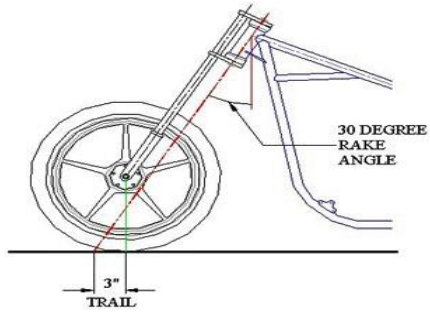


4292-521 - Level 2 Technical Certificate in Vehicle Technology –

4292 – 522 Level 2 Automotive – Theory Exam (1)

March 2018

Q	Acceptable answer(s)	Guidance	Max mks
1a	Any of the following: <ul style="list-style-type: none">▪ Correct PPE required▪ Away from heat▪ Away from naked flames▪ Stored in a secure area▪ Stored in a labelled container		2
1b	Any of the following: <ul style="list-style-type: none">▪ Carelessness▪ Improper behaviour▪ Improper dress▪ Lack of training▪ Alcohol and drugs▪ Unguarded or faulty tools and equipment		2
2	Self-employed individuals work for themselves and employed will work for a company (1 mark). Self-employed are responsible for finding their own work but employed people are delegated work (1 mark). Self-employed keep all the money they earn and employed receive a salary (1 mark). Self-employed individuals are not entitled to holidays/pension entitlement but employed individuals are (1 mark).	1 mark for each comparison made	4
3a	1 mark each for any of the following: <ul style="list-style-type: none">▪ Condition (Cracks/damage)▪ Adjustment (slack / tight)▪ Contamination		2
3b	1 mark each for any of the following: <ul style="list-style-type: none">▪ Checking of main systems for security and wear▪ Updating of vehicle systems▪ Changing oil and filter▪ Checking body for condition		2

4a	So the heavy spots on the tyre can be found accurately (1 mark) and weights added to compensate (1 mark)		2
4b	1 mark for each for any of the following: <ul style="list-style-type: none"> ▪ Voltage (multimeter) ▪ Amperage meter / clamp ▪ Hydrometer ▪ Tester (drop / smart) 		2
5a	As it dissipates heat more quickly (1 mark) they are self-adjusting (1 mark), they are light and have improved stopping power (1 mark), improved feel through the brake pedal / levers to control braking (1 mark)		4
5b	1 mark for each of any of the following: <ul style="list-style-type: none"> ▪ To reduce vehicle speed ▪ To stop the vehicle ▪ To hold the vehicle stationary 		2
6a	i)Twin steered axle (1 mark) and HGV/Heavy Goods (1 mark). ii) 1 mark each for any of the following: <ul style="list-style-type: none"> ▪ To provide a means of changing vehicle direction (1 mark) ▪ Provide a degree of feel (1 mark) without transmitting shock loading to the driver (1 mark) ▪ To achieve minimal tyre slip (1 mark) 		2 2
6b	Rake is the angle of the steering head (inclination) (1 mark) Trail is the point of the front wheel contacting the ground (1mark) and a line drawn through the axis of the steering head (1mark)  <p>Figure 2</p>		3
7a	1 mark for each of the following		2

	It gives a better ride improved handling increases tyre life		
7b	Airbag		1
8a	i) 1 mark for each of any of the following: <ul style="list-style-type: none"> ▪ Front ▪ mid ▪ rear ▪ transverse ▪ longitudinal ▪ underslung. 		2
	ii) 1 mark for each of any of the following reasons: <ul style="list-style-type: none"> ▪ for passenger comfort and space ▪ road holding and handling ▪ carrying capacity ▪ aerodynamics ▪ performance 	2	
8b	1 mark for each of any of the following reasons: <ul style="list-style-type: none"> ▪ Induction – piston moves downwards drawing in air inlet valve open ▪ Compression –piston moves upwards both valve closed compression air ▪ Power – Fuel is injected at high pressure ignites with air due to heat in cylinder ▪ Exhaust – Piston rises upwards exhaust valve opens gas is expelled 		4
8C	i) Flywheel		1
	ii) 1 mark for each of any of the following reasons: <ul style="list-style-type: none"> ▪ To maintain the inertia of the engine at low speeds (rev/mins) ▪ By smoothing out gear changes ▪ By allowing the engine to start using a ring gear ▪ Provide a connection between the engine and transmission 	2	
9a	ai) Disconnecting the battery will cause the alternator to increase output which will create high voltage spikes (1 mark) causing damage to electronic components (ECUs) (1 mark)		2
	a ii) 1 mark for each of any of the following: <ul style="list-style-type: none"> ▪ Multi-meter 		3

	<ul style="list-style-type: none"> ▪ Volt meter ▪ ammeter ▪ oscilloscope ▪ diagnostic test equipment 		
9b	<p>1 mark for each of any of the following faults:</p> <ul style="list-style-type: none"> ▪ short circuit ▪ sulphation ▪ damage/to plate separators ▪ low electrolyte level 		2
10a	Four wheel drive		1
10b	Drive is passed from the main gearbox through to a transfer box /case (1 mark) and then distributed through to the front and rear axles (1 mark) to the drive shafts (1 mark).		3
11	<p>1 mark for any of the following advantages</p> <ul style="list-style-type: none"> ▪ allows gear changes without any reduction in traction or power ▪ allows for faster gear changes ▪ Reduces fuel consumption ▪ Decreases engine noise ▪ Can be operated from the steering wheel no clutch pedal <p>1 mark for any of the following disadvantages</p> <ul style="list-style-type: none"> ▪ Requires special tools and training to repair ▪ Requires regular oil changes 		2
12	<p><u>Band Descriptors</u> <u>9-7 marks</u></p> <p>The learner has provided a detailed recommendation of how to check for any damage, they would have checked the road wheel for damage, and lifted the vehicle on the ramp, checked all key steering and suspension components for signs of damage and listed them alongside an explanation of how and why the fault occurred.</p> <p>A four wheel alignment would have been carried out, to check the suspension and steering angles, adjustments would have been carried out to return to manufacturer's specification, the steering wheel would be checked for correct alignment.</p> <p>Health and safety and legal requirements have been considered throughout their answer.</p> <p>The learner had full understanding of the task and has demonstrated their knowledge in a holistic approach.</p>	<p><u>Indicative content</u></p> <p>The learner provides a detailed explanation must includes</p> <ul style="list-style-type: none"> ▪ Health and safety procedures ▪ Process of checking for damage. <ul style="list-style-type: none"> • Connected four wheel alignment equipment. • Checked suspension settings. • Adjusted to within specification. • Steering wheel alignment. ▪ Identifying the damaged components and the reasons why they failed. 	9

6-4 marks

The learner has presented a mostly accurate recommendation on how to check the vehicle for damage.

Some knowledge is shown of the checking of steering components but no mention of suspension components (or visa versa), no mention of the four wheel alignment has taken place. They listed some components but with limited reasoning for failure.

Awareness of health and safety were mentioned briefly.

The learner has shown knowledge across three or four key areas and has attempted to present them in a logical order but lacks a depth of understanding of the task as a whole; there has been some mention of checks but not in depth enough to show a good understanding of the task.

3-1 marks

Learner shows very limited knowledge of the identification of either steering or suspension components.

The learner has identified some of the process and one or two key areas, but has not been able to describe them in a logical sequence; their approach to the task is very random. No health and safety measures/processes were addressed.

They have not mentioned any checks to be carried to ascertain the extent of the damage

0 marks

No rewardable material.