1.3 EXCHANGING DATA · 1.3.2

Database concepts, keys & ER modelling — Mark scheme

35 marks · spec 1.3.2(a)(b)

AO key: AO1 = knowledge & understanding · AO2 = application · AO3 = reasoned judgements. Accept any valid alternative; do not award the same point twice.

Q	ANSWER	AO	MARKS
1(a)	2 problems × (point + development), max 4, e.g.: • data redundancy — customer details repeated for every order (1), wasting space (1) • data inconsistency — the same customer's details may differ between rows (1) • updates must be made in many places / harder to maintain (1)	AO2	4
1(b)	A relational database. (1)	AO1	1

Q	ANSWER	AO	MARKS
2(a)	A field that uniquely identifies each record (1) + valid example, e.g. CustomerID (1). (2)	AO1	2
2(b)	A field that is the primary key of another table, used to link tables (1) + valid example, e.g. CustomerID in the Order table (1). (2)	AO1	2
2(c)	A foreign key links two tables (a PK from another table) (1); a secondary key is a non-unique field used to search/sort (1). (2)	AO1	2

Q	ANSWER	AO	MARKS
3(a)	It is not unique — many customers share the same surname initial. (1)	AO2	1
3(b)	A field such as CustomerID / a unique membership number (1); because it is unique to each customer and never blank (1). (2)	AO2	2
3(c)	To search or sort customers, e.g. find all customers with a given surname initial. (1)	AO2	1

Q	ANSWER	AO	MARKS
4(a)	1 mark per point, max 4: • three entities shown: Member, Loan, Book (1) • Member to Loan shown as one-to-many (1) • Book to Loan shown as one-to-many (1) • relationships drawn with correct direction/degree labels (1) Loan acts as the link between Member and Book.	AO2	4
4(b)	1 mark per point, max 4: • member-to-author is a many-to-many relationship (1) • which cannot be implemented directly (1) • so a link/junction table is created between Member and Author (1) • holding both primary keys as foreign keys, giving two one-to-many relationships (1)	AO2	4

Q	ANSWER	AO	MARKS
5(a)	Any one: an online form / keyboard entry / OCR / OMR / barcode scan. (1)	AO2	1
5(b)	1 mark each, max 2: CSV / JSON / XML / an API or EDI link. (2)	AO2	2

Q	LEVELS-OF-RESPONSE MARK SCHEME	AO	MARKS
6	Mark using the levels descriptors below. AO1 (knowledge of both structures), AO2 (application to a growing business), AO3 (justified recommendation). **LEVEL** / **DESCRIPTOR** **Level 3 (7–9)**: Balanced discussion of flat-file and relational with accurate benefits/drawbacks, clearly **applied** to the growing business, leading to a **justified** recommendation. Well structured. **Level 2 (4–6)**: Discusses both with **some** application; recommendation made with partial justification. **Level 1 (1–3)**: Basic points about one or both structures with little application or justification. **0**: Nothing creditworthy. **Indicative content** (credit any valid point): • Flat file: simple, cheap and quick to set up for small amounts of data; but causes redundancy and inconsistency and is hard to maintain as it grows. • Relational: stores each fact once, reducing redundancy/inconsistency, easier to update and query, scales well; but is more complex to design and may need a DBMS and expertise. • Application: a growing business has increasing, interrelated data, where flat-file problems worsen. • Justified recommendation: move to a relational database for long-term integrity and scalability.	AO1 ×3 AO2 ×3 AO3 ×3	9

Total for paper: 35 marks