1. a. Require a medium in which to travel

2. b. 65.0 kJ/kg.

3. a. Velocity, net force

4. c. Positive

5. b. the object must change position

6. b. 55m

7. c. the object is travelling at a constant velocity.

8. d. north to south, south to north.

9. d. 4.

10. b. 110m/s.

11. c 20Hz - 20kHz

12. b. 1.53

13. b. 39.8 kJ.

14. d. all of the above.

15. C. E_K increases and E_P decreases

16. Three ways are: 1. by Conduction, by convection and by radiation.

17. Negative work follows when the force has a component opposite or against the displacement.

Example:

A person walking down the stairs with load on its head, the work done is negative as the force applied on the load is in opposite direction to its displacement.

Section 2:

18. a) $H_{max} = \frac{V^2}{2g} \Rightarrow \frac{8^2}{2\times 10}$

$= \frac{64}{20}$

$= 3.2\text{m}$ high.

Hence, the total height is $3.2\text{m} + 2 = 5.2\text{m}$.

b). $S = ut + \frac{1}{2}gt^2$

$2S = 2ut + gt^2$

$2\times 5.2 = 10t^2$

$10.4 = 10t^2$

$t^2 = 1.04$

$t = 1.02\text{s}$

$V = u + gt$

$= 0 + 10(1.02)$

$= 10.2\text{m/s}$.

24. Heat energy gained = Heat energy lost.

$M_s C_s \Delta T = M_s C_s \Delta T$.

$1.35 \times 500 \times 95.7 = 2.15 \times C_s \times 37$.

$64597.5 = 79.55 C_s$.

$C_s = 812 \text{ J/kgK}$.

Specific heat capacity of dry sand = 812 J/kgK

26. i) To produce a shock wave, an object in a given medium must travel faster than the local speed of sound.
⇒ The speed of a source exceed the speed of sound ($V > c$)
ii) The shock waves only occur in supersonic flow.
Reason:
1. They occur to change the nonlinear waves to a linear wave.
2.

27. The basic purpose of a thermostat in a house is to regulate or control the cooling and heating system. The statement is wrong where she complains of the off thermostat instead of switching it on and allow it to adjust the room temperature.