# All the following use equations you should know off by heart…Q5 is HT only

# Single-step calculations:

1. A spring extends by 75 cm, this particular spring has a spring constant of 0.75 N/m. What force is required to produce this extension?
2. What is the weight of an object of mass of 75 kg on Earth?
3. What is the potential difference across a circuit component, where the current through it is 6.5 A and its resistance is 38 Ω?
4. An object falls to the ground from a height of 17 m. This object had a mass of 56 kg. Calculate its maximum gravitational potential energy.
5. *Calculate the momentum of a 175 kg car, travelling at 45 m/s.*
6. A girl, of mass 70 kg, runs at a speed of 0.5 m/s. Calculate her maximum kinetic energy.
7. Find the current produced by 87 C in 47s.
8. Find the p.d. in a circuit where 174 C do 32 J of work.
9. What force is needed to move a 45 kg object at an acceleration of 2.5 m/s²?
10. An electrical appliance transfers 45 J in 75 s. Calculate its power.
11. Calculate the acceleration of a car that reaches a maximum speed of 75 m/s over 90s, from rest.
12. An object falls on an unknown planet with a force of 56 N, and a mass of 12 kg. Calculate the value of gravity for this planet.
13. How much work is done to move an object that weighs 78 N a distance of 6.5 m?
14. A circuit is using 48 A to light a bulb, across the bulb 12.5 V of p.d. passes. Calculate the power of the bulb.

# Multi-step calculations:

1. A vehicle on a motorway travels 1800m in 60s. Calculate:
2. The average speed of the vehicle in m/s
3. How far it would travel at this speed in 300s
4. The velocity of a car increased from 8m/s to 28m/s in 8s without changing direction. Calculate:
5. Its change of velocity
6. Its acceleration
7. A 200W toaster takes 2 minutes to toast some bread.
8. How much energy was transferred per second?
9. How much energy was transferred over the two minutes?
10. The current through the toaster over this time was measured as 5 A:
11. Find the charge that passes through the toaster in this time
12. Calculate the p.d. across the toaster
13. An object, of mass 5 kg, drops from a height of 200 m and lands on the ground 10s later. Its maximum speed, just before impact, is 40 m/s.
14. Calculate the acceleration the object undergoes.
15. Calculate the force of impact.
16. A parachutist of mass 70kg supported by a parachute of mass 20kg reaches a constant velocity. Calculate:
17. The total weight of the parachutist and the parachute.
18. The resultant force on the parachutist.
19. A cat stalks a bird over 20m in 35s. Find:
20. Its average speed
21. Assuming it continues at constant speed, calculate how far the cat will have travelled in 1 minute.