

Name:

Edexcel Style

Combined Science GCSE

Forces and Their Effects and Forces and Matter Test
(Levels 4–9)

Date:

Time Allowed: 50mins

Question	Links to Student Progress Sheet	Score	Total Marks Available
1	9.2	8	
2	9.5	7	
3	9.3	7	
4	9.3,9.10	3	
5	15.1,15.2	5	
6	15.6	11	
7	15.3,15.5	5	
8	15.4	4	
Total			50

Score	Estimated Grade
47 – 50	9
40 – 46	8
33 – 39	7
28 – 32	6
24 – 27	5
20 – 23	4
0 – 19	U

Please be aware that these grade boundaries are Twinkl's own, and may not be in-line with Edexcel's own.

Area for Improvement:

1. (a) Explain the difference between scalar and vector quantities and give one example of each.

(4)

- (b) Forces can be contact or non-contact. Complete the table below, placing a tick to state whether the force is an example of a contact or non-contact force.

(4)

Force	Contact	Non-Contact
air resistance		
electrostatic		
gravitational		
friction		

(Total for Question 1 = 8 marks)

2. (a) State Newton's third law.

(1)

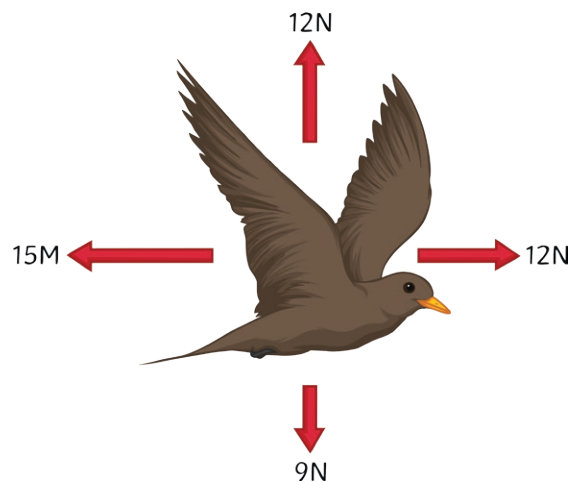
(b) Add four arrows to the diagram of a cyclist shown below to illustrate the forces acting on the bike. You will need to show that the bike is moving forwards.

(3)



(c) The free body diagram below shows the forces acting on a bird. Calculate the resultant forces and add an arrow to the diagram to illustrate the direction the bird is travelling in.

(3)



(Total for Question 2 = 7 marks)

3. (a) If a car has a driving force of 5N north and then a force of 4N west, what is the net force acting on the van?

(2)

- (b) Most machines will not be 100% efficient; there will always be some wasted energy. A motor is supplied with 50J and 20J of energy is wasted as it is converted to thermal energy stores. Using the equation below, calculate the efficiency of the motor.

(3)

$$\text{Efficiency} = \frac{\text{useful energy transferred by the device}}{\text{total energy supplied to the device}}$$

- (c) If most of the heat energy is created by friction, state one way this could be decreased and explain how it works.

(2)

(Total for Question 3 = 7 marks)

4. (a) Explain what is meant by an object being in 'equilibrium'.

(1)

(b) Using the diagram below, show how you could prove that the object is in equilibrium.

(2)



(Total for Question 4 = 3 marks)

5. (a) When a force is applied to an object, it can be stretched, bent or compressed. Explain why more than one force is required to bring about these actions.

(1)

- (b) Describe the difference between elastic and inelastic distortion and give an example for each.

(4)

(Total for Question 5 = 5 marks)

6. A group of students decide to investigate the link between force and extension on a spring.

(a) Explain why a pilot experiment may be useful to conduct.

(1)

(b) Describe how the students would carry out their final experiment. Remember to include an equipment list and any necessary safety precautions.

(6)

(c) State the following:

(3)

i) Independent variable _____

ii) Dependent variable _____

iii) Control variable _____

(d) State the formula that links force, spring constant and extension.

(1)

(Total for Question 6 = 11 marks)

7. (a) An elastic band is attached to a clamp stand, so one end cannot move. A force of 2N is added to the other end and the elastic band stretches by 3cm. Calculate the spring constant of the elastic band. Remember to include all units.

(3)

- (b) Describe the differences between linear and non-linear extension

(2)

(Total for Question 7 = 5 marks)

8. (a) A spring has a spring constant of 50N/m and an extension of 4cm. Calculate the energy transferred to the elastic potential energy store using the equation:

(3)

$$E = \frac{1}{2} \times K \times X^2$$

- (b) What happens to a spring when it has reached its elastic limit?

(1)

(Total for Question 8 = 4 marks)

TOTAL FOR PAPER = 50 MARKS