2016/ODD/08/24/MCS–503 (C)/
CS–503 (O)/591

UG Odd Semester (Old and CBCS)
Exam., December—2016

COMPUTER SCIENCE

(5th Semester)

Course No. : MCS–503 (C) / CS–503 (O)

(Operating System and Architecture)

Full Marks : 75
Pass Marks : 30 (CBCS)
26 (Old)

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, taking **one** from each Unit

UNIT—I

1. *(a)* What is the basic difference between user view and system view of operating system? 2

(b) What do you mean by system program? Discuss the importance of system program. 1+3=4

(c) What are the advantages of modular structure of operating system? 3

(d) Explain the role of process control block in context switch. 4

(e) What do you mean by process contention scope and system contention scope in thread scheduling? 2

2. *(a)* What is privilege instruction? Give example. 2

(b) What do you mean by process? Explain the process states with the help of a diagram. 1+4=5

(c) Compare between multilevel queue scheduling and multilevel feedback queue scheduling. 2

(d) Consider the following set of processes with CPU burst time given in millisecond :

Process	*Burst time*	*Arrival time*
P_1	5	0
P_2	3	1
P_3	3	3
P_4	2	5
P_5	4	6

Calculate the waiting time and turn-around time for FCFS and SJF (preemptive) scheduling algorithm. 6

UNIT—II

3. *(a)* Differentiate between compile time and execution time address binding. 3

(b) What is the importance of swapping? 2

(c) What are the disadvantages of contiguous memory allocation? 2

(d) Discuss the implementation of LRU page replacement algorithm with the help of stack. 4

(e) Explain the cause of thrashing. 4

4. *(a)* Distinguish between static and dynamic loading of memory. 2

(b) What are the benefits of using address space identifier (ASID) in TLB? 2

(c) Compare between forward-mapped page table and inverted page table. 3

(d) Discuss the benefits of segmentation. 3

(e) Consider the following page reference string :

1 2 3 2 1 5 2 1 6 2 5 6 3 1 3

How many page faults would occur for the following page replacement algorithm, taking 3 frames? 5

(i) FIFO

(ii) LRU

UNIT—III

5. *(a)* Define sector, track and cylinder in a hard disk. 3

(b) How can a host interact with the controller? Explain. 5

(c) Explain the interrupt service routine with the help of timeline diagram. 3

(d) Compare between the following : 2×2=4

(i) SCAN and C-SCAN

(ii) Block interleaved parity and block interleaved distributed parity

6. *(a)* Discuss the significance of data stripping. 2

(b) What is the importance of interrupt vector? 2

(c) What is the advantage of DMA? 2

(d) What do you mean by stable storage? 3

(e) Suppose that a disk drive has 100 cylinders from 0 to 99. The drive is currently serving request at 41st cylinder and the previous request was at 35th cylinder. The queue of pending requests in FIFO order is

37, 56, 83, 42, 98, 14, 23

Calculate the total distance that the disk arm moves according to the following scheduling algorithm : 6

(i) FCFS

(ii) SSTF

(iii) C-SCAN

UNIT—IV

7. *(a)* What are the basic file attributes? 3

(b) Explain the procedure of deleting a node in graph directory. 3

(c) State the purpose of file organization module. 2

(d) Explain the different types of index allocation of space. 5

(e) Explain the free space management by counting technique. 2

8. *(a)* What is the advantage of open() system call? 3

(b) What is the function of current file position pointer? 2

(c) Differentiate between acyclic graph and tree structure directory. 4

(d) What do you mean by file system mounting? 3

(e) Compare between contiguous allocation and linked list allocation of space. 3

UNIT—V

9. *(a)* What is cooperating process? What are the advantages of cooperation among processes? 1+3=4

(b) What is the advantage and disadvantage of shared memory communication? 2

(c) What is the necessity of masking some interrupt when a process enters the critical section? 2

(d) State the solutions of dining philosophers problem. 3

(e) Explain the data structure used in banker's algorithm. 4

10. *(a)* Explain the producer-consumer problem. 4

(b) What is bounded waiting in critical section? 2

(c) State the necessary conditions of deadlock. 4

(d) Explain the deadlock avoidance with the help of resource allocation graph. 5

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