Mechanics

1. What is the definition of the moment of a force?
2. If three forces are in equilibrium what can you say about them?
3. A car travels round a banked circular frictionless track. What is the force that provides the centripetal force to keep it moving in a circle?
4. What is the formula for impulse?
5. How would you calculate the braking force of a car with velocity v?
6. Give an equation for the drag force on a parachute.
7. What is the component of a force F in a direction at angle A to that force?
8. A boat floats in water. What is the upthrust on that boat? (Numerical value not required here)
9. A lorry travels at a constant speed of 30 ms^{-1} on a level road. If the drag forces total 2000 N what is the power of the engine of the lorry?
10. Draw a sketch to show the forces acting on a skier travelling down a slope which has some friction.
11. What factors affect the pressure in a liquid?
12. What are the units for power?
13. What factors affect the force produced by a jet of water?
14. What is the work done by a gas at atmospheric pressure (10^5 Pa) when its volume is increased by 0.5 m^3?
15. Give three examples of:
(a) Vectors
(b) Scalars
16. Give an example of the product of two vectors giving a scalar
17. Give one example of the product of a vector and a scalar giving a vector
18. A moving ball collides with and sticks to a stationary ball. What is conserved in the collision?
19. Two balls collide. If the force of ball A on ball B is F what is the force of ball B on ball A?
20. From a velocity time graph how would you find:
(a) The acceleration?
(b) The distance travelled in 2.3s?
21. A car travels 15 km at a constant velocity of 30 ms^{-1} against a resistive force of 750N.
(a) What energy does it consume in its journey?
(b) The power of the engine
22. What is:
(a) the SI unit of torque?
(b) express it in base units.
23. Explain what is meant by a couple.
24. What happens to the path of a projectile dropped from a plane if air resistance is taken into account?
25. A stone is swung round on the end of a string.
(a) In which direction does the force on the stone act?
(b) In which direction does the stone travel if the string breaks?