

0171-502 March 2022

Technicals in Agriculture

Level 3 Agriculture – Theory exam (1)

Q	Acceptable answer(s)	Guidance	Max marks
1	<p>List four continental beef breeds commonly used on UK farms. (4 marks)</p> <p>Acceptable answers</p> <ul style="list-style-type: none"> • Charolais • Piedmontese • Simmental • Belgian/British Blue • Gelbveih • Limousin • Maine Anjou • Chianina • Blonde D'Aquitaine • Saler 	<p>1 mark each up to max of 4 marks</p> <p>Accept any other relevant and correct answer</p>	4
2	<p>A farmer is preparing a non-powered cultivator for work at the beginning of the season.</p> <p>Explain two of the preparation activities a farmer may carry out on the cultivator. (4 marks)</p> <p>Acceptable answer(s)</p> <ul style="list-style-type: none"> • Check the condition of shear bolts/break back mechanisms (1) to prevent the tines getting damaged. (1) • Check points for wear (1) Very worn points will reduce efficiency / wearing damage to cultivator body. (1) • Check frame condition for cracks or excessive rust. (1) Needs repair otherwise the machine may break in use. (1) • Check all attachment pins are present and in good condition. (1) Otherwise, it will cause delay in hitching or damage to the machine. (1) 	<p>Up to 2 marks each, to maximum of 4 marks</p> <p>Accept any other relevant and correct answer</p>	4

	<ul style="list-style-type: none"> • Check tightness of all bolts. (1) Loose bolts may result in parts of the machine falling off and getting lost/to ensure everything moves smoothly (1). • Check hydraulic hoses for wear (1) as oil loss causes pollution/harm to operator/the machine may not work properly (1) • Check machine is lubricated/greased up (1) to prevent wear (1) • Check wheels for correct tyre pressure (1) to ensure the machine is operating evenly/avoid tyre/machine damage (1) • Set up the machine to run level (1) and correct depth (1) 		
3	<p>Explain two different reasons why it is important to control weeds in a cereal crop. (4 marks)</p> <p>Acceptable answer(s)</p> <ul style="list-style-type: none"> • Weed seeds in the harvested crop may reduce crop value (1) and have a financial impact (1) • Weeds compete with the crop for moisture (1) taking it away from the crop and therefore reducing crop growth. (1) • Weeds may harbour crop pests/diseases, (1) which then attack the crop reducing its growth / value (1) • Weeds may shade the crop and therefore reduce sunlight reaching the crop, (1) therefore reducing crop growth. (1) • Weeds may make harvesting more difficult/ block the harvester (1) therefore costing time / money (1) • Weeds compete with the crop for nutrients (1) and therefore reducing crop growth. (1) 	<p>Up to 2 marks each, to maximum of 4 marks</p> <p>Accept any other relevant and correct answer</p> <p>Do not accept:</p> <ul style="list-style-type: none"> • Economic threshold 	4

4	<p>State four ways of reducing losses during the harvesting of a potato crop. (4 marks)</p> <p>Acceptable answer(s)</p> <ul style="list-style-type: none"> • Harvest at optimum soil moisture level • Haulm/green material is desiccated/chopped • Set mechanism at correct depth • Webs are correctly set • Potato skins are set • Appropriate weather conditions • Set wheel widths correctly • Trained/competent operators • Forward speed • Height of elevator • Grading on the harvester 	<p>1 mark each, up to 4 marks</p> <p>Accept any other relevant and correct answer</p> <p>Do not accept:</p> <ul style="list-style-type: none"> • Storage responses 	4
5	<p>Describe four factors necessary to maintain a 365 day calving interval in the dairy cow. (8 marks)</p> <p>Acceptable answers</p> <ul style="list-style-type: none"> • Start of service period, 42 days after calving (1 mark), if too early fertility will be lower (1) / any sooner will make the calving interval too short (1) • End of service period, 85 days after calving (1), if exceeded the calving interval will lengthen (1). • Checking for returns to heat after service. (1) to enable them to be re-served (1) • Pregnancy diagnosis (PD) (1) if carried out too late it will be less effective/delay in re-serving (1) • Drying off 2 months before calving (1) to allow to allow the cow to be in good condition for the next lactation (1) • Monitoring of diseases (1) and maintenance of vaccination programme to ensure the health of the cow (1) • Condition score (1) which is affected by nutrition (1) • Use of a sweeper bull (1) to catch returning cows (1) 	<p>Up to 2 marks each, to maximum of 8 marks</p> <p>Accept answers + or – 5 days</p>	8

6	<p>a) State the function of the meristem cells. (1 mark)</p> <p>b) List three characteristics of meristem cells. (3 marks)</p> <p>Acceptable answer(s)</p> <p>a) Meristem cells function- enable plant growth (1 mark)</p> <p>b)</p> <ul style="list-style-type: none"> • Have a thin cell wall • Have a flexible cell wall • Have less E.R (endoplasmic reticulum) • Shape may differ • Lack space between them/compact • Lack vacuoles • They are small • Contain dense cytoplasm • They are undifferentiated • Considered as stem cells given that they are the origin of many of the cells that go on to rapidly differentiate/specialise and form various parts of the plant. • Group of cells that reside at the shoot and root tips of plants 	<p>b) 1 mark each, up to 3 marks</p> <p>Accept any other relevant and correct answer</p>	4
7	<p>a) Describe how capping is created and its effect on soil structure. (4 marks)</p> <p>b) Describe how a plough pan is created and its effect on soil structure. (4 marks)</p> <p>Acceptable answer(s)</p> <p>a) Capping occurs when heavy rain falls (1) soon after the crop has been drilled (1). If a period of warm, dry weather then follows and dries out the soil (1) a crust or cap can form over the surface (1). This can effect on the soil structure (1) and restricts the free movement of water down through the soil (1).</p> <p>b) Plough pans are created by cultivating at the same depth (1) in wet conditions (1). Creates a smear layer (1) and compaction which prevents nutrients (1) and water passage through the soil (1). Could prevent roots getting through soil (1)</p>	<p>Up to 4 marks for description on capping and up to 4 marks for description on plough pan</p> <p>Accept any other relevant and correct answer</p>	8

8	<p>Explain how the following factors affect the rate of transpiration and their effect on the transpiration rate.</p> <p>a) Decreased air movement. (3 marks) b) Low light levels. (3 marks)</p> <p>Acceptable answer(s)</p> <p>a) Air around the leaf containing water will be slowly moved away (1) so less water is able to evaporate away (1) decreases transpiration rate (1)</p> <p>b) Low light levels will decrease the rate of photosynthesis (1) so less water is drawn into the leaves (1) and therefore the rate of transpiration decreases (1). Stoma open less in low light (1) so consequently less water is lost (1)</p>	<p>Up to 3 marks each</p> <p>Accept any other relevant and correct answer</p>	6
9	<p>Describe the main function of the phloem tissue in plants. (3 marks)</p> <p>Acceptable answer(s)</p> <p>The main function of phloem is to transport carbohydrates/sugars (1) produced during photosynthesis (1) mainly from the leaves to other tissues (1).</p>	<p>Up to 3 marks</p> <p>Accept any other relevant and correct answer</p> <p>Will accept:</p> <ul style="list-style-type: none"> • Glucose 	3
10	<p>List three UK breeds of sheep which are primarily suited to a hill/mountain situation. (3 marks)</p> <p>Answers</p> <ul style="list-style-type: none"> • Welsh Mountain • Beulah • Swaledale • Scottish Blackface • Rough Fell • Herdwick • Cheviot • Shetland • Dalesbred • Derbyshire Gritstone • Exmoor Horn 	<p>1 mark each</p> <p>Accept any other relevant and correct answer</p>	3

11	<p>A farmer is planning a silage making programme for a herd of 300 high yielding dairy cows.</p> <p>Discuss how the farmer may reduce the environmental impact of their silage making operation. (12 marks)</p> <p>Band 1 (1 – 4 marks)</p> <p>Limited understanding of key topics. Answer is mainly descriptive with little evidence of discussion, mostly lacking in detail. Few or no specialist terms are used. Answer may be disorganised or ambiguous. Little evidence of interrelationship between factors. To access the higher marks in the band, discussion is supported with limited examples.</p> <p>Band 2 (5 – 8 marks)</p> <p>Good understanding of key topics and interrelationship between the factors. Evidence of developed discussion but may be lacking in some detail. There will be some use of specialist terms, although they may not always be used correctly. The information is presented mostly in a structured format. 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>Thorough and consistent understanding of key aspects and interrelationship between the factors. Evidence of well-developed discussion. Specialist terms are used correctly and appropriately. Information is presented in a logical and structured format. To access the higher marks in the band, a broad range of examples are used with clear and highly relevant links to the topic.</p>	<ul style="list-style-type: none"> • Indicative content • Reducing irrigation to a minimum or creating own water storage to preserve water in rivers and streams • Using optimum amounts of applied nutrients to eradicate leaching of unused nutrients • Using cultural control methods for pests and diseases to minimise chemical applications • Covering of silage clamp, sides, consolidating • Safe removal of effluent • Minimising the use of fossil fuels • Recycling as many materials as possible • Use of additives to reduce methane • Minimising the use of single use plastics • Using newer, more fuel efficient machines • Managing soil to reduce soil erosion • Minimising transport distances • Different crops/varieties • Maintenance of equipment • Use of suitable machinery • Correct tyre inflation • Weather conditions <p><i>For no awardable content, award 0 marks.</i></p>	12
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