T1578 A Level Physics Worksheets – Sample Pages

Contents:

Section 1, Mechanics and Electricity

This section contains the following 25 question and answer sheets. In addition, there is a sheet of useful equations covering the demands of the topic.

a) Mechanics:

#1) Scalars and Vectors

#2) Equilibrium of Bodies

#3) Turning Effects

#4) Displacement, Speed and Acceleration

#5) SUVAT Equations

#6) Uniform Acceleration

#7) Horizontal and Vertical Motion

#8) Momentum

#9) Newton's Three Laws of Motion

#10) Conservation of Momentum

#11) Circular Motion

#12) Conservation of Energy

#13) Work and Energy

#14) Power

#15) Structure of Materials

#16) Hooke's Law

#17) The Young Modulus

b) Electricity:

#1) Charge, Current, Voltage, Resistance

#2) Energy and Power in Circuits

#3) Resistance and Resistivity

#4) Kirchhoff's 1st Law

#5) The Potential Divider

#6) EMF and Internal Resistance

#7) The Cathode Ray Oscilloscope

#8) Capacitance

Each worksheet is marked out of 20. The total mark available for this topic is 500.

Useful Equations

For each of the following equations, give an example of where it can be used along with the correct units.

- **Speed = distance / time** **($s = d/t$)**
- **Velocity = displacement / time** **($v = \Delta s / \Delta t$)**
- **Acceleration = velocity / time** **($a = \Delta v / \Delta t$)**
- **Force = mass x acceleration** **($F = ma$)**
- **Force = change in momentum / time** **($F = \Delta(mv) / t$)**
- **Force =density x area x velocity ^{2}** **($Force = \rho A v^2$)**
- **Momentum = mass x velocity** **($p = mv$)**
- **Power = Force x velocity** **($P = Fv$)**
- **Work = Force x distance** **($W = Fd$)**
- **Equations of circular motion** **($v = \omega r$, $F = mr\omega^2$, $F = mv^2/ r$, $a = r\omega^2$)**
- **SUVATs**
- **Young's Modulus** **(Young's mod = stress / strain)**
- **Stress = tensile force / x sect area** **(stress = F / A)**
- **Strain = extension / original length** **(strain = e / l)**
- **Young's mod. = consonants / vowels** **(Young's mod. = F l / e A)**
- **Energy stored in a stretched wire** **(E = 1/2 Fe)**

- **Ohm's Law** **(V=IR)**
- **Charge = Current x time** **(Q = It)**
- **Energy = Power x time** **(E = Pt)**
- **Energy = Charge x Voltage** **(E = VQ)**
- **Energy = Voltage x current x time** **(E= VIt)**
- **Power = Voltage x Current** **(P = VI)**
- **Power = Current ^{2} x Resistance** **($P = I^2R$)**
- **Resistance in series** **($R = R_1 + R_2$)**
- **Resistance in parallel** **($1/R = 1/R_1 + 1/R$)**
- **Potential divider** **($V_1 = I (R_1 / (R_1 + R_2)$**
- **Electromotive Force** **($E = I (R + r)$)**
- **Charge on a Capacitor** **($Q = VC$)**
- **Energy stored by a capacitor** **($E = 1/2 QV$)**
- **Oscilloscope frequency** **($f = 1/T$)**

A Level Modular Questions

Mechanics and Electricity

Name:

Date:

Answer all questions on A4 lined paper and staple this sheet to the front.
The deadline for this piece of work is: _____

Scalars and Vectors

1. What is the difference between a scalar quantity and a vector quantity? (2)

2. Which of the following are vector quantities ?

i) mass;
ii) force;
iii) pressure;
iv) speed;
v) acceleration;
vi) volume;
vii) weight. (4)

3. Two forces of 4N and 5N, acting to the left, are acting on a small shopping trolley. What is the size and direction of the resultant force? (2)

4. Draw diagrams to show what is meant by a + b and a - b in terms of vectorial addition and subtraction. (2)

5. Draw a graph to explain the difference between distance and displacement. Make sure the graphs are fully labelled. (4)

6. What is the difference between mass and weight? Use the gravitational field strength on the Earth and Moon to explain your answer. (3)

7. Why does a satellite which is travelling at a constant speed not travel at a constant velocity? (3)

A Level Modular Questions

Mechanics and Electricity

Name:

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Equilibrium of Bodies

1. **How is the *principle of moments* related to equilibrium? (2)**

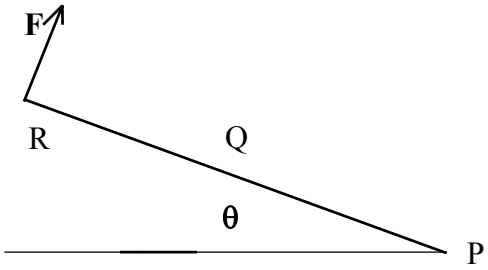
2. **When is a body said to be in *stable equilibrium*? (2)**

3. **What do you understand by the following terms ?**

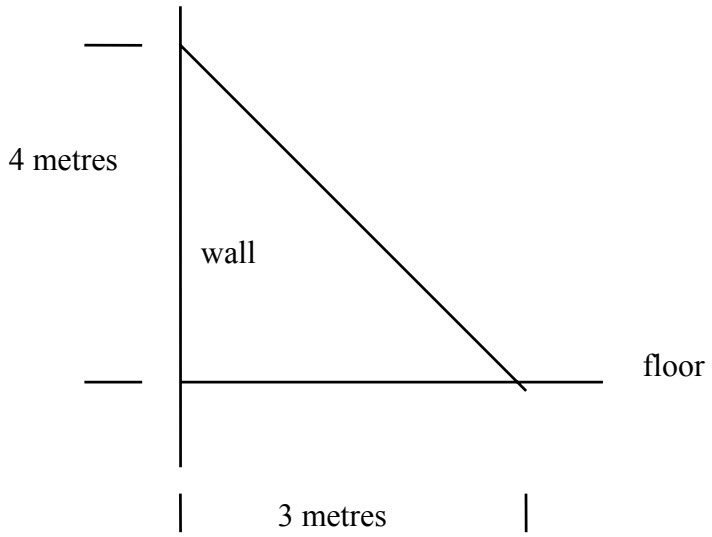
   i) **centre of mass;**
   ii) **moment of a force;**
   iii) **couple;**
   iv) **rigid object. (4)**

4. **Different buildings have different stabilities. Draw two buildings, one which is most stable and one which is least stable. (2)**

5. **The diagram below shows a car bonnet which is hinged at point P. The mass of the car bonnet is 13.5kg and its weight acts through point Q. If PQ = QR = 1.2m and θ is 25 degrees then find the value of F which acts perpendicular to the bonnet. (4)**



6. **A ladder of length 5m rests so that the foot of the ladder is 3m away from the base of the wall and the top of the ladder rests 4m up the wall from the ground. The set-up is drawn for you below. Re-draw the ladder showing the positions of all the forces acting on the ladder. (3)**



7. **If the mass of the ladder is 10kg, find the sizes of any frictional forces or forces perpendicular to the wall or floor. (**Hint: take moments) **(3)**