

MANIPAL UNIVERSITY

## SCHOOL OF INFORMATION SCIENCES FIRST SEMESTER Master of Engineering - ME (Embedded Systems) **DEGREE MAKE - UP EXAMINATION - JULY 2017** Tuesday, July 11,2017 Time : 10:00 to 13:00

Real Time Operating Systems [ESD 603]

Marks: 100

## Answer all the questions.

1)	Briefly describe the five responsibilities of operating systems.			
2)	Describe system calls namely fork and join. Explain how they are useful in process management.			
3)	Assume that the following five processes arrive at almost the same time, with the length of the CPU burst time given in milliseconds: Process CPU Burst Time P1 10 P2 13 P3 9 P4 7 P5 16 Consider a context switch overhead of 1unit. Determine the average turnaround time and average waiting time with the help of Gantt charts, for the following scheduling algorithms a. FCFS b. SJF	(10)		
4)	<ul> <li>C. RR (quantum=3) (3+3+4)</li> <li>What is meant by a race condition? Explain with the help of an example. Also list and explain the conditions which should be satisfied</li> </ul>	(10) 		
	by any solution to a critical section problem.(2+3+5)			
5)	Write the classical solution for Reader writer critical section problem. <sup>(10)</sup> Clearly indicate the number of semaphores used, their initial values and the purpose of using them.			
6)	Explain the use of DRAG for (i) deadlock prevention (ii) deadlock avoidance. (2x5marks)			
7)	Explain the terms (i) external fragmentation (ii) internal fragmentation (iii) Compaction (iv) Page Fault	(10)		
	(4x2.5marks)			
8)	Explain the basic concept of memory segmentation with a neat block diagram.	(10)		
9)	Given memory partitions of 115K, 500K, 200K, 300K, 150K, and 600K	(10)		

- (in order), how would each of the First-fit, Best-fit and worst fit algorithms place the memory segments of processes of 156K, 120K 212K, 417K, 112K and 226K (in order)? In this case which algorithm makes most efficient use of memory?
- 10) Compute the response times for the following tasks based on (10) deadline rate monotonic algorithm. Can the processes be scheduled? Also draw the Gantt chart for the same. Note:- Higher value indicates

Duration: 180 mins.

higher p	riority.		
	Period T	comp. Time, C	Priority, P
Deadlin	e		
Task1	7	3	3
5			
Task2	12	3	2
6			
Task3	20	5	1
22			