C **Reg. No. :** | | | | | | | | | | |

Question Paper Code:53805

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2019

Third Semester

Computer Science and Engineering

15UIT305 OPERATING SYSTEMS

(Common to Information Technology)

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The systems which allows only one process execution at a time, are called CO1- R

   (a) uniprogramming system (b) uniprocessing system

   (c) unitasking systems (d) single system

2. Which one of the following cannot be scheduled by the kernel? CO2- R

   (a) Kernel level thread (b) User level thread

   (c) Process (d) None of the mentioned

3. Swapping requires a _____. CO3 R

   (a) keyboard (b)motherboard (c)monitor (d) backing store

4. _____ is the concept in which a process is copied into main memory from the secondary memory according to the requirement. CO4- R

   (a) Paging (b) Demand paging (c) Segmentation (d) Swapping

5. The _____ program initializes all aspects of the system, from CPU registers to device controllers and the contents of main memory, and then starts the operating system. CO5- R

   (a)main (b)bootloader (c)ROM (d) bootstrap

PART – B (5 x 3= 15Marks)

6. Define operating system. Write its services. CO1- R

7. Compare process and thread. CO2- R

8. Give four necessary conditions for deadlock to occur. CO3- R

9. Sketch the single and two level directory structures. CO4- R

10. With a neat sketch define sector sparing and sector slipping. CO5- R

PART – C (5 x 16= 80Marks)

11. (a) Define co-operating process. With a neat sketch, explain the concept of inter process communications and its communication types. CO1- App (16)

Or

(b) With a neat sketch, explain multiprocessor, distributed, clustered and real time systems. CO1- App (16)

12. (a) Bring out a detailed discussion on the various CPU scheduling algorithms. CO2- App (16)

Or

(b) Define critical section. What are the minimum requirements that should be satisfied by a solution to critical section? Explain Peterson algorithm for 2 process synchronization to critical section problem. CO2- Ana (16)

13. (a) Consider a system with 5 processes (P_0,P_1,P_2,P_3, P_4) and 3 resource types such as 10 instances of A, 5 instances of B, 7 instances of C. Resource-allocation state at time t_0: CO3- Ana (16)

Process	**Allocation**			**Maximum**		
	A	B	C	A	B	C
P_0	0	1	0	7	5	3
P_1	2	0	0	3	2	2
P_2	3	0	2	9	0	2
P_3	2	1	1	2	2	2
P_4	0	0	2	4	3	3

a. Write the Available and Need matrix.

b. Is the system in a deadlocked state? If yes, justify your answer for deadlock. If not, which sequence results in finish[i]== true for all P_i ?

Or

	(b)	When do page faults occur ?Consider the following page-reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults would occur for the following replacement algorithms, assuming one, two, three, four, five, six, or seven frames? Remember that all frames are initially empty, so your first unique pages will all cost one fault each. (i) LRU replacement (ii) FIFO replacement (iii) Optimal replacement.	CO3- Ana	(16)
14.	(a)	Consider the following page reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 How many page faults would occur for the following replacement algorithms? LRU, FIFO and Optimal Assuming three frames that all frames are initially empty. .	CO4- U	(16)
		Or		
	(b)	Compare segmentation and demand paging. With neat sketches, explain the concept of demand paging.	CO4- Ana	(16)
15.	(a)	Consider a typical situation in a multiprocessing environment, in which OS maintains a queue of requests for each I/O device. Assume the disk has 200 cylinders / tracks numbered from 0 to 199 and that the disk request queue has random requests on it. The requested tracks are received in the order 95, 180, 34, 119, 11, 123, 62, 64. The disk head is initially at track 50. Calculate the total head movement to satisfy all the pending requests using FCFS, SSTF, SCAN and LOOK disk scheduling algorithms.	CO5- U	(16)
		Or		
	(b)	With neat sketches, explain the concept of disk management and swap space management.	CO5-U	(16)