total energy = PE + KE = 50 J
 ii. At h = 3.2 \text{ m}; v = 6 \text{ m/s}
 PE = 10 x 3.2 = 32 J
 KE = \frac{6^2}{2} = 18 \text{ J}
 Total energy = PE + KE = 32+ 18 = 50 J
 iii. At h = 0 \text{ m}; v = 10 \text{ m/s}
 PE = 0J
 KE = 10^2 = 50 J
       2
 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 \text{ cm}
Total height = 20 \times 28 = 560 \text{ cm} = 5.6 \text{ m}
Mass of student = 55 kg
g = 9.8 \text{ m/s}^2
time = 5.4 s
Work done = m \times g \times h = 55 \times 9.8 \times 5.6 = 3018.4 J
 No. of steps = 28
 Height of each step = 28 cm
 Total height = 20 \times 28 = 560 \text{ cm} = 5.6 \text{ m}
 Mass of student = 55 kg
 g = 9.8 \text{ m/s}^2
 time = 5.4 s
 Work done = m \times g \times h = 55 \times 9.8 \times 5.6 = 3018.4 \text{ J}
 Power = work done = 3018.4 = 559 W
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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 = $400 \times 1.5 = 600 \text{ J}$

Weight of box = 100 NHeight = 1.5 mi. work done = $m \times g \times h = 100 \times 1.5 = 150 \text{ J}$ ii. potential energy = $m \times g \times h = 100 \times 1.5 = 150 \text{ J}$ iii. weight of 4 boxes = 400 Ntime = 1 minute = 60 swork done = $400 \times 1.5 = 600 \text{ J}$ 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 ********