

Name of the Paper	: Computer Applications In Business
Name of the Course	: B.Com. (Hons.) CBCS
Semester	: IV
Duration	: 1 hour
Maximum Marks	: 25

All questions are compulsory.

Answers should be brief and all parts of a question be answered together.

Q. 1. (a) Fill in the blanks:

4

- (i) performs the function of multiprogramming.
- (ii) displays information such as instructions, messages about the state of the computer, or location of the cursor in the window.
- (iii) allows us to navigate from one web page to another.
- (iv) OLE stands for

Ans. (i) Operating system performs the function of multiprogramming.

(ii) Status bar displays information such as instructions, messages about the state of the computer, or location of the cursor in the window.

(iii) Hyperlink allows us to navigate from one web page to another.

(iv) OLE stands for Object Linking and Embedding.

(b) Answer in one line:

3

(i) What is Ribbon?

(ii) What is template?

(iii) Explain audit trails.

Ans. (i) Ribbon. The ribbon is a user interface element in Microsoft, which combines the menu bar and toolbar into a single floating pane.

(ii) Template. A template is a file that serves as a starting point for a new document. When user opens a template, it is pre-formatted in some way. For example, A user can use the template in Microsoft Word that is formatted as a business letter.

(iii) Audit trail. Audit trail is a series of paper, electronic files and other documents and records that provide documented history of a transaction within an organization.

Q. 2. What is Operating System (OS)? Explain its functions.

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Ans. Operating System and its functions. An operating system is a collection of programs that supervises all the operations of a computer. Each computer must be under the control of an operating system before it can execute any program. It acts as an interface between users and the hardware of a computer system. The operating system is loaded from the hard disk or floppy disk, and this process of loading the operating system is called *booting the system*. An operating system manages the resources of the computer system, such as memory, processor, and input/output devices. It keeps track of the status of each resource and decides who will have a control over computer resources, for how long and when. Examples of operating system are MS-DOS, UNIX, LINUX, and Windows 95/98/NT.

Major functions of an operating system are:

1. **File and software management.** The operating system supports a large library of typical user programs and files. The user only has to tell the operating system which program he wishes to use. The operating system will retrieve the program from the disk and bring it to the main memory. Now these programs can be used by the operator. These programs are text editor, assembler and high-level languages. Files of data can be stored, and retrieved under the operating system.
2. **Input-Output and peripheral management.** The operating system contain a variety of sub-routines such as peripheral device handlers. When writing a program, the user has to specify what he wishes to do with a particular peripheral. The operating system will do the rest.
3. **Memory management.** The operating system can determine how much usable RAM a computer has. The operating system also decides how this RAM is used. The transfer of data and programs into and out of RAM takes place automatically under the supervision of the operating system.
4. **CPU Time management.** The CPU must be used effectively and the scheduling of the CPU is one of the functions of an operating system. When the CPU is idle (Example, during I/O operations), the operating system can give the CPU something to do. Time scheduling is especially important for large computers which serve many people.
5. **Security management.** The OS must provide security features which enable different users to protect their documents. UNIX and LINUX provide strong security by way of passwords, permissions etc. Windows OS such as Windows NT and Windows 2000 also provide good security. Enforce security/confidentiality through usernames, passwords, access rights etc.

Or

Examine the role of the following in a computer network:

6

(i) Repeaters

(ii) Hub

(iii) Switch

Ans. (i) Repeaters. Signals that carry information within a network can travel a fixed distance before attenuation endangers the integrity of the data. A repeater is an electronic device that is installed on the link. It receives a network signal from one LAN terminal cable segment and to regenerate and retransmit the signal as it is in its original strength over one or more other cable segment. It regenerates the strength of the signal before transmitting it. Repeaters operate in the Physical layer of the OSI model and are transparent to all the protocols operating in the layers above the Physical layer.

(ii) Hub. A hub is a common connection point for devices in a network. Hubs connect segments of a LAN. A Hub contains multiple ports so when a packet arrives at one port, it is copied to the other ports so that all segments of the LAN can see all the packets.

(iii) Switch. A switch is the device that filters and forwards packets between LAN segments in a network. Like a hub, a switch too connects individual devices on a network so that they can communicate with one another.

Although a switch looks nearly the same as the hub, it generally is more intelligent. Unlike hubs, network switches are capable of inspecting the data packets as they are received, determining the source and destination device of that packet, and forwarding that packet appropriately. Hubs, in contrast, broadcast all information to each connected computer, whether or not that computer is the intended recipient. In this manner, switches help reduce overall network traffic. Switches operate at the data link layer (layer 2) and sometimes the network layer (layer 3) of the OSI Reference Model and therefore support any packet protocol.

Q. 3. What do you mean by normalization? Explain first three normal forms of a relational database. 6

Ans. Normalization. The process of breaking data across related multiple tables is called normalizing the data. It is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies.

Three stages of normalizing the data are—

- (i) **First normal form.** The rule for first stage of data normalization is—“Each cell of the table must contain only a single value and the table must not contain repeated groups of data”. This rule explains two things—first, each field should store single piece of data. This implies that instead of storing full name in one field, it should be broken into two fields, i.e., FirstName and LastName. Splitting a name avoids issues like inserting name as ‘Sharma Sanjay’ instead of ‘Sanjay Sharma’. This will ease out the sorting and searching operations on database.
- (ii) **Second normal form.** The rule for second normalization stage is—“data not directly dependent on the table’s primary key is moved into another table”. The rule implies that data stored in a table should represent a single entity.
- (iii) **Third normal form.** The last stage of normalization process involves removing all fields that are redundant and are available anywhere in the database. Calculated data is the most common type of redundant data, for example, having a column in ‘customers’ table that calculates average sales made to them.

Or

What is meant by wide area network? How does it differ from local area network? 6

Ans. Wide Area Network. A Wide Area Network is a computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more Local Area Networks (LANs). They can be created as private WANs using dedicated private communication infrastructure or public WANs using public network. The largest WAN in existence is the Internet. They use leased lines and satellites as transmission medium.

Difference between LAN and WAN:

1. Definition. A Local Area Network (LAN) is a private computer network that connects computers in small physical areas. For example, A small office, A single

building, multiple buildings inside a campus, etc. Wide Area Network (WAN) is a type of computer network to connect offices which are located in different geographical locations. Wide Area Network (WAN) depends mainly on Internet Service Providers (ISPs) for connection solutions.

2. **Cost.** Initial set-up costs for Local Area Networks (LANs) are low as the devices required to set up the networks are cheap. If there is a need to set-up a couple of extra devices on the network, it is not very expensive to do that. Initial set-up costs for Wide Area Networks (WANs) are high, because of the devices (Routers, Firewalls etc.), cables and manpower required.

3. **Maintenance costs.** Local Area Network's (LAN's) running costs are less because it covers a relatively small geographical area, so it is easier to maintain at relatively low costs while Wide Area Networks (WAN's) running costs are high. Wide Area Networks (WAN's) normally have recurring monthly cost as Service Provider access fees.

4. **Congestion.** Wide Area Networks (WANs) are more congested than Local Area Networks (LANs).

5. **Ownership.** LAN is typically owned, controlled, and managed by a single person or organization. WANs (like the Internet) are not owned by any one organization but rather exist under collective or distributed ownership and management over long distances.

6. **Connections.** One LAN can be connected to other LANs over any distance via telephone lines and radio waves. Computers connected to a WAN are often connected through public networks, such as the telephone system. They can also be connected through leased lines or satellites.

7. **Bandwidth.** In the LAN, high bandwidth is available for transmission while in the WAN, low bandwidth is available for transmission.

8. **Used by.** LAN is widely used by various government and business organisations as it provides the users more capabilities in data processing and information exchange as compared to the *stand-alone computers*. Each computer/node in a LAN can communicate with any other computer of the network. There is a high degree of interconnection between computers due to physical connection, whereas, private WANs are maintained by large organisations like banking and insurance companies. Though they are expensive to create and maintain but they provide secure and high rates of data transmission.

Q. 4. Explain the two fundamental integrity rules.

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Ans. The two fundamental integrity rules are— (i) Referential integrity, and (ii) Entity integrity.

(i) **Referential integrity** is the mechanism the system provides to maintain foreign keys. It refers to the accuracy and consistency of data within a relationship. In relationships, data is linked between two or more tables. This is achieved by having the foreign key (in the associated table) reference a primary key value (in the primary-or parent-table). Because of this, we need to ensure that data on both sides of the relationship remain intact. So, referential integrity requires that, whenever a foreign key value is used it must reference a valid, existing primary key in the parent table. A foreign key may have either a null entry, as long as it is

not a part of its table's primary key, or an entry that matches the primary key value in a table to which it is related. It is possible for an attribute not to have corresponding value, but it will be impossible to have an invalid entry. For example, A Customer might not yet have an assigned sales representative (number), but it will be impossible to have an invalid sales representative (number).

- (ii) **Entity Integrity** specifies that instances of the entities are distinguishable and thus no prime attribute (component of a primary key) value may be null. It is the integrity rule which states that if an attribute of a table is prime attribute (unique identifier), it cannot accept null values, or in other words no component of a primary key values may be null. By definition, all entities must be distinguishable, i.e., they must have a unique identification of some kind. Primary keys perform that unique identification function in a relational database. Hence, an identifier (Primary key value) that was completely null would be a contradiction. If two entities are not distinguishable from each other, then by definition these are not two entities but one.

Difference between Entity integrity and Referential integrity. While the entity integrity deals with the primary key concept, the referential integrity is concerned with the concept of foreign key, i.e., with the attributes of a relation having domains. The domain of foreign keys is those of the primary key of another relation. To ensure that a value that appears in one relation for a given set of attributes also appears for a certain set of attributes in another relation. This condition is called as referential Integrity. For example, if a base relation includes a foreign key, then it must have a primary key to match in some other relation, or wholly be a null value. The value of a primary key which appears in the base table (entity set) whenever there is a cardinality (entity relation) then the value of a primary key, which becomes a foreign key in the entity relation the value of foreign key and primary key should be the same. Referential integrity constraints are created in order to ensure that data entered into one table is compatible with corresponding data in the other related tables. Values from one column are dependent on the values of columns in other tables. For example, there are two tables viz, Student Details and Book Issued in a college database as given below. StudentDetails and BookIssued tables have Enrolment No and Accession No as the primary key respectively that ensure entity integrity. The StudentId is the foreign key in BookIssued table which can get value from EnrolmentNo of the Student Details only thus maintaining referential integrity.

Student Details

Enrolment No (Primary Key)	StudentName	Course
HR01/07	Anjali Gambhir	Economics (H)
HR02/07	Bhawana Aggarwal	Philosophy (H)
HR03/07	Ajay Gulati	B.Com (H)

Accession No (Primary Key)	Student Id (Foreign Key)	DateOfIssue
A001	HR02/07	24/07/07
A003	HR02/07	24/07/07
B004	HR01/07	4/08/07

Or

Explain the various keys of a relation used in RDBMS.

6

Ans. Any attribute in the table which uniquely identifies each record in the table is called *key*. It can be a single attribute or a combination of attributes. For example, in STUDENT table, STUDENT_ID is a key, since it is unique for each student. In PERSON table, his passport number, driving license number, phone number, SSN, email address are the keys since they are unique for each person.

STUDENT	PERSON
STUDENT_ID	EMPLOYEE_NAME
STUDENT_NAME	EMPLOYEE_DOB
ADDRESS	EMP_ADDRESS
DOB	EMP_PASSPORT_NUM
COURSE	LICENCE_NUMBER
	SSN

Various keys of a relation used in RDBMS:

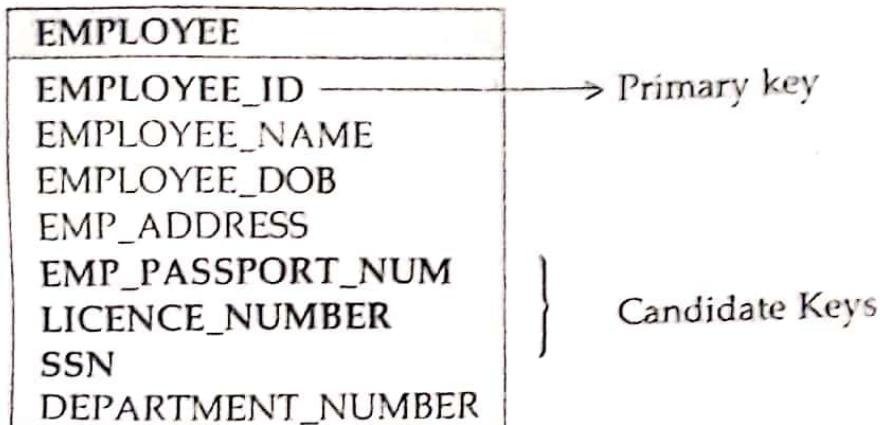
1. **Primary Key.** It is the first and foremost key which is used to uniquely identify a record. It can be a single attribute or a combination of attributes. For an entity, there could be multiple keys as seen in PERSON table above. Most suitable key from those lists becomes a primary key. In the Person table above, we can select SSN as primary key, since it is unique for each person. We can even select Passport Number or License Number as primary key as they are also unique for a person. However, selection of primary key for each entity is based on requirement and developer.

For a student, STUDENT_ID is a primary key and for an employee EMPLOYEE_ID is a primary key.

EMPLOYEE
EMPLOYEE_ID —————> Primary Key
EMPLOYEE_NAME
EMPLOYEE_DOB
EMP_ADDRESS
EMP_PASSPORT_NUM
LICENCE_NUMBER
SSN
DEPARTMENT_NUMBER

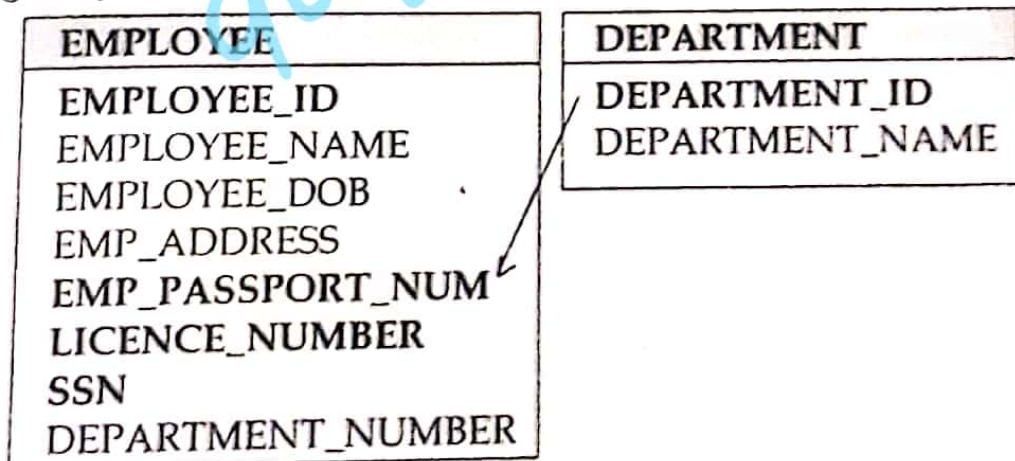
2. **Secondary/Candidate Key.** As we discussed above, an employee is identified by his ID in his office. Apart from his ID, does he have any other unique keys, so that he can be identified from others? Yes, he has passport number, PAN number, SSN number (if applicable), driving license number.

email address, etc. These also identify specific person uniquely. But we can choose any one of these unique attributes as primary key in the table. Rest of the attributes, which hold as strong as primary key are considered as Candidate key/Secondary key. In the example of employee table, EMPLOYEE_ID is best suited for primary key as it is from his own employer. Rest of the attributes like Passport Number, SSN, License Number, etc. are considered as Candidate keys.



3. **Alternate key.** An alternate key is a key associated with one or more columns whose values uniquely identify every row in the table, but which is not the primary key. For example, where the primary key for a table may be the employee id, the alternate key might combine the first, middle, and last names of the employee.

4. **Foreign key.** In a company there are different departments such as Accounting, Human Resource (HR), Development, Quality, etc. An employee, who works for that company, works in a specific department. But we know that the employee and department are two different entities. So we cannot store his department information in the employee table. Instead, what we do is we link these two tables by means of primary key of one of the table i.e., in this case, we pick the primary key of department table – DEPARTMENT_ID and add it as a new attribute/column in the Employee table. Now DEPARTMENT_ID is a foreign key for Employee table, and both the tables are related.



5. **Compound key.** A key in a table is formed by combining more than one attributes/columns of the same table. These columns of the table can or cannot be keys in the table. The compound key acts as a primary key only when all the columns in the compound keys are together, individually those columns are not keys. In other words, a unique record from the table is fetched only if we combine more than one column. If we use them individually, we will not get any unique record.

For example, 'Student enrolls for a course, STUDENT_ID and COURSE_ID, when combined together gives the particular course to which he is enrolled for. Only STUDENT_ID or COURSE_ID alone does not give correct data.

In the table given, STUDENT_ID, 100 alone gives us multiple courses. To know about a particular course we need both STUDENT_ID and COURSE_ID. In this case, both the IDs are primary keys from their table, but in STUDENT_COURSE table, they form primary key when they are combined together. Hence they are called compound keys.

STUDENT_COURSE		
STUDENT_ID	COURSE_ID	NO_OF_HOURS
100	401	20
100	402	15
101	401	25
103	403	10

6. **Composite key.** A Composite key is similar to compound key, but the columns which are part of composite keys are always keys in that table.

7. **Surrogate Key.** Surrogate key is a kind of primary key, but it is not defined by the designer. It is a system generated random number, which uniquely identifies the entity in the system and not available for the user.