Subject Code: BCS-26 **Roll No.** | | | | | | | | | | | |

B. Tech.
ODD SEMESTER
MINOR TEST 2017 - 2018

Subject Name: Principles of Operating Systems

Time: 2 Hrs. **Max. Marks: 20**

Note: Answer all questions.

Q.1 Attempt any Three parts of the following. Q. 1(a) is compulsory.

(a). Consider the data given in following table- 4

Partition size (KB)	2KB		4KB		20KB		10KB	
Job sizes (KB)	2KB	10KB	3KB	7KB	6KB	8KB	20KB	4KB
Burst Time	3	8	2	1	5	1	8	6

Assume that all jobs arrive at the same time in above order and processed by CPU in FIFO manner. Determine when the job of size 20KB get the memory and be completed in case of best fit, worst fit and first fit allocation techniques.

(b). What are the various goals of designer while developing an operating system. Explain in detail. 2

(c). Consider the following segment table- 2

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

Determine which of the following addresses are valid and What are the physical addresses for them?

(a) 0,430 (b) 1,10 (c) 2,500 (d) 2, 105 (e) 3,400 (f) 4,112 (g) 1, 20

(d) What is paging? Explain the various types of page table. 2

Q.2 Attempt any Two parts of the following. Q. 2(a) is compulsory.

(a). Consider the following page reference string- 4

2,6,3,6,4,6,5,6,4,6,2,6,3,6,4,6,5,6

How many page fault would occur, if following page replacement algorithm uses 4 frames and initially all frames are empty.

a. Least Recently Used Page replacement algorithm
b. FIFO Page replacement algorithm
c. Optimal Page replacement algorithm

(b). Explain the following terms in brief- 2

a. Process and Program
b. Process Control Block
c. Process State
d. Context Switching

(c). For each of the following decimal virtual addresses, compute the virtual page number and offset for a 4KB and 8KB pages- 2

a. 20000 b. 32768
c. 60000 d. 18956

Q.3 Attempt any Two parts of the following. Q. 3(a) is compulsory.

(a). Attempt the following questions- 4

I. A computer whose processes have 1024 pages in their address space keeps its page table in memory. The overload required for reading a word from the page table is 5ns. To reduce this overhead, the computer has TLB, which holds 32 (virtual page, physical page frame) pairs, and can do a lookup in 1ns. What hit rate is needed to reduce the mean overhead to 2ns.

II. Consider a system with Logical Address space 32 bits, Physical address space 64MB. The memory is byte addressable and page table entry size is 2bytes. What is the approximate size of page table?

(b). What is privileged instruction? Explain in detail. Which of the following instructions are privileged? Give the reason for each. 2

a. Read Device register for a given device.
b. Disable all interrupts.
c. Issue a trap instruction
d. Change processor mode from kernel to user.
e. Updating entries of page table.
f. Read the clock
g. Clear memory
h. Set value of timer

(c). You are given the following data about a virtual memory system- 2

a. The TLB can hold 1024 entries and can be accessed in 1ns
b. A page table entry can be found in 100ns
c. The average page replacement time is 6ms

If page references are handled by the TLB 99% of the time, and only 0.01% lead to a page fault, what is the effective address-translation time?