

EGT2
ENGINEERING TRIPOS PART IIA

Monday 6 May 2024 9.30 to 11.10

Module 3E1

BUSINESS ECONOMICS

*Answer not more than **two** questions.*

All questions carry the same number of marks.

*The **approximate** percentage of marks allocated to each part of a question is indicated in the right margin.*

*Write your candidate number **not** your name on the cover sheet.*

STATIONERY REQUIREMENTS

Single-sided script paper.

SPECIAL REQUIREMENTS TO BE SUPPLIED FOR THIS EXAM

CUED approved calculator allowed.

10 minutes reading time is allowed for this paper at the start of the exam.

You may not start to read the questions printed on the subsequent pages of this question paper until instructed to do so.

You may not remove any stationery from the Examination Room.

1 Consider the concrete industry operating under the assumptions of perfect competition in a market.

(a) Discuss the conditions for the concrete industry to meet the criteria for perfect competition and the implications of these conditions for the model. [15%]

(b) Suppose the total long-run monthly costs for a typical concrete producing firm is given by $TC(q) = 20q^2 + 100q + 8000$, where q is the number of pallets of concrete mix bags produced per month. Demand for pallets is given by $Q(P) = 3700 - 3P$, where Q is the quantity demanded of pallets per month and P is the price per concrete mix pallet. Determine the long-run equilibrium quantity in pallets produced by each firm in this market. What is the long-run price and aggregate quantity in pallets? How many firms operate in equilibrium? [40%]

(c) A large infrastructure project in the area causes a sudden shift in the demand for concrete mix. The new aggregate demand is given by $Q(P) = 4200 - 3P$. How many firms enter or exit the market? Explain. [15%]

(d) A business economics student notes that, in reality, firms in the industry offer a wide variety of types of concrete mix bags (post mix, multi-purpose, rapid, insulating, etc.). Explain why this is the case and what model would be better suited to characterise the industry. What are the implications for consumers, firms and society? [30%]

2 Suppose that two competing firms, A and B, produce a homogeneous good. Both firms have a marginal cost of $MC = £40$. Describe what would happen to output and price in each of the situations described in (a) – (c) if the firms are at (i) Cournot equilibrium, (ii) collusive/cartel equilibrium, and (iii) Bertrand equilibrium. Include diagrams in your answer.

- (a) Because Firm A must increase wages, its MC increases to £60. [25%]
- (b) The marginal cost of both firms increases. [25%]
- (c) The demand curve shifts to the right. [25%]
- (d) When is each of models (i), (ii) and (iii) applicable to describe behaviour in a market? Provide examples of the real world. [25%]

3 Answer the two questions below.

(a) Companies are increasingly using AI to collect information on customers purchases and design pricing algorithms used in real time. Discuss how data collected can be used by companies in applying dynamic pricing (non-linear pricing). What are some potential issues? How dynamic pricing affects consumers, producers and society overall? Should Competition/Antitrust authorities be concerned? [50%]

(b) Cement is a key ingredient to make concrete. Cement accounts for as much as 90% of concrete mix greenhouse emissions. Decarbonising concrete plants has been advocated as part of many climate goal setting agencies. Discuss three economic solutions that could address climate impact resulting from concrete plant emissions. How is the issue of pollution connected with Game Theory? [50%]

END OF PAPER