



III Semester M.C.A. Examination, January 2016
(CBCS)
COMPUTER SCIENCE
MCA 301 : File Structures

Time : 3 Hours

Max. Marks : 70

PART – A

Answer **any five** of the following. **Each** question carries **six** marks. (5x6=30)

1. What is a track, sector and cylinder ? Discuss the working of the hard-disk drives.
2. Given the following records :
6, 5, 4, 3, 2, 1, 7
What are the disadvantages and advantages of storing these records using sequential file organization and indexed file organization method ?
3. Give a brief note on UNIX directory structure.
4. Given a text file with following characters and corresponding frequencies, discuss a mechanism to compress the text file. What is your compression-ratio ?

Character	a	f	i	u	o	m
Frequency	0.1	0.15	0.2	0.3	0.15	0.1
5. How do linear probing, quadratic probing and chaining manage collision ?
6. Define prefix B+ Tree. How does it differ from B-Tree ? What are the complexities of inserting, deleting and searching an element in prefix B+ Tree.
7. Define B-Tree. Represent B-Tree using object-oriented mechanism. Consider insert and search operations.
8. "The optical disk drives are used extensively to store large data and are reliable". Please comment whether the statement made here is true. If true, what makes optical drives more powerful compared to other drives ?



PART – B

Answer **any four** of the following questions. **Each** carries 10 marks. **(4x10=40)**

9. Consider the following record structure of a student :

Name	character of size 20
Age	integer
Register_number	integer
Gender	character
Marks	integer

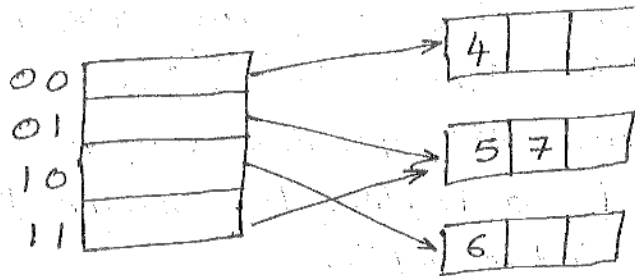
Assume that there are 100 records in a file and the buffer size is 10.

Discuss the operations open, close, read and write for a problem to increase the marks of each student by 5.

10. Given a 2-3 Tree (B-Tree of order 3), with a leaf node capacity to hold 2 records, build B-Tree for the following inputs. (Show the tree at each insertion).
8, 18, 22, 4, 3, 6, 9, 28, 44, 13.

11. What is multi-level indexing ? Why does one use multi-level indexing ? Discuss advantages and disadvantages of multi-level indexing.

12. Given the bucket size of 3 and the following snapshot of hashing with a hashing function $h(k) = k$, insert the records : 9, 13, 22, 14, 0, 3, 2, 8 using extendible hashing.



13. Use 2-way external merge sort algorithm to sort the following numbers :

2, 6, 9, 4, 3, 2, 8, 1, 7

Mention the working of k-way merge sort algorithm.

14. What is the difference between internal sorting and external sorting ? When sorting large number of records using the internal sorting, what are the memory related issues ? How are these issues handled using external sorting ?