

**Coimisiún na Scrúduithe Stáit**  
**State Examinations Commission**

**Leaving Certificate 2019**

**Marking Scheme**

**Agricultural Economics**

**Ordinary Level**

## **Note to teachers and students on the use of published marking schemes**

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

## **Future Marking Schemes**

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

### **Note regarding the Marking Scheme**

The support notes presented are neither exclusive nor complete. They are not model answers but a sample of possible responses.

The support notes in many cases contain key phrases which must appear in the candidate's answer in order to merit the assigned marks.

Further relevant points of information presented by candidates are marked and rewarded on their merits.

The level of detail required in any answer is determined by the context and the manner in which the question is asked and by the number of marks assigned to the answer in the examination paper. Requirements may therefore vary from year to year.

Words, expressions, or phrases must be correctly used in context and not contradicted, and where there is evidence of incorrect use or contradictions the marks may not be awarded.

## Summary of Marks Allocations

### PART 1 (120 Marks)

Answer 15 questions from 20. 8 marks per question.

Question	Marks	Question	Marks
1	3 + 3 + 2 marks	11	2 x 4 marks
2	3 + 3 + 2 marks	12	2 x 4 marks
3	3 + 3 + 2 marks	13	2 x 4 marks
4	2 + 2 + 4 marks	14	2 x 4 marks
5	4 + 2 + 2 marks	15	2 x 4 marks
6	3 + 3 + 2 marks	16	3 + 3 + 2 marks
7	2 x 4 marks	17	2 x 4 marks
8	3 + 3 + 2 marks	18	2 x 4 marks
9	2 x 4 marks	19	2 x 4 marks
10	2 + 3 + 3 marks	20	2 x 4 marks

### PART 2 (200 MARKS)

**6 QUESTIONS - 4 QUESTIONS TO ANSWER  
ALL QUESTIONS CARRY EQUAL MARKS (50 marks).**

Question 1		Question 4	
a	12 marks	a(i)	3 x 6 marks
b	10 marks	a(ii)	2 x 6 marks
c(i) and (ii)	9 marks	b(i)	2 x 5 marks
d(i) and (ii)	9 marks	b(ii)	2 x 5 marks
e	2 x 5 marks		
Question 2		Question 5	
a	3 x 6 marks	a(i)	2 x 4 marks
b(i)	8 marks	a(ii)	2 x 4 marks
b(ii)	8 marks	a(iii)	2 x 8 marks
c advantages	2 x 4 marks	b(i)	9 marks
c disadvantages	2 x 4 marks	b(ii)	9 marks
Question 3		Question 6	
a	2 x 6 marks	a	8 marks
b	2 x 7 marks	b(i)	8 marks
c(i)	6 marks	b(ii)	10 marks
c(ii)	6 marks	c(i)	13 marks
d	12 marks	c(ii)	11 marks

## Support Notes

### PART 1 (120 Marks)

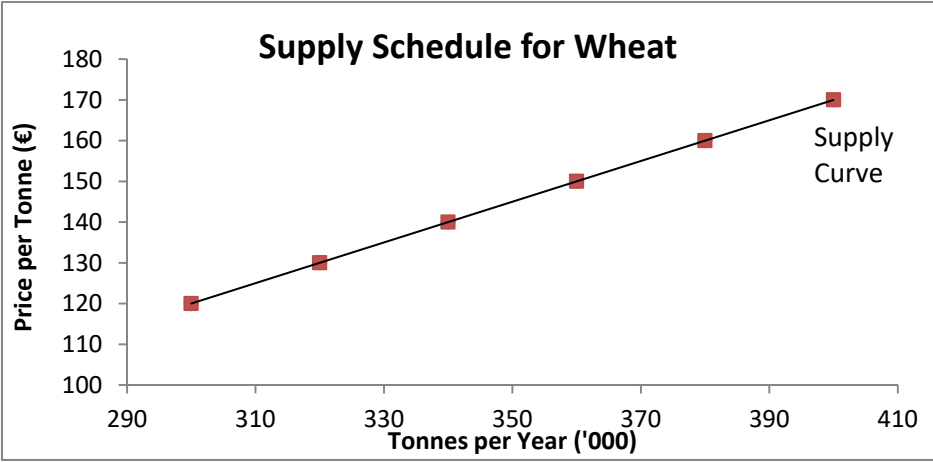
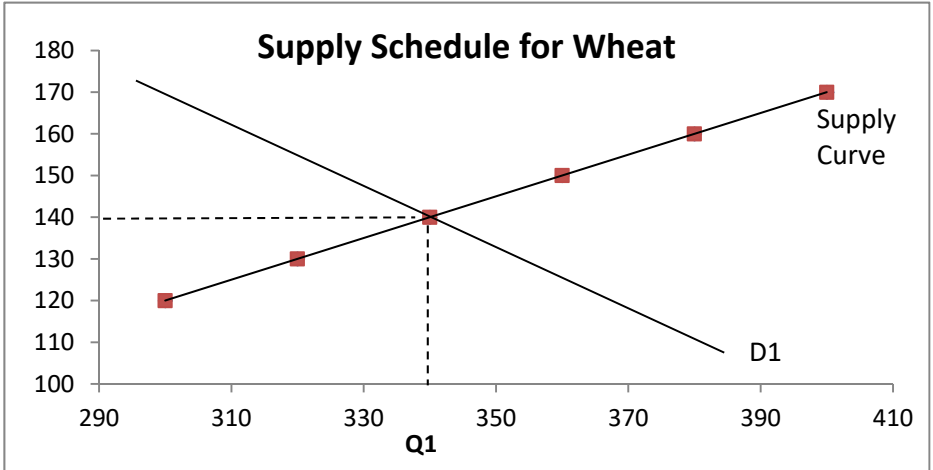
Answer 15 questions from 20. 8 marks per question.

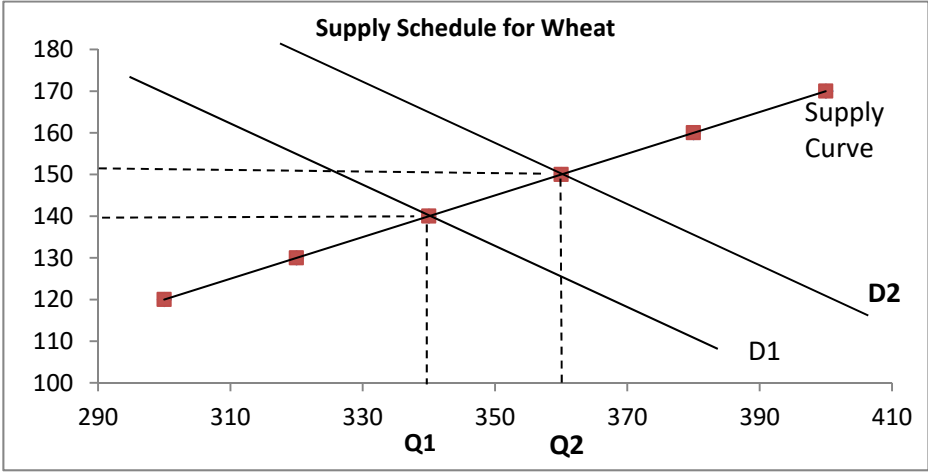
PART 1		Marks						
1.	(i) True (ii) True (iii) False	3 + 3 + 2						
2.	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Pigs</td> <td style="text-align: center;">Dairy</td> <td style="text-align: center;">Cereal</td> </tr> <tr> <td style="text-align: center;">€450 million</td> <td style="text-align: center;">€2,500 million</td> <td style="text-align: center;">€250 million</td> </tr> </table>	Pigs	Dairy	Cereal	€450 million	€2,500 million	€250 million	3 + 3 + 2
Pigs	Dairy	Cereal						
€450 million	€2,500 million	€250 million						
3.	quantity price all	3 + 3 + 2						
4.	(i) Any <b>two</b> from: <ul style="list-style-type: none"> <li>• Land</li> <li>• Labour</li> <li>• Capital</li> <li>• Entrepreneurship / Enterprise / Management</li> </ul> (ii) Any <b>one</b> from, for example <ul style="list-style-type: none"> <li>• Artificial fertilisers</li> <li>• Plant protection products</li> <li>• Diesel</li> <li>• Veterinary services</li> <li>• Compound feeds</li> </ul>	2 + 2  4						
5.	(i) A direct tax is a government levy on the income, property or wealth of people or companies. The burden of direct taxation cannot be shifted onto another person or another entity.  (ii) CAT PAYE	2 + 2  2 + 2						
6.	smaller food lower	3 + 3 + 2						
7.	(i) 55% (ii) 31%	4 + 4						
8.	A: Agricultural output (milk) B: Processing C: Cheese	3 + 3 + 2						
9.	(i) downward pressure (ii) downward pressure	4 + 4						
10.	Gross Output includes Direct Payments. FFI = Gross Output – Direct Costs – Overhead Costs. €86,560 – €29,915 – €25,288 = <b>€31,357</b>	Workings: 2 + 3 Answer: 3						

PART 1		Marks
11.	1. Straight line 2. Declining Balance	4 + 4
12.	(i) – 2 (ii) Inferior good	4 + 4
13.	(i) Any <b>one</b> of, for example <ul style="list-style-type: none"> <li>• Cash in hand or at bank</li> <li>• Debtors / accounts receivable</li> <li>• Non-breeding animal stock</li> </ul> (ii) Any <b>one</b> of, for example <ul style="list-style-type: none"> <li>• Creditors / accounts payable</li> <li>• Bank overdraft</li> <li>• Overdue tax payments</li> </ul>	4  4
14.	(i) 8 (ii) 1.6	4 + 4
15.	Any <b>two</b> of, for example <ul style="list-style-type: none"> <li>• Premium price for quality assured product</li> <li>• Greater certainty of a market for their produce</li> <li>• Support and training for maintaining quality standards on farm</li> <li>• Award schemes for the highest standards achieved</li> </ul>	2 x 4m (2 + 2)
16.	sustainable optimise natural	3 + 3 + 2
17.	Any <b>two</b> of, for example <ul style="list-style-type: none"> <li>• Research: Agricultural production, environmental management, animal welfare, food products, food safety</li> <li>• Farm advisory service</li> <li>• Agricultural college courses</li> <li>• Agricultural training programmes</li> <li>• Organised farm walks, discussion groups, etc.</li> <li>• Open days at various Teagasc locations</li> <li>• Farm safety advice</li> <li>• Socio-economic analysis e.g. National Farm Survey</li> </ul>	4 + 4
18.	(i) Farms: 137,500 (ii) Area: 4.5 million ha	4 + 4
19.	(i) Agricultural wages: Decrease (ii) Quantity of agricultural labour: No change	4 + 4
20.	(i) 100.0 (ii) risen	4 + 4

**PART 2 (200 Marks)**

Answer 4 questions from 6. 50 marks per question.

PART 2 – Question 1	Marks
<p>(a)</p> <p>Any <b>two</b> of, for example:</p> <ul style="list-style-type: none"> <li>• Costs of production of wheat</li> <li>• Costs of production of related commodities, e.g. barley</li> <li>• Technology progress and husbandry improvement</li> <li>• Environmental Variables, e.g. weather, pests, disease</li> <li>• Market price of related commodities, e.g. barley.</li> </ul>	<p>6 + 6</p>
<p>(b)</p>  <p>The graph shows a linear supply curve for wheat. The y-axis is labeled 'Price per Tonne (€)' and ranges from 100 to 180 in increments of 10. The x-axis is labeled 'Tonnes per Year ('000)' and ranges from 290 to 410 in increments of 20. Six data points are plotted and connected by a straight line, labeled 'Supply Curve'. The points are approximately at (300, 120), (320, 130), (340, 140), (360, 150), (380, 160), and (400, 170).</p>	<p>10 marks:</p> <p>(i) Curve: 6 (ii) Labels: 2 (ii) Title: 2</p>
<p>(c)(i) and (ii)</p>  <p>The graph shows the supply and demand for wheat. The y-axis is labeled 'P1' and ranges from 100 to 180. The x-axis is labeled 'Q1' and ranges from 290 to 410. An upward-sloping 'Supply Curve' and a downward-sloping 'D1' curve intersect at an equilibrium point. Dashed lines from this intersection point indicate an equilibrium price of 140 on the y-axis and an equilibrium quantity of 340 on the x-axis.</p>	<p>9 marks:</p> <p>(i) D1 curve: 3 (ii) P1: 3 (ii) Q1: 3</p>

PART 2 – Question 1	Marks
<p>(d)(i) and (ii)</p>  <p>The graph, titled 'Supply Schedule for Wheat', plots Price (P) on the vertical axis and Quantity (Q) on the horizontal axis. The vertical axis ranges from 100 to 180 in increments of 10. The horizontal axis ranges from 290 to 410 in increments of 20. An upward-sloping 'Supply Curve' is marked with red squares at points (300, 120), (320, 130), (340, 140), (360, 150), (380, 160), and (400, 170). Two downward-sloping demand curves are shown: D1 and D2. D1 is the lower demand curve, and D2 is the upper demand curve. The initial equilibrium is at the intersection of the Supply Curve and D1, corresponding to quantity Q1 (340) and price P1 (140). The new equilibrium is at the intersection of the Supply Curve and D2, corresponding to quantity Q2 (360) and price P2 (150). Dashed lines indicate these equilibrium points on the axes.</p>	<p>9 marks:</p> <p>(i) D2 curve: 3  (ii) P2: 3  (ii) Q2: 3</p>
<p>(e)</p> <p>Any <b>two</b> of, for example:</p> <ul style="list-style-type: none"> <li>• Reduction in price of wheat</li> <li>• Increase in demand for flour, bread or biscuits</li> <li>• Increase in the price of substitute goods, e.g. barley</li> <li>• Change in the tastes/preferences of consumers</li> <li>• Increase in consumers' income.</li> </ul>	<p>10m (5 + 5)</p>



PART 2 – Question 2	Marks
<p>(a)</p> <p>Any <b>three</b> of, for example:</p> <ul style="list-style-type: none"> <li>• Quality of the land (land more suitable to more profitable enterprises will attract higher prices)</li> <li>• Weather / climate patterns (land in drier / warmer areas tends to lower the costs of production and attract higher land prices)</li> <li>• Location close to urban areas (the closer the agricultural region to bigger towns and cities the higher the prices for farmland as there tends to more demand for alternative uses of land)</li> <li>• The size of fields and fragmentation of land tends to affect land prices (small fields tend to attract lower land prices)</li> <li>• The dominance of forestry in a region can dictate the price of remaining land for farming (the price of land tends to be set according to what it would make if sold for forestry).</li> </ul>	<p>18 (3 x 6m)</p>
<p>(b)(i)</p> <p>Supply is price inelastic when changes in price bring about little or no change in the quantity of the good / commodity / factor of production concerned. The supply of agricultural land is basically fixed in the sense that the quantity available for use cannot easily change in response to changes in land prices. Also, in Ireland, farmers tend to hold on to their land in cases where they are not making full use of the land even if land prices are rising.</p>	<p>8 (4 + 4)</p>
<p>(b)(ii)</p> <p>Derived demand means that the good / commodity / factor of production concerned is demanded not for its own sake but because it is needed to produce another good or commodity. Land is demanded by farmers as it is a basic factor in the production of agricultural output. In general, an increase in demand for the final good (say milk or beef) should lead back to an increase in the (derived) demand for land needed to carry more beef and dairy livestock.</p>	<p>8 (4 + 4)</p>
<p>(c)</p> <p><b>Two</b> advantages from, for example:</p> <ul style="list-style-type: none"> <li>• Farmers can avoid the large costs involved in buying land or borrowing money from banks in order to do so</li> <li>• Farmers are only committed to the duration of the lease. When land is bought and the investment does not work out for the farmer, he may have difficulty in selling this land quickly</li> <li>• The farmer pays the agreed annual rent over the term of the lease even if land prices and conacre rates have increased in the meantime.</li> </ul> <p><b>Two</b> disadvantages from, for example:</p> <ul style="list-style-type: none"> <li>• The farmer has no guarantee that he will have the use of the land concerned when the term of the lease is up</li> <li>• Farmers planning for the very long term or for succession by a son or daughter on the farm may not have certainty that these long-term plans will be realised</li> <li>• The farmer may be stuck with high annual rents under the terms of the lease at a time when land prices and conacre rates may be falling</li> <li>• The farmer may not be able to get out of the lease in the event of some more desirable piece of land becoming available on the rental or land sales market.</li> </ul>	<p>Advantages: 2 x 4</p> <p>Disadvantages: 2 x 4</p>

PART 2 – Question 3	Marks
<p>(a)</p> <p>Any <b>two</b> of, for example:</p> <ul style="list-style-type: none"> <li>• The bank will consider the financial position of the farm in detail. Has the farm enough current profitability, cash flow and solvency (low debt level) to be able to meet the obligations of repaying the loan and making regular interest payments</li> <li>• If the loan is to finance expansion on the farm the manager will want to see a detailed business plan that is achievable and properly costed</li> <li>• The bank would also want to be satisfied that the farmer has the skills and commitment necessary to deliver on the business plan</li> <li>• The bank will have to be satisfied that the farm has sufficient owned assets as collateral for the loan so that if the farm runs into trouble with loan repayments, the bank will get its money back.</li> </ul>	6 + 6
<p>(b)</p> <p>Any <b>two</b> of, for example:</p> <ul style="list-style-type: none"> <li>• Agricultural Industry as a whole is expanding particularly in dairying and this requires additional capital.</li> <li>• Individual farmers must reorganise and expand their operations / set up new enterprises if they are to maintain incomes comparable with others in a growing economy. This entails larger milking parlours, bigger tractors, more animal housing, etc.</li> <li>• The resource mix in farming is changing with the substitution of machines and non-farm power for horsepower and manpower. These new inputs require much more capital than the traditional inputs they are displacing.</li> <li>• Farming is becoming more dependent on science and technology. Modern farming entails computer-controlled activities around milking, milk quality, feeding animals, grassland management, etc.</li> </ul>	7 + 7
<p>(c)(i)</p> <p>X = Long-term liabilities = 500,000 – 400,000 = €100,000</p>	6
<p>(c)(ii)</p> <p>Any <b>one</b> of, for example:</p> <ul style="list-style-type: none"> <li>• Long term loan from a bank</li> <li>• Capital lease where there is a transfer of the ownership of the asset concerned (e.g. tractor, combine harvester, etc.) to the farmer at the end of the lease</li> <li>• Any kind of payments due that have been deferred for more than one year from the balance sheet date e.g. deferred income tax</li> <li>• Pension liability for the farm workers.</li> </ul>	6

PART 2 – Question 3	Marks
<p>(c)(iii)</p> <p>The farm is in a strong situation with respect to solvency.</p> <p>Solvency refers to the ability of the farm business to meet all its debt obligations both short and long-term.</p> <p>Two ratios which measure solvency:</p> <p>Debt to Net Worth Ratio = Total Liabilities / Net Worth = 130,000 / 400,000 = 0.325 / 1</p> <ul style="list-style-type: none"> <li>This is well below the guideline value of 1. McDonald’s farm is solvent. Its equity or net worth makes a far greater contribution to the assets of the farm than its short and long-term creditors (those to whom the farm owes money).</li> </ul> <p>Gearing Ratio = Total Liabilities / Total Assets = 130,000 / 530,000 = 0.245 / 1</p> <ul style="list-style-type: none"> <li>This means that the farm has considerably less debt than assets. A debt ratio which is well below 1 indicates that McDonald’s farm is very solvent.</li> </ul>	<p>12 (4 + 4 + 4)</p>

PART 2 – Question 4	Marks
<p>(a)(i)</p> <p>Any <b>three</b> of:</p> <ul style="list-style-type: none"> <li>• to increase agricultural productivity by promoting technical progress and ensuring the optimum use of the factors of production, in particular labour</li> <li>• to ensure a fair standard of living for farmers</li> <li>• to stabilise markets</li> <li>• to assure the availability of supplies</li> <li>• to ensure reasonable prices for consumers.</li> </ul>	3 x 6m
<p>(a)(ii)</p> <p>Any <b>two</b> of</p> <p><i>GLAS:</i></p> <p>This agri-environment scheme is</p> <ul style="list-style-type: none"> <li>○ green as it preserves our traditional hay meadows and low-input pastures;</li> <li>○ low carbon as it retains the carbon stocks in soil through margins, habitat preservation and practices such as minimum tillage; and,</li> <li>○ agri-environment as it promotes agricultural actions compatible with the protection of the environment, water quality, the landscape and its features.</li> </ul> <p>Depending on the type of GLAS scheme the farmer signs up for, he can receive annual payments of up to €7,000 from the Department of Agriculture.</p> <p><i>Knowledge Transfer (KT) Programme:</i></p> <p>This allows farmers to attend specially formed KTP discussion groups which are facilitated by qualified agricultural consultants and advisers. The purpose is to up-skill Irish farmers, to encourage efficiency and effectiveness of work and ensure they engage in a process of continuous improvement which will not only develop their enterprise but also contribute the overall development of the agri-food sector. As part of their commitment under the programme farmers attend a specified number of meetings of their KT Group.</p> <p><i>Areas of Natural Constraint (ANC) Scheme:</i></p> <p>This scheme deals with areas of land that are designated as disadvantages/constrained. It was previously called the Disadvantaged Areas Scheme. Funding is available to farmers who occupy and farm the land in those areas and have the required amount of livestock on their farm, which must be fit for grazing. On-farm inspections may be carried out to ensure applicants are complying with regulations. The DAFM has published on its website a list of all the areas that are covered by the scheme. All applicants must comply with Cross Compliance requirements as set down in EU legislation.</p>	2 x 6m (3 + 3)

PART 2 – Question 4	Marks
<p>(b)(i)</p> <p>Outline any <b>two</b> from, for example:</p> <ul style="list-style-type: none"> <li>• Trade restrictions such as tariffs and border controls may be applied to Irish agri-food exports entering the UK market making Irish produce less competitive.</li> <li>• Non-trade barriers (e.g. sanctions, paperwork, certification) may be applied to Irish agri-foods entering the UK market. This would cause long delays at ports.</li> <li>• Divergence between policies that affect agri-foods in the UK and EU (e.g. food standards) may impinge upon the ability to trade freely.</li> <li>• The UK market may be opened to competition from third party countries, which may compete against Irish agri-food exports.</li> <li>• Trade restrictions and barriers may disrupt the processing and supply chains of Irish agri-food manufacturers.</li> <li>• Changes in UK consumer preferences as a result of Brexit may have an impact on the demand for Irish agri-food products.</li> <li>• A hard Brexit is likely to lead to an ongoing weakness in the value of sterling which would make Irish agri-food exports less competitive on the UK market than might have been the case with the UK still in the EU.</li> </ul>	5 + 5
<p>(b)(ii)</p> <p>Any <b>two</b> from, for example:</p> <ul style="list-style-type: none"> <li>• Lobbying of EU and British negotiators involved in the Brexit process to help safeguard the interest of the Irish agri-food sector.</li> <li>• Facilitating discussions between interested parties in Ireland (e.g. farmer representatives, trade unions, processors, exporters) through the National Stakeholder Consultative Committee and All Island Civil Dialogue process, in efforts to identify challenges and help with preparations.</li> <li>• The introduction in 2017 of low-cost flexible finance for farmers through the Agri Cash Flow Support Loan Scheme. The aim of the scheme was to support farmers experiencing short-term financial pressure due to the market uncertainty and drop in the value of the Pound Sterling following the Brexit referendum.</li> <li>• Financial assistance for farmers through budget measures, e.g. an increase in the earned income tax credit and income averaging over 5 years to reduce farmers' tax burden.</li> <li>• Additional funding for Bord Bia to support affected agri-food companies.</li> <li>• Increased funding under the Rural Development Programme and Seafood Development Programme.</li> <li>• Trade missions and development of strategies for the market diversification of Irish agri-food output and a reduction in the reliance on UK markets.</li> </ul>	5 + 5

PART 2 – Question 5	Marks
<p>(a)(i)</p> <p>Any <b>two</b> from, for example</p> <ul style="list-style-type: none"> <li>• Dairygold</li> <li>• Kerry Group</li> <li>• Glanbia</li> <li>• Greencore</li> <li>• Dawn Meats</li> </ul>	<p>4 + 4</p>
<p>(a)(ii)</p> <p>Any <b>two</b> from, for example</p> <ul style="list-style-type: none"> <li>• Dairygold manufactures and supplies natural, sustainable innovative dairy products especially cheese and ingredients.</li> <li>• Kerry Group supplies key ingredients to food, beverage and pharmaceutical industries derived from Irish agriculture. Kerry also manufactures and sells its chilled food products in Ireland, the UK and many international markets.</li> <li>• Greencore Group plc is a leading manufacturer of convenience foods. It supplies a wide range of chilled, frozen and ambient foods to some of the most successful retail and food service customers in the UK.</li> <li>• Glanbia is a global nutrition company that takes pure and clean ingredients including milk, whey and grains, to produce high-quality nutritional ingredients and branded consumer products for its customers and consumers worldwide. Its major production facilities are in Ireland, the US, the UK, Germany and China.</li> </ul>	<p>4 + 4</p>
<p>(a)(iii)</p> <p>Any <b>two</b> of, for example</p> <ul style="list-style-type: none"> <li>• National output / GDP (Agricultural output, €8 billion; Agri-food output amounts to 8% of national output or 25% of manufacturing output)</li> <li>• Employment (Agri-food provides 173,000 jobs or about 8.5% of national employment)</li> <li>• Exports (Agri-food exports amount to over €12 billion per year equivalent to about 10% of total exports)</li> <li>• Net exports (Agri-food sector makes an even bigger contribution to national net exports, maybe as much as 20%, as the import content of our agri-food exports is relatively low)</li> <li>• Regional development i.e. outside of the greater Dublin area (most agri-food activity and jobs are located outside of Dublin and the proportion of jobs provided by the agri-food sector outside Dublin could be around 12% i.e. approximately 150,000 out of 1.2 million jobs outside of Dublin).</li> </ul>	<p>2 x 8m (4 + 4)</p>

PART 2 – Question 5	Marks
<p>(b)(i)</p> <p>Mention at least <b>two</b> significant changes, for example:</p> <ul style="list-style-type: none"> <li>• Big increase in dairy cow numbers and dairy herd sizes</li> <li>• More investment in larger milking facilities</li> <li>• Improved efficiency at farm level e.g. higher milk yields, lower average cost of production (€/L)</li> <li>• Increased greenhouse gas emissions from more cows</li> <li>• Dairy farmers producing milk for a genuine free market with all the business risks involved</li> <li>• Some farmers switching to dairying as it much more profitable than other areas of agriculture.</li> </ul>	<p>9m (5 + 4)</p>
<p>(b)(ii)</p> <p>Mention at least <b>two</b> significant changes, for example:</p> <ul style="list-style-type: none"> <li>• Increased size and profitability of the dairy processing sector</li> <li>• More employment in dairy processing (10,000 jobs)</li> <li>• More employment in support industries e.g. farm buildings and milking parlour construction</li> <li>• More business for the dairy inputs sectors e.g. compound feed, veterinary supplies, IT services, etc.</li> <li>• Investment in new processing facilities providing more employment in rural areas.</li> </ul>	<p>9m (5 + 4)</p>

PART 2 – Question 6							Marks
(a)							8m (2 for table, 6 for MP column)
Fertiliser input (100 kg/ha)	Total Product (tonnes/ha)	Part (a) Marginal Product (tonnes/ha)	Part (c) Total Revenue (€/ha)	Part (c) Marginal Revenue (€/ha)	TC €	MC €	
1	3	-	150	-	100	-	
2	7	4	350	200	200	100	
3	12	5	600	250	300	100	
4	14	2	700	100	400	100	
5	15	1	750	50	500	100	
6	15	0	750	0	600	100	
7	14	-1	700	-50	700	100	
(b)(i)							8
The Law of Diminishing Returns states that when more and more of a variable factor or input is added to a set of fixed factors of production, eventually a point will be reached at which the extra output obtained from each additional extra unit of the variable factor will decline.							
(b)(ii)							10 (5 + 5)
Diminishing returns sets in after 3 units of fertiliser input.  The extra output (marginal product) from the 3 <sup>rd</sup> fertiliser unit was 5 tonnes but the extra output from the 4 <sup>th</sup> fertiliser unit was 2 tonnes and the extra output from the 5 <sup>th</sup> fertiliser unit was 1 tonne and so on.							
(c)(i) See table.							13 x 1m
(c)(ii)							11m (4 + 4 + 3)
The most profitable level of fertiliser use is when Marginal Cost equals Marginal Revenue. This occurs at 4 units of fertiliser input. See workings in final two columns above. Beyond that input, profit would begin to decline.							
<b>OR</b>							
Fertiliser input 1	Total Cost = €100	Revenue = €150	Profit = €50				
Fertiliser input 2	Total Cost = €200	Revenue = €350	Profit = €150				
Fertiliser input 3	Total Cost = €300	Revenue = €600	Profit = €300				
Fertiliser input 4	Total Cost = €400	Revenue = €700	Profit = €300				
Fertiliser input 5	Total Cost = €500	Revenue = €750	Profit = €250				
Profit is maximised at 3 or 4 units of fertiliser use.							
<b>OR</b>							
The marginal cost per unit of fertiliser is €100. The marginal revenue product (MRP) varies with the amount of fertiliser used. At 2 units the MRP is €200 (4 x €50), at 3 units the MRP is €250 (5 x €50), at 4 units the MRP is €100 (2 x €50). There is no point using more than 4 units of fertiliser as this where profit is maximised. Profit would be maximised at either 3 or 4 units. Producing the 4th unit yields no additional profit as the MRP and MC are the same value.							



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