Physicsaholics

DPP – 2 (Work, Energy & Power)

Video Solution on Website:- https://physicsaholics.com/home/courseDetails/38

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Q 1. If velocity of a body is twice of previous velocity, then kinetic energy will become

(a) 2 times (b) $\frac{1}{2}$ times

(c) 4 times (d) 1 time

Q 2. A spring 40 mm long is stretched by the application of a force. If 10 N force required to stretch the spring through 1 mm, then work done in stretching the spring through 40 mm is

(a) 84 J (b) 68 J

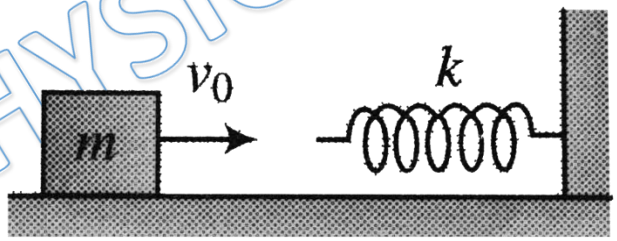
(c) 23 J (d) 8 J

Q 3. A block of mass 0.1 kg attached to a spring of spring constant 400 N/m is putted rightward from x_o = 0 to x_1 = 15 mm. Find the work done by spring force

(a) 0.045 J (b) – 0.045 J

(c) 0.45 J (d) – 0.45 Js

Q 4. A block of mass m is moving with an initial velocity V_o towards a stationary spring of stiffness k attached to the wall as shown in figure. Find the maximum compression in the spring



(a) $\left(\sqrt{\frac{m}{k}}\right)v_o$ (b) $\left(\sqrt{\frac{k}{m}}\right)v_o$

(c) $\left(\sqrt{\frac{1}{mk}}\right)v_o$ (d) $\left(\sqrt{\frac{mv_o}{k}}\right)$

Q 5. When a spring is stretched by 2 cm, magnitude of work done by spring is 100 J. If it is stretched further by 2 cm, the magnitude of work done by spring will be

(a) 100 J (b) 200 J

(c) 300 J (d) 400 J

Q 6. A mass of 0.5kg moving with a speed of 1.5 m/s on a horizontal smooth surface, collides with a nearly weightless spring of force constant k = 50 N/m. The maximum compression of the spring would be

(a) 0.15 m (b) 0.12 m
(c) 1.5 m (d) 0.5 m

Q 7. A particle moves in a straight line with retardation proportional to its displacement. Its loss of kinetic energy for any displacement x is proportional to

(a) x^2 (b) e^x
(c) x (d) $\ln x$

Q 8. Natural length of a spring is 60 cm, and its spring constant is 4000 N/m. A mass of 20 kg is hung from it. The extension produced in the spring is ($g = 9.8\, m/s^2$)

(a) 4.9 cm (b) 0.49 cm
(c) 9.4 cm (d) 0.94 cm

Q 9. A body of mass 8kg is moved by a force F = (3x)N, where x is the distance covered Initial position is x = 2m and final position is x = 10m. If initially the body is at rest find the final speed

(a) 12 m/s (b) 4 m/s
(c) 6 m/s (d) 2 m/s

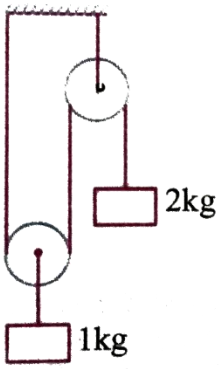
Q 10. A block is initially at rest on a horizontal frictionless surface when a horizontal force in the positive direction of an axis is applied to the block. The force is given by $\vec{F} = (1 - x^2)\hat{\imath}$ N, where x is in meters and the initial position of the block is x = 0. The maximum kinetic energy of the block is $\frac{2}{n}$ J in between x = 0 and x = 2m. Find the value of n?

(a) 1 (b) 2
(c) 3 (d) 4

Q 11. A block of mass 5.0 kg slides down an incline of inclination 30^0 and length 10m. Find the work done by the force of gravity

(a) 300 J (b) 245 J
(c) -145 J (d) 65 J

Q 12. In the pulley-block system shown in figure, strings are light. Pulleys are massless and smooth. System is released from rest. In 0.3 seconds work done by tension on block of mass 2kg? ($g = 10\, m/s^2$)



(a) 2 J
(b) 6 J
(c) -1.5 J
(d) -2 J

Answer Key

Q.1 c	**Q.2 d**	**Q.3 b**	**Q.4 a**	**Q.5 c**
Q.6 a	**Q.7 a**	**Q.8 a**	**Q.9 c**	**Q.10 c**
Q.11 b	**Q.12 d**			