

Qualification: 0171-30/31/32/33-002/502 Level 3 Technicals in Agriculture – Theory Exam

June 2018

1	Describe two ways that a machine operator can minimise the impact on the environment. (4 marks)		
	Acceptable answer(s)	Guidance	Max mks
	<p>2 marks for each description, up to 4 marks</p> <ul style="list-style-type: none"> • Set up the machinery correctly (1) to ensure accuracy of operation (1) • Correct application of slurry/manure/fertiliser (1) to avoid run off (1) • Minimise oil/fuel spillages (1) through correct fuelling (1) • Reducing cultivation operations (1) using minimum tillage to reduce emissions (1) • Correct calibration of application equipment (1) to prevent nutrient leaching/chemical pollution (1) • Correct waste disposal (1) to prevent pollution (1) • Using economy modes on PTOs speed (1) to save fuel (1) 	Accept any other relevant answer	4
2	<p>For a winter wheat crop, state the proportion of nitrogen fertiliser, as a percentage, applied at each of the following growth stages. (2 marks)</p> <p>a) tillering (growth stage 20) (1 mark)</p> <p>b) stem extension (growth stage 30). (1 mark)</p>		
	Acceptable answer(s)	Guidance	Max mks

	<p>1 mark each</p> <p>a) accept any answer between 20-33%</p> <p>b) accept any answer between 20-33%</p>	<p>As there may be a variation in approach across the country, answers could vary from a single value e.g 20% or a range e.g 22-25%. Both are acceptable.</p> <p>For a) and b) do not accept answers under 20% or over 34%</p> <p>Do not penalise if they do not provide an answer with a percentage sign.</p>	2
3	<p>a) State one way of measuring the moisture content of a grain sample. (1 mark)</p> <p>b) State the maximum moisture content for the effective long term storage of wheat. (1 mark)</p> <p>c) Explain two implications of storing wheat above the optimum moisture content. (4 marks)</p>		
	<p>Acceptable answer(s)</p>	<p>Guidance</p>	<p>Max mks</p>
	<p>a) 1 mark for any of the following</p> <ul style="list-style-type: none"> • Moisture meter (1) • Send for laboratory analysis / oven test (1) <p>b) 1 mark for: 14%</p> <p>c) 2 marks for each explanation, up to 4 marks</p> <ul style="list-style-type: none"> • Pest build up in the grains (1) so grain quality is reduced (1) • Grain sweating and warming (1) reduces the quality and produce mould/mycotoxins (1) • Risk of spontaneous combustion (1) therefore the crop is lost (1) • Less marketable (1) due to low quality (1) • Germination (1) which reduces the quality of the crop (1) 	<p>b)Accept half a percent either side.</p> <p>c)Accept any other relevant answer</p>	6
4	<p>Describe the uptake, transport and loss of water from plants. (6 marks).</p>		
	<p>Acceptable answer(s)</p>	<p>Guidance</p>	<p>Max mks</p>
	<p>2 marks for each description, up to 6 marks</p>	<p>Accept any other relevant answer</p>	6

	<p>Uptake Absorption of water by root hairs (1) by negative pressure or sucking (1) Or Osmosis (1) transfer of water into the roots (1)</p> <p>Transport Xylem tissues (1) transport water to leaves via suction pull (1) or Movement of water (1) up the stem (1)</p> <p>Loss of water Stomata regulate water loss (1) to guard cells and turgidity (1) or Transpiration (1) through the leaf's stomata (1) or Evaporation (1) through the leaves (1)</p>		
5	<p>a) State four soil characteristics that can affect plant growth and development. (4 marks). b) Give an example of how each of these characteristics can affect plant growth and development. (4 marks).</p>		
	Acceptable answer(s)	Guidance	Max mks
	<p>a) 1 mark each for any of the following, up to 4 marks</p> <ul style="list-style-type: none"> • pH • Organic matter • Availability of nutrients • Soil index • Drainage/water logging • Compaction/poor aeration • High or low soil water table • Soil type e.g clay, sandy etc • Structure <p>b) 1 mark for each example, up to 4 marks</p> <ul style="list-style-type: none"> • Stunting growth • Reducing yield • Plants falling over/dying • Reduced resistance to pest attack • Reduced resistance to disease • Failing to germinate • Failing to establish • Droughting off of crops • Increased weed competition • Delay in harvesting 	Accept any other relevant answers	8

6	<p>a) Describe the life cycle of a named agricultural annual crop. (2 marks)</p> <p>b) Describe the life cycle of a named agricultural perennial crop. (2 marks).</p>		
	Acceptable answer(s)	Guidance	Max mks
	<p>2 marks each, up to 4 marks</p> <p>a) 1 mark for a named agricultural annual crop</p> <p>Annual crop completes its life cycle from germination to production of seeds within one year and then dies. (1 mark)</p> <p>b) 1 mark for a named agricultural perennial crop</p> <p>Perennial crop is a crop that lives for more than two years. (1 mark)</p>	Accept any other suitable answers	4
7	With reference to common couch grass, explain how asexual reproduction can take place. (3 marks)		
	Acceptable answer(s)	Guidance	Max mks
	<p>3 marks for:</p> <p>Underground rhizome (1) will produce a new plant (1) and when cut or chopped will self-propagate (1)</p> <p>or</p> <p>Underground stem (1) will produce a new plant (1) and when cut or chopped will self-propagate (1)</p>	Accept any other suitable wording	3
8	<p>a) What is the normal body temperature of a lamb? (1 mark)</p> <p>b) State, in days, the gestation period in ewes. (1 mark)</p>		
	Acceptable answer(s)	Guidance	Max mks
	<p>1 mark each for</p> <p>a) 39.5°C -41°C</p> <p>b) 147 - accept 3 days either side</p>	<p>a) Do not penalise candidates if they don't put centigrade or Fahrenheit</p> <p>b) accept any range or a single value as long as it is correct</p>	2

9	<p>a) A finished bacon pig at slaughter will weigh approximately how many kilograms live-weight. (1 mark)</p> <p>b) What is the definition for a Gilt? (1 mark)</p>		
	Acceptable answer(s)	Guidance	Max mks
	<p>a) 1 mark for</p> <ul style="list-style-type: none"> • 100kg (accept any range from 90-110kg) <p>b) 1 mark for</p> <ul style="list-style-type: none"> • A young female pig that hasn't produced a second litter of piglets 	Accept any other suitable wording for b)	2
10	State three beef finishing systems available in the UK. (3 marks)		
	Acceptable answer(s)	Guidance	Max mks
	<p>1 mark for each, up to 3 marks</p> <ul style="list-style-type: none"> • Grass fed • Barley/Cereal • 18 month Grass & Cereal • 24 month Grass & Silage 	Accept answers in years e.g 1.5 years (18 months)	3
11	Describe four features of a block calving dairy herd. (4 marks)		
	Acceptable answer(s)	Guidance	Max mks
	<p>1 mark for each, up to 4 marks</p> <ul style="list-style-type: none"> • All cows calve together in a short period (1) • A period of time when cows are dry (1) • Easier feed management as all animals at similar stage in the lactation (1) • Very busy periods – calving, serving (1) • Achieving a tight calving pattern (1) • Uneven cash flow (1) 	Accept any other relevant answers	4

12	<p>Preparation for the breeding season (tupping) is important for achieving high lambing percentages. Describe two checks that would be carried out as part of preparation for tupping in each of the following:</p> <p>a) Rams or Tups. (2 marks)</p> <p>b) Ewes. (2 marks)</p>		
	<p>Acceptable answer(s)</p> <p>a) 1 mark each, up to 2 marks</p> <ul style="list-style-type: none"> • Testicles for lumps and condition • Sperm checked for motility, mobility and fertility • Feet – lameness • General health and body condition, score four needs to be fit <p>b) 1 mark each, up to 2 marks</p> <ul style="list-style-type: none"> • Checking for broken mouths • Up to date with any enzootic and toxoplasmosis vaccinations • Body condition – egg flushing • Udders for lumps and teat condition – mastitis checks • Trimming tail head wool for efficient mating • Feet – lameness • Health problems – prolapse 	<p>Guidance</p> <p>a) Accept the term MOT if used as part of the description– 1 mark</p> <p>Accept any other relevant answers</p>	<p>Max mks</p> <p>4</p>
13	<p>Discuss the impact of poor drainage on crops and livestock, how this can be improved and what the benefits might be. (12 marks)</p>	<p>Acceptable answer(s)</p> <p>Band 1 (1 – 4 marks)</p> <p>Limited discussion of drainage methods, effects and benefits on crops and livestock health and performance. There will be little or no specialist terms. Answer may be disorganised and ambiguous. To access the higher marks in the band, discussion is supported with relevant examples.</p> <p>Band 2 (5 – 8 marks)</p>	<p>Guidance</p> <p>INDICATIVE CONTENT</p> <p>Impacts on crops</p> <ul style="list-style-type: none"> • Timeliness of operations • Water logging • Access to operations • Rutting and compaction • Leaching of nutrients <p>Max mks</p> <p>12</p>

	<p>Adequate discussion of drainage methods, effects and benefits on crops and livestock health and performance. Clear evidence of understanding of interrelationships. There will be some use of specialist terms, although they may not always be used appropriately. The information is presented mostly in a logical order. To access the higher marks in the band, discussion is supported with a range of relevant examples with clear links to the topic.</p> <p>Band 3 (9 – 12 marks)</p> <p>Detailed discussion of drainage methods effects, and benefits on crops and livestock health performance. Thorough and consistent evidence of understanding of interrelationships between the factors. Specialist terms will be used correctly and appropriately. Information will be presented in a logical order. To access the higher marks in the band, a comprehensive range of examples is used with comprehensive links to the topic.</p>	<ul style="list-style-type: none"> • Seed loss <p>Impacts on livestock</p> <ul style="list-style-type: none"> • Feet problems • Liver fluke • Increase of flies and associated problems • Poaching of grass • Rutting of ground • Access to animals eg for feeding • Timeliness of operations <p>Improvement</p> <ul style="list-style-type: none"> • Subsoil • Mole • Tile/Plastic Pipe • Backfill • Watercourse, Ditch/Dyke management <p>Benefits</p> <ul style="list-style-type: none"> • Drier/warmer soils • Root penetration • Reduced nutrient loss • Efficient nutrient usage • Water holding capacity • Saturation point • Field Capacity • Soil Moisture Deficits • Soil Structure • Compaction • Soil/air movement through soils • Machine efficiency • Timeliness of operations • Improved yields • Reduction in weeds • Livestock health – feet, worms <p><i>For no awardable content, award 0 marks.</i></p>	
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