Roll No.:

MIT School of Engineering, Pune
Term Assessment: 2 (2020-21)

Branch Code: BTIS   **Class: T. Y. B. Tech**   **Semester: V**
Branch: Computer Science and Engineering
Subject Code: 18BTIS502/18BTCS502: System Programming and Operating Systems

Date   : 07-12-2020   Max. Marks: 20
Time   : 10:30 am to 11:30 am

Instructions
1. Attempt the Que 1 OR Que 2 and Que 3 OR Que 4.
2. Neat diagrams must be drawn, wherever necessary.
3. Use of logarithmic tables, slide rule, Mollier chart, electronic scientific calculator and steam tables are allowed.
4. Figures to right indicate the marks allotted to the questions.

Q1.   Attempt the following questions: **5 M**

   a) Explain the following points with respect to threads and processes:
       1.   What is a thread? Explain difference between process and threads.
       2.   Draw process state diagram stating the transition between various process states.

   a. How OS processing is benefit with the process pre-emption in OS? For the table given   **5 M**
       below; draw the Gantt chart illustrating the process execution based on the round robin
       with a time quantum of 4. Solve it for calculating the average waiting time and average
       turnaround time.

Data for RR with time quantum 4		
	Arrival time	Burst time
A	0	8
B	3	6
C	5	7
D	8	4
E	10	5

OR

Q2.   a) Present producer-consumer problem. Explain how to solve it.   **4 M**

   b) Find out the safe sequence for the execution of the following processes using Banker's   **6 M**
       algorithm. Maximum resources R_1 = 13, R_2 = 7, R_3 = 10 units

Allocation Matrix			
	R_1	R_2	R_3
P_1	2	1	1
P_2	7	2	3
P_3	3	2	2
P_4	1	1	3

Maximum Required			
	R_1	R_2	R_3
P_1	4	3	3
P_2	7	2	4
P_3	4	2	5
P_4	5	3	3

Q3. a) Organize given page reference string with 3 frames for FIFO and LRU. Calculate number **6 M** of page faults and page hits.

A, B, C, D, E, C, D, A, F, G, H, G, H, I, E, D

b) Which memory partitioning method results in external fragmentation? Explain allocation **4 M** strategies – first fit and next fit to reduce the fragmentation.

OR

Q4. Attempt the following questions **4 M**

a. What is TLB? Explain the model of paging system making use of TLB operations.

b. Consider the reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 2, 1, 2, 0, 1, 7, 0, 1 for a memory with **6 M** four frames. Trace optimal, and LRU page replacement algorithms

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