

0171-516 Level 3 Land-based Engineering - Theory exam (1) - March 2018

0171-38 Level 3 Advanced Technical Extended Diploma in Land-Based Engineering (1080)

Q	Acceptable answer(s)	Guidance	Max mks
1	<ul style="list-style-type: none"> • Drum • Dry disc • Wet disc • Caliper disc. 	1 mark for each, max of 3 marks	3
2	Brake pedal or lever operated fluid (1) pushes piston in caliper out (1) and compresses brake pads against disc (1) and slows drive shaft. (1)	4 marks for explanation, accept any other suitable answer	4
3	<p>Description to include</p> <ul style="list-style-type: none"> • flat level ground • correct tyre pressures • measure distance with tracking tool or tape measure inside rims edges at the front and rear deduct reading to get tracking. • 4WD vehicle shown will toe-out typical reading 0-3 mm • adjust each steering rod end the same amount • Roll vehicle forward and recheck • ensure all fittings are torqued at end of procedure. 	Accept any other suitable answer	5
4	<ul style="list-style-type: none"> • Fire • Burning • Electric shock • Damage to components • Fumes • Short circuit • Earth • Accept any other suitable answer 	1 mark each, up to 3 marks	3

5	<p>i) wire or component broken or disconnected (1) current will not flow (1)</p> <p>ii) wire grounded or wires touching (1) usually results in blown fuse (1)</p> <p>iii) Loose, dirt or faulty connection or faulty components (1) usually cause heat. (1)</p>	<p>2 marks per explanation, up to 6 marks</p> <p>Accept any other suitable answer</p>	
6	<p>Amps = watts/volts</p> <p>60w divided by 12V = 5 amps</p>	<p>1 mark for correct formula</p> <p>1 mark for substitution</p> <p>1 mark for correct answer</p>	3
7	<p>a) GPS—accurate positioning system via orbiting satellites</p> <p>b) CANBUS – allow controllers to communicate with each other.</p> <p>c) ISOBUS – Serial control and communications data network</p>	<p>1 mark for each correct answer</p> <p>Accept any other suitable answer</p>	3
8	<p>a) A resistor is an electronic component that restricts the flow of current (1) passing through it, most do it by separating the wire with a semiconductor (1) that has fewer free electrons (1)</p> <p>b) Zener diodes (are a single component that works like a normal diode) but it also allows current to flow in the opposite direction (1) when a required breakdown voltage is reached (1) to give a steady voltage output. (1)</p>	<p>3 mark each, up to 6 marks</p> <p>Accept any other suitable answer</p>	
9	<p>Wave 1- straight line linear voltage relates to pressure (bar)</p> <p>Wave 2- Multiple wave form with missing segment at regular intervals</p> <p>Wave 3- Voltage drops over time</p>	<p>1 mark for each</p> <p>Accept any other suitable answer</p>	3
10	<p>a) Micron- size of particles (usually) a filter will remove 1000 μM</p> <p>b) Cavitation- Air or vapour in the hydraulic oil causing erratic system operation, damage and noise.</p>	<p>1 mark each answer</p> <p>Accept any other suitable answer</p>	3

	c) Cracking pressure - The pressure at which a hydraulic valve begins to open.		
11	<p>The variable displacement pump 4 sends pressurised oil via the inlet priority valve (1) to the rocker shaft valve 6 (1), which controls the oil feed to the lift cylinders which is determined by the stepper motor 5 (1). If the operator moves a control on the cab panel 1, (1) this signal is then sent to the hitch control unit electronic box 2 (1), it then monitors the position of the rocker shaft by position sensor 3 / draft forces by lower link pins 7 (1) and reacts to the signal by opening or closing the raise and lower valve 6 (1) by means of the stepper motor 5 (1).</p>	<p>(1 mark for each point up to 6 marks)</p> <p>Alternative terminology may be used.</p> <p>Accept any other correct responses.</p>	6
12	3000/14.5 = 206.84 bar (accept a range between 200 – 207 bar)	<p>1 mark for conversion 1bar – 14.5psi</p> <p>1 mark for substitution</p> <p>1 mark for the correct answer</p>	3
13	<p>Band 1 (1-4 marks) Basic fault procedures listed with some understanding of component layout and operation. Little or no specialist terms used.</p> <p>Band 2 (5-8 marks) Some fault finding procedures listed in a logical sequence reasonable understanding of component layout and operation. Some specialist terms used. The information is mostly presented in a structured format.</p> <p>Band 3 (9-12 marks) Clear understanding of fault finding procedures and clear appreciation of component layout, and operation. Specialist terms will be used correctly and appropriately. Diagnostics presented in a structured format.</p>	<p>Indicative content Visual - System leaks from master and slave cylinders, pipes and hoses trailer brake valve. Inspect- fluid level, condition and correct type. Operate the brakes – to check noise Bleed system – correct procedures explained to remove air Conclusions- internal leakage brake discs.</p> <p><i>For no awardable content, award 0 marks.</i></p>	12