

NAME:

KEY

DATE:

Period:

Exam 6 Review – Energy, Work and Power

1. Define Power in your own words

Work o.

2. Define Work in your own words

3. What is the difference between PE and KE?

4. What is the difference between ePE and gPE?

5. What is the mechanical energy in a 1.1kg ball that was dropped, has a velocity of 2m/s, and is 1.4m above the ground?

$$ME = gPE + KE$$

$$ME = m \cdot g \cdot h + \frac{1}{2} m v^2$$

$$ME = 1.1 \text{ kg} \cdot 1.4 \cdot 9.8 + \frac{1}{2} \cdot 1.1 \text{ kg} \cdot 2^2$$

$$ME = 17.3 \text{ J}$$

6. How high up is a 16kg pumpkin that has a gPE of 118J?

$$gPE = m \cdot g \cdot h$$

$$118 \text{ J} = 16 \text{ kg} \cdot 9.8 \cdot h$$

$$h = 0.75 \text{ m}$$

7. A 78kg go-kart is experiencing 3160J of KE. What is the velocity of that go-kart?

$$KE = \frac{1}{2} m v^2$$

$$3160 \text{ J} = 34 v^2$$

$$3160 \text{ J} = \frac{1}{2} \cdot 78 \cdot v^2$$

$$93 = v^2$$

$$v = 9.64 \text{ m/s}$$

8. The suspension springs in Trinidad's Fiat compress at maximum 20cm and have an ePE of 1200J. What is the spring constant of the spring?

~~$$KE = \frac{1}{2} m v^2$$~~

$$ePE = \frac{1}{2} k d^2 \quad 1200 \text{ J} = \frac{1}{2} k (0.20 \text{ m})^2$$

$$1200 \text{ J} = 0.02 k$$

$$60,000 \text{ N/m} = k$$

9. Trinidad is driving his Fiat down 2
- nd
- street and hits one of the many bumps. His wheel moves up and compresses the spring of his suspension 8cm. What is the ePE?

$$ePE = \frac{1}{2} k d^2$$

$$ePE = \frac{1}{2} \cdot 60,000 \cdot (0.08)^2$$

$$ePE = 192 \text{ J}$$

NAME:

DATE:

Period:

10. Trinidad foolishly allows Ray to drive his new Fiat. Ray naturally jumps the fiat over the train track 1m. If the jump has a gPE of 11,760J, what is the combined mass of Trinidad, Ray, and the Fiat?

$$gPE = M \cdot g \cdot h$$

$$11,760 = 1m \cdot 9.8 \cdot M$$

$$1200kg = M$$

11. The car is undamaged, thankfully, and they drive another 2km before Trinidad has had enough of Ray's hooning. How much work has been done in that 2km? ($F = F_N$)

$$W = F \cdot d$$

$$W = (1200 \cdot 9.8) \cdot 2000m$$

$$W = 2.35 \times 10^7 J$$

12. What type of quantity is Work?

vector

13. Lauren's chicken walks across the street. It is a fast chicken that moves across the 12m street in 8s. What is the velocity? If the forward force the chicken exerts is 3N, what is the power exerted by that chicken?

$$12/8 = v$$

$$v = 1.5 m/s$$

$$P = F \cdot v$$

$$P = 3N \cdot 1.5 m/s$$

$$P = 4.5 W$$

14. Jenna is doing her nails. The brush moves with a force of 2N and exerts the power of 0.017W. If her fingernail is 1cm long, how fast is each stroke of the brush?

$$P = F \cdot v$$

$$0.017 = 2N \cdot v$$

$$0.008 m/s = v$$

15. A cat falls out of a tree (it's okay, they always land on their feet. Except when they wear sweaters.) ME of a 2kg falling cat is 98J. The gPE is 60. How fast is the cat falling?

$$ME = gPE + KE$$

$$ME = M \cdot g \cdot h + \frac{1}{2} M v^2$$

$$98J = 2kg \cdot 9.8 \cdot h$$

$$98J = 60J + \frac{1}{2} 2kg \cdot v^2$$

$$38J = v^2$$

$$v = 6.16 m/s$$

16. What will the KE of the cat be when it's just 0.5m from the ground? gPE?

$$98J = 2kg \cdot 9.8 \cdot 0.5 + \frac{1}{2} 2kg \cdot v^2$$

$$98 = 9.8 + v^2$$

$$88.2J = v^2$$

$$v = 9.4 m/s$$

17. How high up was the cat to begin with?

$$98J = M \cdot g \cdot h$$

$$98J = 2 \cdot 9.8 \cdot h$$

$$98J = 19.6h$$

$$5 = h$$