Database Management System: Assignment 5

Total Marks : 20

June 27, 2022

Question 1

Which of the following specifies how an application server communicates with the external web? *Marks: 2* **MCQ**

a) HTTP

b) SMTP

c) Web browser

d) CGI

Answer: d)
Explanation: Common Gateway Interface is a standard interface between the web and application server.
(Refer to Lecture-21).
So, option (d) is correct.

Question 2

Identify the incorrect statement(s) from the following? *Marks: 2* **MSQ**

a) `Javascript` and `AJAX` technology are used to design server-side applications.

b) `Servlet` runs inside application servers.

c) `JDBC` connections always stay connected.

d) `Java Server Page` is platform-independent.

Answer: a), c)
Explanation: `Javascript` and `AJAX` technology are used to design client-side applications and `JDBC` connections stay connected until the client disconnects.
Hence, options a) and c) are the answer.

Question 3

What will be the availability of the Redundant Arrays of Independent Disks (RAID) system, if the `Mean Time Between Failure (MTBF)` is 25 days and the `Mean Time To Repair (MTTR)` the system is 18 hours?

Marks:2 **MCQ**

a) 97.09%

b) 96.02%

c) 58.14%

d) 30.25%

Answer: a)
Explanation: `Mean time between failures` is the average time between failures.
Mean time between failures (MTBF) = total available time / number of failures.
`Mean time to repair` is the average time taken to repair the system.
Mean time to repair(MTTR)= total unavailable time /number of failures
Availability = Total available time /(total available time +total unavailable time)
Availability (in %) = $\frac{MTBF}{(MTBF+MTTR)}$
= $\frac{25*24*100}{(25*24+18)}$
= $\frac{60000}{(618)}$
= 97.087 % $\approx$ 97.09 %
Hence, option a) is correct.

Question 4

Suppose there is a 256 gigabyte flash storage system, with 4 kilobyte page size. The address of each page is stored in the memory as an array called a flash translation table. If the size of the flash translation table is 512 megabytes, what is the maximum address size of a page?

Marks: 2 **MCQ**

a) 8 bytes

b) 16 bytes

c) 32 bytes

d) 64 bytes

Answer: a)

Explanation: No. of flash pages = $\frac{\texttt{256 gigabyte}}{\texttt{4 kilobyte}} = \frac{\texttt{256 x } 10^{30}}{\texttt{4 x } 10^{10}} = 64 \text{ x } 10^{20}$.
Suppose, each address requires p bytes.
Therefore, the flash translation table would be = p x 64 x 10^{20} = 512 megabyte
So, $p = \frac{512 \times 10^{20}}{64 \times 10^{20}} = 8$ bytes

Question 5

Identify the correct statement(s) about the following RAID levels?

Marks: 2 **MSQ**

a) `RAID 0` provides byte-level striping with mirroring.

b) `RAID 1` provides disk mirroring without striping.

c) `RAID 3` provides byte-level striping with dedicated parity checking.

d) `RAID 5` provides Byte-level striping without parity bits.

Answer: b), c)
Explanation: `RAID 0` provides block-level striping without parity or mirroring and `RAID 5` provides block-level striping with distributed parity. Therefore, these two statements are given in options a) and d) are incorrect.
Hence, options b) and c) are the answers.

Question 6

Suppose, there is a 512 gigabyte magnetic disk with 256 surfaces and 1024 tracks per surface. If it has 512 sectors in each track, what will be the size of one sector?

Marks: 2 **MCQ**

a) 512 bytes

b) 1 KB

c) 2 KB

d) 4 KB

Answer: d)
Explanation: Capacity of a magnetic disk = Total number of surfaces x Number of tracks per surface x Number of sectors per track x Number of bytes per sector
So, the size of a sector

$$= \frac{\texttt{Capacity of a magnetic disk}}{\texttt{No.of surfaces x No.of tracks x No.of sectors}}$$

$$= \frac{512 \times 2^{30}}{256 \times 1024 \times 512} \texttt{ bytes}$$

$$= \frac{2^{39}}{2^{27}} \texttt{ bytes}$$

So, the number of bytes per sector = 2^{12} bytes = 4 KB

Question 7

Which of the following layer is not present in a typical 3-tier Mobile Application architecture?
Marks: 2 **MCQ**

a) Application layer

b) Presentation layer

c) Business layer

d) Data layer

Answer: a)
Explanation: A typical 3-tier Mobile Application Architecture consist: Presentation layer
Business layer
Data layer
Hence, option a) is the answer.

Question 8

Consider a database management system that organizes its records of a file in sequential order and one block contains only whole records. A file containing faculty records has 824 records and each record is 40 bytes long. If the disk block size is 1 kilobyte, and the block pointer size is 8 bytes, how many blocks will be required to store the faculty file?

Marks: 2 **MCQ**

a) 25

b) 32

c) 33

d) 42

Answer: c)
Explanation: One block can store only whole records.
So, one block can store n numbers of whole records and one block pointer.
One record size = 40 bytes
Disk block size = 1024 bytes
Disk block pointer = 8 bytes
Actual storage size of one block = (1024 - 8) = 1016 bytes
n = 1012/40 = 25.3 $\approx$ 25
So, maximum of 25 records can be stored in a block.
There are 824 records in the file, hence the required number of blocks = 824 / 25 = 33

Question 9

In a `Drawing Competition`, `participants` individually can enroll their names for the competition. There are many `groups` in the competition depending on the age of the `participants`. A `participant` can `participate` in only one `group` and a `group` consists of multiple `participants`. Each `group` has a unique name (GName) and a `participant` also has a unique id. The result (score) of each group is maintained separately. Which of the following statement(s) are incorrect? *Marks: 2* **MSQ**

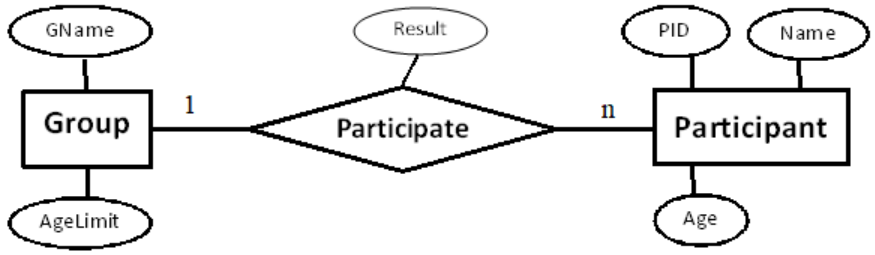
a) Entity `Group` does not have any primary key.

b) `Participate` is a one-to-many relationship between `Group` and `Participants`.

c) `Participate` is a many-to-many relationship between `Group` and `Participant`.

d) `GName` may be the foreign key of `Participate` relation between `Group` and `Participant`.

Answer: a), c)
Explanation: If we draw the ER diagram of it, we can see there will be a `one-to-many` relationship between `Group` and `Participant`.
`Gname` is the primary key of the entity `Group` table. Hence, can be the foreign key of `Participate` relation between `Group` and `Participant`.



So, options a) and c) are false statements.

Question 10

Identify the correct statement(s) from the following. *Marks: 2* **MCQ**

a) `Dynamic hashing` file organization is used to store multiple relations in one file.

b) In `sequential file` organization, records are ordered by a search key.

c) `Heap` file organization is used to store related records on the different block to minimize I/O.

d) In `multitable clustering file` organization, records are ordered by a search key.

Answer: b)
Explanation: In `sequential file` organization, records are ordered by a search-key. Only this statement is correct. Hence, option b) is correct.