(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2164 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. V) ODD SEMESTER THEORY EXAMINATION 2013-14

OPERATING SYSTEM

Time : 3 Hours *Total Marks : 100*

Note :– (1) Attempt **all** questions. All questions carry equal marks.

(2) Use suitable diagram wherever necessary.

1. Attempt any **four** of the following : **(4×5=20)**

(a) What is an operating system ? Define the components of an operating system.

(b) What is Real Time Operating System ? What is the difference between Hard real time and Soft real time operating system ?

(c) Define the Services provided by the Operating System.

(d) Write down the difference between Multiprocessing and Multiprogramming operating system.

(e) Explain the need of System Protection with the help of examples.

(f) What do you understand by System Call ? Enumerate five system calls used in Process Management.

2. Attempt any **four** of the following : **(4×5=20)**

(a) Define the different states of a process with diagram. Explain the need of process suspension.

(b) State and describe the Producer – Consumer problem with its suitable solution.

(c) List the essential requirements of Critical Section Implementation.

(d) Define Message passing and Shared memory inter-process communication.

(e) Differentiate between User thread and Kernel thread. What is thread cancellation ?

(f) Define Semaphore with suitable examples.

3. Attempt any **two** of the following : **(2×10=20)**

(a) Consider the set of the processes given in the table and the following scheduling algorithms :

(i) Round Robin (Quantum = 1)

(ii) Round Robin (Quantum = 2)

(iii) Shortest Remaining Job First

Process Id	Arrival Time	Execution Time
A	0	4
B	2	7
C	3	3
D	3.5	3
E	4	5

If there is tie within the processes, the tie is broken in the favour of the oldest process. Draw the Gantt chart and find the Average Waiting Time, Response time and Turn-around time for the algorithms. Comment on your result. Which one is better and why ?

(b) Describe the Banker's algorithm for Safe allocation. Consider a system with five processes and three resource types and at time T_0 the following snapshot of the system has been taken :

	Allocated			Maximum			Available		
Process Id	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	1	1	2	4	3	3	3	1	0
P2	2	1	2	3	2	2			
P3	4	0	1	9	0	2			
P4	0	2	0	7	5	3			
P5	1	1	2	11	2	3			

(i) Determine the total amount of resources of each type.

(ii) Compute the need matrix.

(iii) Determine if the state is safe or not using Banker's algorithm.

(iv) Would the following request be granted in the current state ?

(a) P1 <3, 3, 1>

(b) P2 <2, 1, 0>

(c) (i) What are the necessary conditions to hold a deadlock in a system ?

(ii) What are the approaches that can be used for Prevention of deadlock ?

4. Attempt any **two** of the following : **(2×10=20)**

(a) (i) Consider a logical address space of eight pages of 1024 words, each mapped onto a physical memory of 32 frames then :

(a) How many bits are in logical address ?

(b) How many bits are in physical address ?

(ii) Explain the difference between internal and external fragmentation.

(b) Consider the following reference string 12 3 4 2 1 5 6 2 1 2 3 7 6 3 2 1 2 3 6. How many page faults will occur for :

(i) First in First out

(ii) L R U page replacement algorithm ?

Assuming three and four frames (initially empty) in each case.

(c) (i) What is Thrashing ? State the cause of thrashing and discuss its solution.

(ii) Write the difference between paging and segmentation.

5. Attempt any **two** of the following : **(2×10=20)**

(a) Suppose the moving head disk with 200 tracks is currently serving a request for track 143 and has just finished a request for track 125. If the queue of request is kept in FIFO Order 86 147 91 177 94 150. What is total head movement for the following scheduling :

(i) FCFS

(ii) SSTF

(iii) C-Scan ?

(b) What is a Directory ? Define any two ways to implement the directory.

(c) Write short notes on :

(i) I/O Buffering

(ii) Sequential file

(iii) Indexed file.