

**CDOE**  
**BACHELOR OF COMPUTER APPLICATIONS (CBCS-2019 COURSE)**  
**B.C.A. SEM - III : WINTER :- 2021**  
**SUBJECT: OPERATING SYSTEMS**

**Day : Tuesday**  
**Date 15-02-2022**

**W-21867-2021**

**Time : 02:00 PM-05:00 PM**  
**Max. Marks: 60**

**N.B.:**

- 1) Q 4 from Section I is COMPULSORY.
- 2) Answer ANY TWO questions from Q 1, 2, 3 in Section I.
- 3) Answer ANY TWO questions from Q 5, 6, 7 in Section II.
- 4) All question CARRY EQUAL marks.
- 5) Answers to Both the sections should be written in SAME answer book.
- 6) Draw a labeled diagram WHEREVER necessary.

**SECTION - I**

**Q.1) Answer the following (6 Marks X 2=12)**

- a) Describe various types of operating system structures in detail.
- b) Differentiate between memory management with bit map and memory management with linked list.

**Q.2) Answer the following (6 Marks X 2=12)**

- a) What is virtual memory? How virtual addresses are converted to physical addresses? Explain with suitable example.
- b) Describe a classical problem of producer-consumer problem in detail.

**Q.3) Explain the following (6 Marks X 2=12)**

- a) Explain the relative merits and demerits of using hierarchical directory structure over single-level and two level directory structures.
- b) What is DMA? Explain DMA transfer with help of DMA controller.

**Q.4) Write short notes on the following: Attempt ANY THREE (4 Marks X 3=12)**

- a) Interrupt handler
- b) Clock page replacement algorithm
- c) Working set model
- d) Conditional critical region
- e) Time slice scheduling

**SECTION - II**

**Q.5) Answer the following (12 Marks X 1=12)**

Consider the following set of process.

Process	In time (am)	Run Time (min.)	Priority
P1	10.00	10	4
P2	10.03	4	3
P3	10.06	8	1
P4	10.10	3	2

Calculate the average waiting time and average turnaround time for each of the following scheduling algorithm:

- a) SJF   b) SRTN   c) PBPS

**Q.6) Answer the following (12 Marks X 1=12)**

Main memory consist of operating system at head, below it 20k hole, then some part of the memory in use. Below it 25k hole, below some part of memory in use, below it 26k hole then some part of memory in use and below it 42k hole. A request of 23k is made by process. Draw the basic structure of memory. Explain following algorithms and draw the memory structure by using following algorithms.

- a) First fit   b) Best fit   c) Next fit   d) Worst fit

**Q.7) Answer the following (12 Marks X 1=12)**

Suppose that a disk drive has 100 cylinders, numbered 0 to 99. The head is currently serving a request at cylinder 40 and moving outside. The queue of pending requests are kept in FIFO order.

15, 96, 35, 27, 73, 42, 39, 55, 34, 32, 17

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling algorithms?

- 1) FCFS   2) SSTF

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