

1. (10 points) Moved here from H2.

A. A business service is characterized by the value it offers one or more stakeholders

**Solution:** A is true:

B. A business service is characterized by an underlying or associated financial exchange

**Solution:** B is false: a business service is about value transfer. Notice the contrast here is between “business” service and “technical” service. Although a financial exchange can occur with some business services, finance doesn’t characterize business services. A business service can occur without financial exchange as when a consulting practice (such as IBM Global Services) installs network equipment from an equipment vendor (such as Cisco): their customer pays both parties but the vendor and the practice provide services to each other in addition to the services they provide their customer

C. A business service offering is different from a goods offering in that a business service inherently involves coproduction

**Solution:** C is true: coproduction means that the parties to a service engagement (nominally, service consumer and provider) interact to realize the value transferred during the service engagement

D. A business service is intangible but goods are tangible

**Solution:** D is false: many goods are intangible (e.g., digital media) and some services include components that are tangible (e.g., food at a restaurant)

E. Accounting and auditing are examples of business-level responsibilities that can be understood as cross-cutting concerns on par with logging at a technical level

**Solution:** E is true:

2. (6 points) Of the following statements, identify all that hold about XML.

A. XML is valuable for e-business because it provides the desired level of conceptual modeling needed in e-business

**Solution:** A is false: XML doesn’t offer conceptual modeling as such

B. XML has a natural match with messaging middleware but can be effectively used even without messaging middleware

**Solution:** B is true:

C. The XML Schema instance namespace offers some essential terms (elements or attributes) to be used within a schema-compliant XML document

**Solution:** C is true:

3. (16 points) Of the following statements, identify all that hold about XML Schema.

- A. Specifying the schema of an XML document helps catch certain errors in an incoming document even before trying to use that document

**Solution:** A is true:

- B. Using XML syntax for a language is most valuable from the tooling perspective, and not necessarily so for human readability

**Solution:** B is true: you know about the readability challenges if you have tried to read XML Schema and XSLT documents!

- C. XML InfoSet specifies that the attributes of an element are unordered

**Solution:** C is true:

- D. XML InfoSet specifies that comments may occur *only* before the main element of an XML document

**Solution:** D is false: comments may occur in other places as well

- E. XML Schema provides a way to specify minimum and maximum bounds on the number of values an attribute of an element can take

**Solution:** E is false: attributes may take exactly one value

- F. Since attributes can only take string values, XML Schema doesn't allow types on attributes

**Solution:** F is false: attributes may have types, although these types must be *simple*, i.e., based on the string type

- G. In XML, a text node under an element includes the largest possible contiguous block of text not interrupted by a subelement

**Solution:** G is true:

- H. Attributes are a convenience but anything that attributes can represent we can represent using elements

**Solution:** H is true:

4. (8 points) Of the following statements, identify all that hold about keys and other database-related concepts.

- A. The document-centric view was generally not promoted by Database Administrators (DBAs) in large enterprises because they preferred to give a central role to existing enterprise databases

**Solution:** A is true:

- B. Although XML doesn't allow the keys on an element to refer to its parents, this is mainly based on implementation ease: there is no fundamental or logical reason why keys referring to parents could not be defined

**Solution:** B is true: you should be able to state what selected elements are unique or exist without regard to what is a parent or not, although the needs of indexes are simplified when all the selectors and fields point downwards

- C. To define a keyref presupposes that a corresponding key or unique is defined

**Solution:** C is true:

- D. Let  $K_1$  be a key with one selector and three fields that applies on a context node. Let  $K_2$  be another key on the same context node, with the same selector, and with exactly two of the three fields. Then given  $K_1$ ,  $K_2$  is redundant

**Solution:** D is false:  $K_2$  is more informative than  $K_1$  because it says that two of the three fields are adequate to ensure uniqueness; thus any document that satisfies  $K_2$  will satisfy  $K_1$ ; that is, given  $K_2$ ,  $K_1$  is redundant

5. (20 points) Of the following statements, identify all that hold about XML keys, integrity constraints, and other aspects of relating XML to databases:

- A. Common business documents such as real-life purchase orders and repair manuals are typically better treated in the document-centric view than the data-centric view

**Solution:** A is true: business documents are typically structured in semiregular ways

- B. In the document-centric view, we would generally find real-life documents that have no or few elements with mixed content

**Solution:** B is false: although mixed content is not fundamentally needed, mixed content elements would be common in document-centric settings, e.g., in XHTML documents or snippets that contain natural language words, some of them marked up with formatting elements

- C. The XML Root as defined in SQL/XML is identical to the root of the XML InfoSet

**Solution:** C is false: XML Root as defined in SQL/XML allows a forest whereas the root in XML InfoSet allows only a single tree

- D. XML supports creating NULL elements for each element type that we wish to define as nillable

**Solution:** D is true:

- E. SQL/XML Publishing functions can be used in a SELECT query to output serialized representations of XML elements, possibly even including subelements and attributes

**Solution:** E is true:

- F. What makes it difficult to represent an XML document as a set of tables is that every table has a key but not every XML document has a key

**Solution:** F is false:

- G. Except for the introduction of XML Type as a data type, SQL/XML makes no substantial change to the traditional SQL DDL

**Solution:** G is true:

- H. In a number of settings, SQL/XML treats char, varchar, and clob as if they were more or less interchangeable string-like data types

**Solution:** H is true: for `xmlparse`, `extractValue`, and so on

- I. SQL/XML SELECT queries output rows some of whose cell values may be XML elements

**Solution:** I is true:

- J. When defining a table in SQL/XML, the XML Type must always be marked NOT NULL, since we should express a null value in the style of `<elem xsi:nil='true'/>`

**Solution:** J is false: our example schema allows NULL, for instance