H Roll No. .....

TBC–402/TBI–402

B. C. A./B. Sc. (IT)

(FOURTH SEMESTER)

END SEMESTER EXAMINATION, 2019

OPERATING SYSTEM

Time : Three Hours

Maximum Marks : 100

Note : (i) This question paper contains five questions.

(ii) All questions are compulsory.

(iii) Instructions on how to attempt a question are mentioned against it.

(iv) Total marks assigned to each question are twenty.

1. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Define operating system. Describe the various functions of operating system.

(b) Explain the structure of operating system.

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(c) Define Batch Operating System. What are the disadvantages of Batch operating system ? How is it removed in Multiprogramming Operating system ?

2. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What are schedulers ? Explain the different scheduler used by the operating system.

(b) For the following set of processes, calculate the average turnaround time, average waiting time, throughput and CPU utilization for SRTN algorithm :

Arrival time	Process	CPU Burst	Priority
0	P1	3	2
2	P2	7	2
4	P3	9	5
5	P4	8	1

(c) Describe Multilevel Feedback Queue Scheduling Algorithm.

3. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Define RAG. What are the consequences of RAG ? Draw diagram to support your answer.

(b) Discuss the conditions to be satisfied by the solution of critical section problem. Explain strict alternation with respect to Algo 1.

(c) Consider the following snapshot of a system :

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	4	5	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

(i) What is the content of need matrix ?

(ii) Is the system in a safe state ?

(iii) P1 request for two resources. Will the request be accepted ?

4. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Explain the different contiguous memory management schemes.

(b) What is meant by fragmentation problem ? How can it be controlled using Paging and Segmentation technique ?

(c) If a memory reference takes 200 ns :

(i) How long does a paged memory reference take ? (2 mark)

(ii) If we add TLBs, and 75% of all page-table references are in the TLBs, what is the effective memory reference time ? (Assume that finding a page table entry in the TLBs takes 20 ns, if the entry is there). (3 mark)

(iii) On a simple paging system with a page table containing 64 entries of 11 bits (including valid-invalid bit) each and a page size of 512 bytes. (5 mark)

(1) How many bits in the LA specify the offset ?

(2) How many bits are in LAS ?

(3) What is the size of LAS ?

(4) How many bits in the PAS specify the frame number ?

(5) How many bits in the PA specify the offset within the page ?

5. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Explain the following directory structure :

(i) One level directory structure

(ii) Two level directory structure

(iii) Tree directory structure

(b) Explain the file access methods.

(c) Suppose that a disk has 5000 cylinders, numbered from 0 to 4999. The device is currently serving a request at cylinder 143 and the previous request was at cylinder 125. The queue of pending requests in FIFO order is

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130.

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 FCFS and SCAN disk-scheduling algorithm.