


**Qualification: 0171-32-006/506 Level 3 Agriculture – Theory exam (2) (Mixed Farming)**

**June 2018**

1	What does the term 'permanent pasture' mean? (1 mark)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<p><b>1 mark for the following</b></p> <p>Land growing grass for five years or longer</p>	Accept any other suitable wording	<b>1</b>
2	State <b>two</b> benefits of including Meadow Fescue in a grass seeds mixture. (2 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<p><b>1 mark for each benefit stated from any 2 of the following; up to 2 marks</b></p> <ul style="list-style-type: none"> <li>• Good winter hardiness</li> <li>• Good performance in adverse soil conditions</li> <li>• Especially suited to conservation</li> <li>• Wide leaves produce high quality hay</li> <li>• Very palatable</li> <li>• Good digestibility</li> </ul>	Accept any other suitable answer	<b>2</b>
3	<p>A farmer is planning a fertiliser regime for a grass ley.</p> <p>a) State <b>five</b> factors that the farmer would need to take into account. (5 marks)</p> <p>b) For each factor stated in 3a), explain why the farmer should take them into account. (5 marks)</p>		

	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<p><b>a) 1 mark for each factor up to 5 marks</b></p> <ul style="list-style-type: none"> <li>• Planned use</li> <li>• Desired level of productivity</li> <li>• Current soil index levels</li> <li>• Links to metabolic diseases e.g magnesium deficiency</li> <li>• Soil type</li> <li>• Environmental regulations and codes of practice e.g NVZ</li> <li>• Age of sward</li> <li>• Grass species present and desired</li> <li>• Timing e.g Grass growth patterns</li> <li>• Previous applications of organic material</li> </ul> <p><b>b) 1 mark per explanation, up to 5 marks</b></p> <ul style="list-style-type: none"> <li>• Planned use- level of fertiliser will differ according to planned use eg hay, silage, grazing</li> <li>• Desired level of productivity – higher productivity means that higher nutrient levels are needed</li> <li>• Current soil index levels- to avoid over/under application</li> <li>• Links to metabolic diseases e.g magnesium deficiency – adding high levels of potash will lock up magnesium leading to magnesium deficiency in livestock</li> <li>• Soil type- sand leaches nutrients more readily than clay soils</li> <li>• Environmental regulations and codes of practice e.g NVZ- need to be adhered to for environmental protection</li> <li>• Age of sward - will the grass respond to higher levels of fertiliser</li> <li>• Grass species present and desired – ryegrasses respond better to higher levels of fertiliser</li> <li>• Timing/Grass growth patterns – fertilisers should be added at the optimum time for nutrient uptake</li> <li>• Previous applications of organic material – should be taken into account to avoid over application of nutrients</li> </ul>	Accept any other suitable answer	10
4	State <b>two</b> reasons why Nitrogen is important for grass crops. (2 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>

	<p><b>1 mark for each reason from any of the following; up to 2 marks</b></p> <ul style="list-style-type: none"> <li>• Promotes leaf growth</li> <li>• Increases chlorophyll levels/increases levels of Photosynthesis</li> <li>• Promotes yield</li> <li>• Promotes protein levels in grass.</li> </ul>	Accept any other suitable answer	2
5	<div style="text-align: center;">  </div> <p><a href="http://cropscience.bayer.co.uk">http://cropscience.bayer.co.uk</a></p> <p style="text-align: center;"><b>Figure 1</b></p> <p>Give <b>three</b> reasons why the grass shown in Figure 1 affects the productivity of the sward. (3 marks)</p>		
<b>Acceptable answer(s)</b>		<b>Guidance</b>	<b>Max mks</b>
<p><b>1 mark per reason, up to 3 marks</b></p> <ul style="list-style-type: none"> <li>• It <u>grows slowly</u> and is therefore unproductive</li> <li>• Short growth leading to <u>lower yield</u></li> <li>• <u>Low in nutrients</u> compared to other species</li> <li>• <u>Takes up space</u> of more productive grasses</li> </ul>		Accept any other suitable answer	3
6	Explain <b>three</b> ways that the time of cutting of the grass will affect grass silage. (3 marks)		
<b>Acceptable answer(s)</b>		<b>Guidance</b>	<b>Max mks</b>

	<p><b>1 mark per explanation, up to 3 marks</b></p> <ul style="list-style-type: none"> <li>• Earlier cutting = higher D values/ later cutting = lower D values</li> <li>• Earlier cutting = lower yield/ later cutting = higher yield</li> <li>• Cutting mid-afternoon, when the sun is high, will result in higher sugars</li> <li>• If cut before rain, nutrients could be leached out</li> </ul>	Accept any other suitable answer	3
7	Explain <b>three</b> ways of promoting lacto-bacillus bacteria in clamped grass silage. (3 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<p><b>1 mark per explanation, up to 3 marks</b></p> <ul style="list-style-type: none"> <li>• Roll the clamp to exclude air as lacto-bacilli are anaerobic bacteria</li> <li>• Effective sheeting to exclude air as lacto-bacilli are anaerobic bacteria</li> <li>• Use additives such as sugars/acid to enhance conditions for lacto-bacillus</li> <li>• Use live bacteria to increase the numbers of lacto-bacillus</li> </ul>	Accept any other suitable answer	3
8	List <b>four</b> causes of an ATV turning over whilst in use. (4 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<p><b>1 mark each for any 4 of the following, up to 4 marks</b></p> <ul style="list-style-type: none"> <li>• Overloading</li> <li>• Tyre pressures are too low/ or uneven</li> <li>• Turning across a slope</li> <li>• Going too fast on uneven ground</li> <li>• Too much weight on a trailer going down a steep hill</li> <li>• Too much weight on a trailer going across a steep hill</li> <li>• Incorrect body weight distribution on a slope</li> </ul>	Accept any other suitable answer	4
9	<p>a) Name the <b>four</b> stages of the 4 stroke cycle for a diesel engine. (4 marks)</p> <p>b) Describe the <b>four</b> stages of the 4 stroke cycle for a diesel engine. (8 marks)</p>		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>

	<p><b>a) 1 mark for each stage, up to 4 marks</b></p> <ul style="list-style-type: none"> <li>• Intake/ induction/ suction.</li> <li>• Compression</li> <li>• Combustion/power/ignition</li> <li>• Exhaust/outlet.</li> </ul> <p><b>b) 2 marks for each stage described, up to 8 marks</b></p> <ul style="list-style-type: none"> <li>• Intake/ induction/ suction - In this stroke the intake valve must be open and the exhaust valve closed (1) as the piston moves down, air is drawn in through the intake valve (1)</li> <li>• Compression- Piston moves up which compresses the air (1). Both the intake and exhaust valves are closed during this stage. (1)</li> <li>• Combustion/power/ignition- the piston moves up compressing the air with both valve closed (1). Diesel is injected into the hot air creating an explosion, forcing the piston down (1)</li> <li>• Exhaust/outlet –the piston moves up pushing out exhaust gasses (1) through the exhaust valve, inlet valve closed (1)</li> </ul>	Accept any other suitable descriptions for b)	12
10	<p>a) State <b>two</b> advantages of a torque converter compared to manual transmission. (2 marks)</p> <p>b) Name the <b>three</b> major parts of a torque converter. (3 marks)</p>		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<p><b>1 mark for each advantage , up to 2 marks</b></p> <ul style="list-style-type: none"> <li>• Will not stall</li> <li>• Automatic transmission (no gear changing required)</li> </ul> <p><b>b) 1 mark for each of the following, up to 3 marks</b></p> <ul style="list-style-type: none"> <li>• turbine</li> <li>• impeller</li> <li>• stator</li> <li>• oil</li> </ul>	Accept any other suitable answer for a)	5
11	What is the correct tyre pressures for an ATV being used on rough terrain? (1 mark)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>

	<p><b>1 mark</b></p> <ul style="list-style-type: none"> <li>Between 0.2 and 0.5 bar</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>Between 3 PSI and 7 PSI</li> </ul>		1
12	Explain <b>one</b> advantage and <b>one</b> disadvantage of having a differential on an ATV. (2 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<p><b>Advantage – 1 mark</b></p> <ul style="list-style-type: none"> <li>it allows you to turn sharper without lifting a wheel off the ground</li> </ul> <p><b>Disadvantage - 1 mark</b></p> <ul style="list-style-type: none"> <li>if cornering and one wheel leaves the ground, the machine will stop or slow down</li> </ul>	Accept any other suitable answers	2
13	<p>A livestock farmer wishes to increase his productivity and efficiency in one grass field, which is used for grazing and silage.</p> <p>Another second steep grass field on the farm has become unproductive. The farmer wishes to improve this without a complete re-seed. The farm also owns an ATV which is under used.</p> <p>Discuss methods that could be used to increase the production of the fields. Give examples of where the ATV could be utilised, the risks that may be involved and how to overcome them. (12 marks)</p>		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<p><b>Band 1 (1-4 marks)</b> Limited discussion of methods to increase productivity of the field. There will limited examples of ATV utilisation, risks and how to overcome them. Answer may be disorganised and ambiguous.</p> <p><b>Band 2 (5-8 marks)</b> Adequate discussion of methods to increase productivity of the field. There will be a fair range of examples of ATV utilisation, risks and how to overcome them. There will be some use of specialist terms, although they may not always be used appropriately. The information is presented mostly in a structured format.</p> <p><b>Band 3 (9-12 marks)</b> Detailed discussion of methods to increase productivity of the field. There will be a wide range of examples of ATV utilisation, risks and how to overcome them. Specialist terms will be used correctly and appropriately. Information will be presented in a structured format.</p>	<p><b>Indicative content</b></p> <p><b>Methods</b></p> <ul style="list-style-type: none"> <li>Carry out soil analysis test – using the ATV and GPS tracking</li> <li>From the results of the soil analysis, add nutrients accordingly to bring the PH to 6 and the P, K and Mg indices to 2</li> <li>Improve clover and beneficial grass of the sward by either slot re-seeding or broadcasting and chain harrow</li> <li>Increase organic matter in soil by using FYM and slurry, if the field allows</li> </ul>	12

		<ul style="list-style-type: none"> <li>• Add nitrogen when the grass starts to grow in the Spring</li> <li>• Weed control</li> <li>• Improved drainage</li> <li>• Manage stocking rates</li> <li>• Check for pests</li> <li>• Check for compaction</li> </ul> <p><b>ATV utilisation</b></p> <ul style="list-style-type: none"> <li>• Carry out soil analysis test – using the ATV and GPS tracking</li> <li>• May be used for weed and pest control</li> <li>• Use for checking stock and grass growth</li> <li>• Carrying winter feed to stock in the field</li> </ul> <p><b>Risks and how to overcome them</b></p> <ul style="list-style-type: none"> <li>• ATV overturning</li> <li>• Carry out a risk assessment</li> <li>• Adequate training</li> <li>• Drive up and down the slope, rather than across</li> <li>• Take care when turning across the slope</li> <li>• Keep speed down</li> <li>• Don't overload the ATV and load evenly</li> <li>• Check tyre pressures regularly</li> <li>• Wear appropriate PPE</li> </ul> <p><b><i>For no awardable content, award 0 marks.</i></b></p>	
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