

Question number	Answer	Notes	Marks
7 (a)	Any 2 from air bags; side impact beams/bars; crumple zones /collapsible bumpers; collapsible steering column /wheel;	Allow references to strong / laminated / safety glass ignore unqualified bumpers	2
(b) (i)	Any four from MP1. same momentum change (with or without a seatbelt); MP2. (but) time of impact increases; MP3. (which) reduces rate of momentum change; MP4. (therefore) reducing the (average) force; MP5. the seat belt stretches (during collision); MP6. (which) increases the area over which the force acts; MP7. (hence) pressure on body reduces;	Ignore • references to momentum reducing • word equation	4
(b) (ii)	A sensible suggestion; e.g. there is a higher momentum (transfer in collision) there is a larger force during impact straps have a greater area over which force acts larger area of straps reduces the pressure		1

(c)	Momentum (of car and dummy) reduces to <u>zero</u> ; OR All momentum is absorbed by the Earth;		1
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(Total for Question 7= 8 marks)