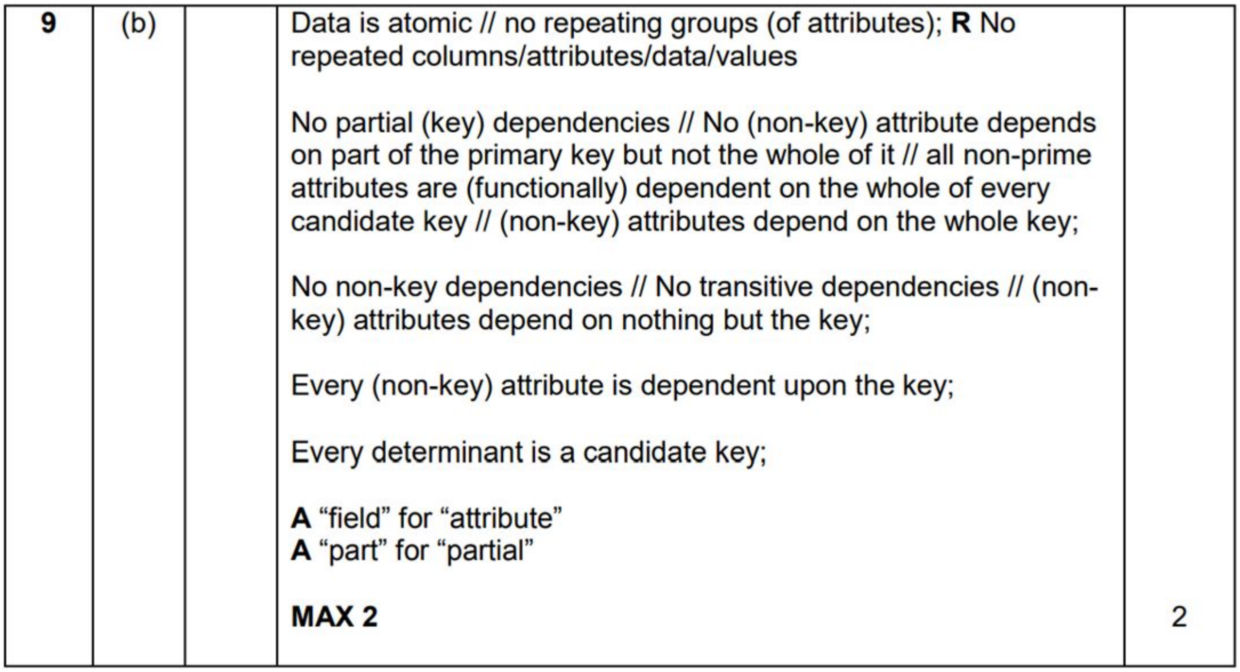
AQA Computer Science A-Level

4.10.3 Database design and normalisation techniques

Marking Scheme

Additional Specimen AS Paper 1

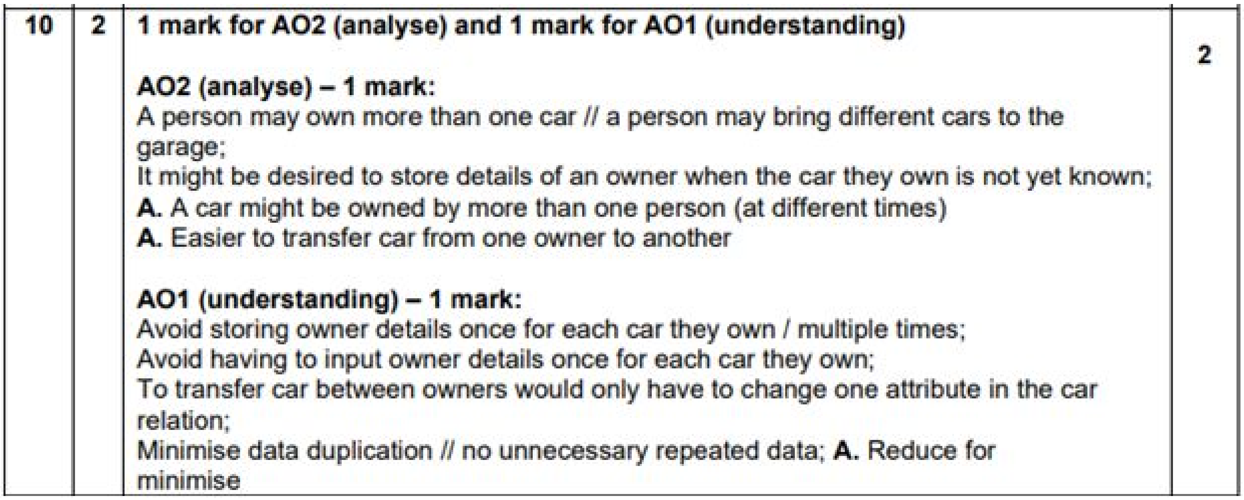
June 2012 Comp 3

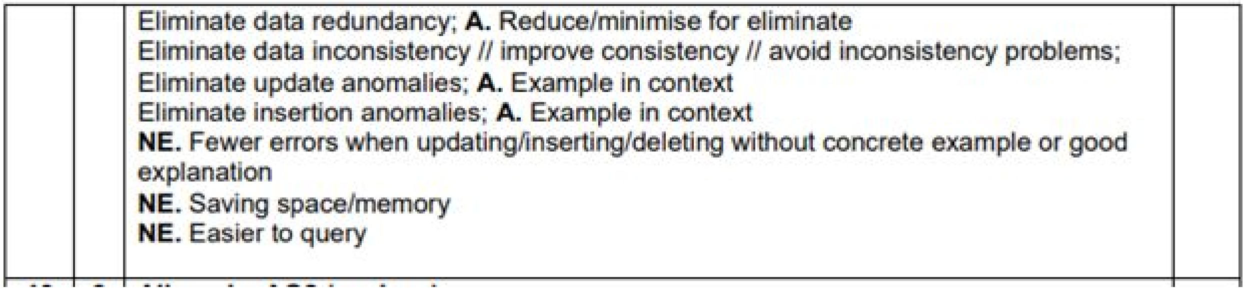


9	(b)		Data is atomic // no repeating groups (of attributes); **R** No repeated columns/attributes/data/values No partial (key) dependencies // No (non-key) attribute depends on part of the primary key but not the whole of it // all non-prime attributes are (functionally) dependent on the whole of every candidate key // (non-key) attributes depend on the whole key; No non-key dependencies // No transitive dependencies // (non-key) attributes depend on nothing but the key; Every (non-key) attribute is dependent upon the key; Every determinant is a candidate key; **A** “field” for “attribute” **A** “part” for “partial” **MAX 2**	2

9	(f)		**ONE MARK FOR PRINCIPLE AND MAX TWO MARKS FOR IMPLEMENTATION** **Principle:** Create a new table (**A** link table) (BookCopy); through which Book and Loan tables will be (indirectly) linked; **Implementation details using a new primary key:** Create a new unique ID/key field (e.g. CopyID) (for each copy); Store the BookID and the CopyID in the new table; Replace the BookID in the Loans table with this CopyID; Note: In this implementation, CopyID is unique, i.e. BookID 1 and 2 cannot both have CopyID 1. **Implementation details using a composite key:** Create a new field CopyID; Composite key formed by BookID and CopyID; **TO** if composite key is clearly in book table or loan table Store the BookID and the CopyID in the new table; **R** adding CopyID to Book table as this would created data redundancy but this does not talk out other mark scheme points Add the CopyID field to Loans table; **R** replace BookID with CopyID Note: In this implementation, CopyID is not unique, e.g. BookID 1 and 2 can both have CopyID 1.	

June 2017 Paper 2





10	2	**1 mark for AO2 (analyse) and 1 mark for AO1 (understanding)** **AO2 (analyse) – 1 mark:** A person may own more than one car // a person may bring different cars to the garage; It might be desired to store details of an owner when the car they own is not yet known; **A.** A car might be owned by more than one person (at different times) **A.** Easier to transfer car from one owner to another **AO1 (understanding) – 1 mark:** Avoid storing owner details once for each car they own / multiple times; Avoid having to input owner details once for each car they own; To transfer car between owners would only have to change one attribute in the car relation; Minimise data duplication // no unnecessary repeated data; **A.** Reduce for minimise Eliminate data redundancy; **A.** Reduce/minimise for eliminate Eliminate data inconsistency // improve consistency // avoid inconsistency problems; Eliminate update anomalies; **A.** Example in context Eliminate insertion anomalies; **A.** Example in context **NE.** Fewer errors when updating/inserting/deleting without concrete example or good explanation **NE.** Saving space/memory **NE.** Easier to query	2

10	7	**All marks AO2 (analyse)** **1 mark:** Create a new relation to identify which make/model(s) of car each part can be fitted to; **A.** Use of a relation name that clearly identifies the purpose eg `PartToFitMakeModel` instead of an explanation **A.** If it is just stated that a new relation is creation if the attributes in the relation make its purpose clear **NE.** A relation to link the `Part` and `Car` relations **2 marks from:** Store the attributes `PartID`, `Make` and `Model` in the new relation; **I.** Inclusion of additional attributes Make the `PartID`, `Make` and `Model` / all the attributes the entity identifier; **A.** The creation of a new field as an entity identifier for this relation if it is explained that a constraint would also need to be added to ensure that it is not possible to record twice in the relation that a particular part could be fitted to a particular make and model of car Accept answers by example, such as: `PartToFitMakeModel(PartID, Make, Model)` **Alternative Response** **1 mark:** Create two new relations, one to associate an entity identifier with each make and model of car (eg `MakeModelID`) and one to link the parts to this new relation. **A.** If it is just stated that new relations will be created if the attributes in the relations make their purpose clear **2 marks from:** Store the attributes `Make` and `Model` with a new entity identifier (eg `MakeModelID`) in one of the new relations; Store the `PartID` in the other new relation together with the entity identifier from the first new relation (eg `MakeModelID`); Make the `PartID` and `MakeModelID` the entity identified in the second new relation; **A.** The creation of a new field as an entity identifier for this relation if it is explained that a constraint would also need to be added to ensure that it is not possible to record twice in the relation that a particular part could be fitted to a particular make and model of car Accept answers by example, such as: `UniqueMakeModel(MakeModelID, Make, Model)` and `PartToFitMakeModel(PartID, MakeModelID)` **A.** Table or entity for relation. **A.** Field for attribute. **A.** Primary key for Entity Identifier.	3

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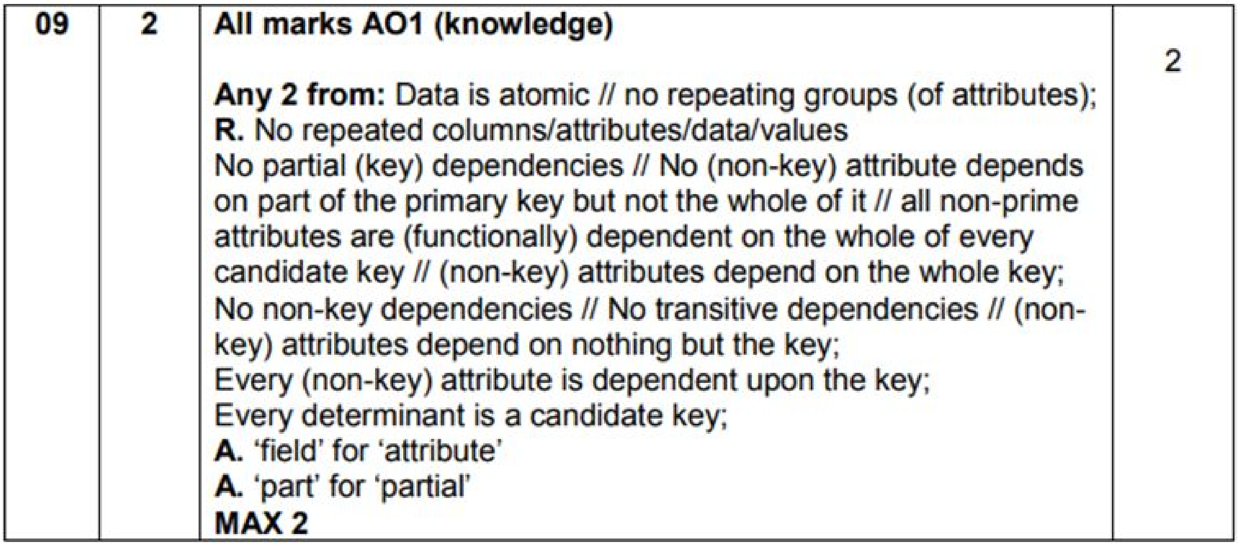
9	**(a)**		**What means:** every attribute (in relation) is dependent on the key; the whole key; and nothing but the key; **R.** Everything OR (relations) contain no repeating groups (of attributes) // data is atomic; no partial dependencies; no non-key dependencies; **R** No repeated columns/attributes/data OR every determinant (in the relation) is a candidate key;;	**4**	
			MAX 2 **Why important:** Eliminate update anomalies; **A** Example Eliminate insertion anomalies; **A** Example Eliminate deletion anomalies; **A** Example Eliminate data inconsistency // improve consistency // avoid inconsistency problems; *Minimise data duplication // no unnecessary repeated data; **A** Reduce for minimise **R** eliminate *Eliminate data redundancy; **A** Reduce/minimise for eliminate **NE** Easier to update/insert/delete without concrete example or good explanation **NE** Less errors when updating/inserting/deleting without concrete example or good explanation **NE** Saving space/memory **NE** Easier to query **Award marks to points made anywhere across 9(a)** **Can only award one of the two marks indicates by asterisks (*)** **MAX 2**		

Specimen Paper 2



09	**2**	**All marks AO1 (knowledge)** **Any 2 from:** Data is atomic // no repeating groups (of attributes); **R.** No repeated columns/attributes/data/values No partial (key) dependencies // No (non-key) attribute depends on part of the primary key but not the whole of it // all non-prime attributes are (functionally) dependent on the whole of every candidate key // (non-key) attributes depend on the whole key; No non-key dependencies // No transitive dependencies // (non-key) attributes depend on nothing but the key; Every (non-key) attribute is dependent upon the key; Every determinant is a candidate key; **A.** 'field' for 'attribute' **A.** 'part' for 'partial' **MAX 2**	2