

## THEME A: CONCEPTS · A3.4 · HL ONLY

## Alternative databases and data warehouses

Original practice questions · 33 marks · about 50 minutes · covers A3.4.1–A3.4.4

**Instructions.** Answer all questions. The maximum mark for this paper is [33 marks]. The marks available are shown in brackets. Parts badged **HL** assess higher level only content; standard level students may leave these out. **A3.4 is a higher level only topic**, so every question in this paper is HL.

**1****Total: 6 marks**

A supermarket chain runs 400 stores. Alongside its relational database it is considering other ways of storing data: the locations and delivery zones of every store, a rapidly changing basket of items held while a customer shops online, and a growing archive of product photographs and reviews.

- (a) **HL** Outline what is meant by a NoSQL database. **[2]**

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- (b) **HL** Identify the most suitable database model for storing the store locations and delivery zones, and justify your choice. **[2]**

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- (c) **HL** Explain why an in-memory database suits the online shopping basket. **[2]**

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The chain builds a data warehouse holding fifteen years of sales data drawn from its tills, its website and its loyalty scheme.

- (a) **HL** Explain what is meant by describing the warehouse data as subject-oriented. [2]

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- (b) **HL** Explain why the data held in a warehouse is time-variant and non-volatile. [4]

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The tills continue to use the chain's operational relational database, which is separate from the warehouse.

- (a) **HL** Explain why the chain keeps the data warehouse separate from the operational database used by the tills. [4]

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- (b) **HL** Outline what is meant by integrated data in a data warehouse. [2]

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4

Total: 5 marks

Managers use online analytical processing (OLAP) tools against the warehouse.

- (a) **HL** Describe the role of OLAP in business intelligence. [3]

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- (b) **HL** Outline **one** difference between an OLAP query and a transaction processed at a till. [2]

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5

Total: 5 marks

The chain also applies data mining techniques to the warehouse.

- (a) **HL** Describe how association rule discovery could be useful to the chain. [3]

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- (b) **HL** Outline what is meant by anomaly detection. [2]

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6

Total: 5 marks

To serve stores in several countries, the chain moves to a distributed database with copies of the data held in three regions.

- (a) **HL** Describe **two** features of a distributed database. [4]

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- (b) **HL** State **one** difficulty in keeping the three regional copies consistent. [1]

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END OF QUESTIONS