UG Odd Semester (CBCS) Exam., December—2017

COMPUTER SCIENCE

(5th Semester)

Course No. : MCSCC–503 (C)

(Operating System and Architecture)

Full Marks : 70

Pass Marks : 28

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 do you mean by Operating System from the view of system? Discuss its basic functions. 2+3=5

(b) Discuss the merits and demerits of layered structured operating system. 5

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

Process	*Burst time*	*Arrival time*
P_1	4	0
P_2	2	1
P_3	4	2
P_4	2	7
P_5	3	8

Calculate the average waiting time and turn-around time for SJF (preemptive) scheduling algorithm. 4

2. *(a)* Discuss the demerits of dual mode operation. 2

(b) Explain process states with the help of diagram. 4

(c) What do you mean by I/O-bound and CPU-bound process? 2

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

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

Calculate the waiting time for priority scheduling (preemptive) and round-robin scheduling algorithm. 3×2=6

UNIT—II

3. *(a)* Explain the working principle of TLB. 3

(b) What is dynamic loading? Explain how dynamic linking can share libraries. 1+4=5

(c) Consider the following page reference string :

4 2 7 1 2 3 1 2 5 3 2 6 4 1 4

Calculate the number of page faults that would occur for the following page replacement algorithm, taking 4 frames : 3×2=6

(i) Optimal page replacement

(ii) LRU

4. *(a)* What is fragmentation? Explain how paging removes fragmentation. 1+3=4

(b) Explain the working strategies of inverted page table. 4

(c) Consider the following page reference string :

7 0 1 3 4 2 3 5 4 1 6 5 7 1 2 7 1

How many page faults would occur for the following page replacement algorithm, taking 3 frames? 3×2=6

(i) FIFO

(ii) Optimal page replacement

UNIT—III

5. *(a)* What is the difference between I/O mapped I/O and memory-mapped I/O? 3

(b) What do you mean by maskable and non-maskable interrupt? 1½×2=3

(c) What do you mean by stable storage? 2

(d) Suppose that a disk drive has 100 cylinders from 0 to 99. The drive is currently serving request at 23rd cylinder and the previous request was at 18th cylinder. The queue of pending request in FIFO order is

15 52 44 98 75 34 81

Calculate the total distance that the disk arm moves according to the following scheduling : 2×3=6

(i) FCFS

(ii) SSTF

(iii) C-SCAN

6. *(a)* Explain the interrupt driven I/O cycle. 5

(b) What do you mean by disk speed? 3

(c) What is sector slipping and sector forwarding? 2

(d) Suppose a disk drive has 50 cylinder from 0 to 49. The drive is currently serving 35th cylinder and previous request was at 31st cylinder. The sequence of pending request is

5 30 15 20 38 43 29 48

Calculate the total distance that the disk arm moves according to the following scheduling algorithm : 2×2=4

(i) SCAN

(ii) LOOK

UNIT—IV

7. (a) What is file? Explain different file operations. 1+4=5

(b) What are the advantages of Acyclic-Graph directories? 4

(c) Explain the different types of table used to implement file-system. 4

(d) What is mounting? 1

8. (a) What is file pointer? 1

(b) What are the disadvantages of single level directory? 3

(c) Explain the implementation of directory with the help of hash table. 4

(d) What do you mean by index allocation of space? Explain. 5

(e) What is file allocation table? 1

UNIT—V

9. (a) What are the different types of interprocess communication? 4

(b) What do you mean by critical section problem? Explain. 4

(c) What do you mean by safe state of a system? 3

(d) What are the procedures to terminate process when system enters into a deadlock? 3

10. (a) What is bounded buffer and unbounded buffer? 2

(b) Explain the Peterson's solution to critical section problem. 5

(c) Explain the usage of semaphore. 4

(d) What do you mean by resource allocation graph? 3

★ ★ ★