Total No. of Questions : 8]

SEAT No. : ____

PA-1500

[Total No. of Pages : 3

[5926]-120

T.E. (Information Technology)
OPERATING SYSTEMS
(2019 Pattern) (Semester-I) (314442)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3. or Q.4, Q.5 or Q.6, and Q.7 or Q.8.***
2) ***Figures to the right side indicate full marks.***

Q1) a) What is semaphore and mutex? Explain with the help of pseudocode, how semaphore is used to solve producer consumer problem? **[9]**

b) What are the four necessary conditions for deadlock? How is a deadlock detected in a system with resources having single instances? Explain with an example. **[9]**

OR

Q2) a) Define mutual exclusion, race condition, semaphore. Deadlock. **[6]**

b) What is Bankers safe sequence algorithm? Apply it for finding safe sequence of execution of 5 processes in a system having Snapshot at time T0: **[12]**

	Allocation	Max	Available
	A B C	A B C	A B C
P0	0 1 0	7 5 3	3 3 2
P1	2 0 0	3 2 2	
P2	3 0 2	9 0 2	
P3	2 1 1	2 2 2	
P4	0 0 2	4 3 3	

Also determine whether following requests can be granted or not:

i) Request for process P2: - 3 0 0 and

ii) Request for process P3: - 0 0 1

P.T.O.

Q3) a) Given memory partitions of 150k, 650k, 280k, 390k and 540k (in order) how would each of the First fit, Best fir, and Worst fit algorithms place processes of 212k, 457k, 112k, 510k and 326k (in order) **[9]**

b) With the help of neat diagrams, Write a short note on Buddy system. **[8]**

OR

Q4) a) Explain Belady's anomaly with suitable example. **[6]**

b) Consider the following segment table: **[6]**

Segment	Base	Length
0	1790	350
1	2722	1050
2	520	925
3	5200	450
4	4200	655

What are the physical addresses for the following logical addresses?

i) 0,330

ii) 2,525

iii) 4,700

iv) 3,400

v) 1,1110

c) What are the distinctions among logical, relative and physical addresses? **[5]**

Q5) a) A disk drive has 200 tracks, numbered 0-199. The drive is currently serving the request at track no 53. The queue of pending requests in FIFO order is 98, 183, 37, 122, 14, 124, 65, 67. Starting from the current head position what is the total distance that disk arm moves to satisfy all the pending requests for the following disk scheduling algorithms. Assume that the head is moving in the increasing order of track number for SCAN and C-LOOK. **[12]**

i) FCFS

ii) SCAN

iii) C-LOOK

iv) SSTF

b) Explain with diagrams different I/O buffering techniques. **[6]**

OR

Q6) a) List and explain different file access methods. **[9]**

b) Describe different methods of record blocking with the help of a neat diagram. **[9]**

Q7) a) What is system software? Explain any four system software in brief? **[6]**

b) Explain imperative statement, declarative statement, and assembly directive of assembly language programming? **[6]**

c) Discuss with example what is forward reference problem. **[5]**

OR

Q8) a) Explain ORIGIN, EQU and LTROG with an example. **[6]**

b) Explain the data structures required for two PASS Assembler in detail. **[6]**

c) Differentiate between literal and immediate operand. **[5]**