Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic : 2_Motion and Forces

Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

		Indicative Content	Mark
QWC	*	An explanation including some of the following ideas • brakes apply a force to the car • this force from brakes makes the car decelerate/ lose velocity • a force also acts on the driver • driver decelerates at same rate as the car • does not move with respect to car/ stays in the driving seat • moves slightly because belt stretches • small/ no horizontal force acts on the shopping bag • shopping bag continues at similar/ same velocity • until shopping bag falls off seat / hits dashboard • ideas can be expressed in terms of energy, momentum and/or by reference to Newton's laws	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited explanation of the difference in decelerations of at least two of the objects Car **(C)**, Shopping **(S)** and Passenger **(P)** mainly describing the effects.	

		E.g. (at start) **C** stops (very quickly) while **P / S** carries on moving (for a longer time) OR **S** carries on at same speed / hits the dashboard while **P** is held back / slowed down (by the seatbelt) • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	**3 - 4**	• A simple explanation of the difference in decelerations of at least **two** of the objects Car, Shopping and Passenger, including a reason for at least one of the decelerations. E.g.(at start) **C** stops (very quickly) **because of** friction at the brakes and at the road while **P / S** carries on moving (for a longer time) OR **S** carries on moving (at same speed) / hits the dashboard while **P** is held back / slowed down **because of** stretching force from the seatbelt) • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	**5 - 6**	• A detailed explanation of the relative decelerations of **C**, **S and P** including mention of the physical principles involved in any two such as that named forces are needed to change given motions. E.g. (The force of) friction is large for **C** to slow down / stop quickly but is low for **P** and **S**. **<u>So / thus / therefore etc</u>** **P** or **S** carry on at the same speed (initially). **P** decelerates more slowly than **C because / as a result etc** of the stretching (force) of the seatbelt. OR *The idea of* Newton's first law / inertia / need for a force to change motion *and the role of friction and elastic / tension / stretching force in producing the **three** named decelerations. OR Named force needed for a described change in momentum/kinetic energy to stop / slow down each of the **three** objects.* • *the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately* • *spelling, punctuation and grammar are used with few errors*

Q2.

	Answer	***Acceptable answers***	***Mark***
(a) (i)	*D the same size as the driving force*		***(1)***
(a) (ii)	*transposition: (1) {change in) speed= acceleration × time substitution: (1) speed = 12 × 4 evaluation: (1) 48 (m/s) (1)*	*transposition and substitution can be in either order substitution mark can be scored when incorrectly transposed word/symbol equation is given Give full marks for correct answer no working*	***(3)***
(b)	*An explanation linking* • *{acceleration of sports is 2x / time to reach 30 m/s is ½} that of family car / RA (1)* • *mass of sports car LESS than ½ that of family car or RA (1)(so resultant force required is less)*	*Attempt to use f = m × a scores one mark e.g. 4200 OR 3600 scores 1 Correct numerical comparison scores both marks e.g. 4200:3600 numerically or in words scores 2 marks*	***(2)***

		Indicative Content	***Mark***
QWC	****(c)***	*An explanation including some of the following ideas* • *brakes apply a force to the car* • *this force from brakes makes the car decelerate/ lose velocity* • *a force also acts on the driver* • *driver decelerates at same rate as the car* • *does not move with respect to car/ stays in the driving seat* • *moves slightly because belt stretches* • *small/ no horizontal force acts on the shopping bag* • *shopping bag*	***(6)***

		continues at similar/ same velocity • *until shopping bag falls off seat / hits dashboard* • *ideas can be expressed in terms of energy, momentum and/or by reference to Newton's laws*	
Level	***0***	*No rewardable content*	
1	***1 - 2***	• *A limited explanation of the difference in decelerations of at least two of the objects Car **(C)**, Shopping **(S)** and Passenger **(P)** mainly describing the effects. E.g. (at start) **C** stops (very quickly) while {**P / S**} carries on moving (for a longer time) OR **S** {carries on at same speed / hits the dashboard} while **P** is {held back / slowed down} (by the seatbelt)* • *the answer communicates ideas using simple language and uses limited scientific terminology* • *spelling, punctuation and grammar are used with limited accuracy*	
2	***3 - 4***	• *A simple explanation of the difference in decelerations of at least **two** of the objects Car, Shopping and Passenger, including a reason for at least one of the decelerations. E.g.(at start) **C** stops (very quickly) **because of** friction at the brakes and at the road while {**P / S**} carries on moving (for a longer time) OR **S** {carries on moving (at same speed) / hits the dashboard} while **P** is {held back / slowed down}**because of** stretching force from the seatbelt)* • *the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately* • *spelling, punctuation and grammar are used with some accuracy*	
3	***5 - 6***	• *A detailed explanation of the relative decelerations of **C**, **S and P** including mention of the physical principles involved in any two such as that named forces are needed to change given motions. E.g. (The force of) friction is large for **C** to {slow down / stop} quickly but is low for **P** and **S**. {**So / thus / therefore etc**}**P** or **S** carry on at the same speed (initially). **P** decelerates more slowly than **C** {**because / as a result etc**} of the stretching (force) of the seatbelt.* *OR The idea of* {Newton's first law / inertia / need for a force to change motion} and the	

		role of friction and {elastic / tension / stretching} force in producing the **three** named decelerations. OR Named force needed for a described change in {momentum/kinetic energy} to {stop / slow down} each of the **three** objects. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors