

THEME A: CONCEPTS · A3.3

Database programming — Mark scheme

34 marks · covers A3.3.1–A3.3.6

How to mark. Each creditworthy point is on its own line and ends with a semicolon (;). A line beginning with ... is an *expansion* of the line above it, so the pair is worth the marks shown. A slash (/) separates acceptable alternative wordings. Words in (brackets) are not needed for the mark. Mark positively: credit what the student has got right rather than penalising what is missing, and accept any valid alternative not listed here. Do not award more than the maximum for a part. Where a later part uses a wrong answer from an earlier part correctly, award follow-through marks (FT). **HL** marks parts that assess higher level only content.

Q	ANSWER	MARKS
1(a) A3.3.1	Award [3] max Award [1] per point up to [3] max. Both types must be addressed. DDL is used to define or change the structure of the database itself; ... (for example) creating, altering and dropping tables and their columns and constraints; DML is used to work with the data held inside that structure; ... (for example) retrieving, inserting, updating and deleting rows; DDL changes the schema, whereas DML leaves the schema unchanged and changes only the contents;	3
1(b) A3.3.1	Award [1] max DDL (data definition language);	1
1(c) A3.3.1	Award [1] max DML (data manipulation language); Some texts classify SELECT separately as DQL. Accept DML, which is the classification used in the syllabus.	1
2(a) A3.3.2	Award [3] max Award [1] for SELECT of the two named columns FROM BOOK; [1] for the WHERE condition on Price; [1] for ORDER BY Price DESC. <pre>SELECT Title, Price FROM BOOK WHERE Price > 15 ORDER BY Price DESC;</pre> Accept >= 15 only if the candidate states the assumption. Accept any correct syntax variation. Do not award the third mark if DESC is missing, since the question asks for the most expensive first.	3
2(b) A3.3.2	Award [4] max Award [1] for selecting CustName and Title; [1] for joining ORDERS to CUSTOMER on CustID; [1] for joining ORDERS to BOOK on ISBN; [1] for correct, complete syntax that would run. <pre>SELECT CUSTOMER.CustName, BOOK.Title FROM ORDERS JOIN CUSTOMER ON ORDERS.CustID = CUSTOMER.CustID JOIN BOOK ON ORDERS.ISBN = BOOK.ISBN;</pre>	4

Q	ANSWER	MARKS
	Accept INNER JOIN, or the older comma syntax with the join conditions in a WHERE clause. Accept table aliases. Award [3] max if only one of the two joins is correct.	
3(a) A3.3.2	Award [3] max Award [1] for SELECT of City; [1] for FROM CUSTOMER; [1] for DISTINCT (or an equivalent GROUP BY City). <pre>SELECT DISTINCT City FROM CUSTOMER;</pre> Accept SELECT City FROM CUSTOMER GROUP BY City. Award [2] max without DISTINCT or GROUP BY, since Leeds would then appear twice.	3
3(b) A3.3.2	Award [3] max Award [1] for SELECT Title FROM BOOK; [1] for using LIKE; [1] for the wildcard placed on both sides of History. <pre>SELECT Title FROM BOOK WHERE Genre LIKE '%History%';</pre> The wildcard must appear before and after the word, so that both Modern History and Ancient History are returned. Award [2] max for 'History%' alone. Accept any wildcard character the candidate defines.	3
4(a) A3.3.3	Award [2] max Award [1] for UPDATE BOOK SET Price correctly increased by 10 per cent; [1] for the WHERE clause restricting it to Science. <pre>UPDATE BOOK SET Price = Price * 1.1 WHERE Genre = 'Science';</pre> Accept Price + (Price * 0.1) or equivalent. Award [1] max if the WHERE clause is missing, since every book would be repriced.	2
4(b) A3.3.3	Award [2] max Award [1] for INSERT INTO CUSTOMER with VALUES; [1] for all four values correct and in the right order. <pre>INSERT INTO CUSTOMER (CustID, CustName, City, JoinDate) VALUES ('C104', 'Ines Duarte', 'Cardiff', '2026-04-01');</pre> Accept the short form without the column list provided the four values are in table order.	2
4(c) A3.3.3	Award [1] max Any one, [1] max. The index must be updated as well as the row itself, so there is more work to do; After many modifications the index becomes fragmented and has to be rebuilt or reorganized; The index entries must be kept in sorted order, which costs time on every write;	1
HL 5(a) A3.3.4	Award [3] max Award [1] for SELECT CustID; [1] for COUNT; [1] for GROUP BY CustID.	3

Q	ANSWER	MARKS
	<pre>SELECT CustID, COUNT(*) AS NumOrders FROM ORDERS GROUP BY CustID;</pre> Accept COUNT(OrderID). The alias is not required. Award [2] max without GROUP BY, since the query would then return a single total.	
HL 5(b) A3.3.4	Award [3] max Award [1] for AVG(Price) with Genre selected; [1] for GROUP BY Genre; [1] for HAVING on the aggregate. <pre>SELECT Genre, AVG(Price) AS AvgPrice FROM BOOK GROUP BY Genre HAVING AVG(Price) > 15;</pre> The syllabus lists this function as AVERAGE; accept AVG, AVERAGE or MEAN. The condition must be in HAVING, not WHERE, because it filters on an aggregate. Award [2] max if WHERE is used instead of HAVING.	3
HL 6(a) A3.3.5	Award [2] max Award [1] for the point and [1] for the expansion. Any one reason. A view can expose only the columns the staff need; ... (so) sensitive fields such as payment details are hidden while names and cities remain visible; The view is read-only unless it is defined otherwise; ... (so) staff cannot accidentally alter or delete customer records; The view hides the complexity of the underlying tables and joins; ... (so) staff can query it simply, and the tables beneath can be restructured without breaking their queries;	2
HL 6(b) A3.3.6	Award [3] max Award [1] per property correctly explained, up to [3] max. The answer must be linked to placing an order. Atomicity: reducing the stock and inserting the ORDERS record form one indivisible transaction, so if the system fails between them the whole thing is rolled back; Consistency: the transaction moves the database from one valid state to another, so stock can never be reduced without a matching order record; Isolation: two customers ordering the last copy at the same moment do not see each other's partial changes, so the stock figure cannot be reduced twice; Durability: once the order is committed it is stored permanently and survives a power failure or crash; Award [1] per property, [3] max. A property named without explanation gains no mark.	3

Total for this paper: 34 marks