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Roll No.

333554(33)

B. E. (Fifth Semester) Examination, April-May 2021

(New Scheme)

(IT Branch)

OPERATING SYSTEM

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) from each question is compulsory. Attempt any two parts from parts (b), (c) and (d) of each question.

Unit-I

1. (a) What is system call?

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- (b) What is real time operating system? Explain with their application, advantages and disadvantage. 7
- (c) What is the Kernel? Explain with their typical mechanism supported by O.S. 7
- (d) Write short notes on : 7
- (i) Batch operating system
 - (ii) Throughput of a system

Unit-II

2. (a) How the program is different from process or both are the same? Justify your answer. 2
- (b) Explain fundamental state transition for process and events pertaining to a process. 4+3
- (c) What is critical section and how it can help to solve the producer/consumer problem. 7
- (d) If the different jobs and their arrival time and burst time is given below find avg. waiting time using FCFS and Preemptive SJF. 7

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Process	Arrival time	Burst time
P ₁	0	8
P ₂	1	4
P ₃	2	9
P ₄	3	5

Unit-III

3. (a) Give the methods for handling deadlock. 2
- (b) Consider the following current allocation : 7

Process	Allocation			Max			Available		
	R ₁	R ₂	R ₃	R ₁	R ₂	R ₃	R ₁	R ₂	R ₃
P ₁	2	2	3	3	6	8	7	7	10
P ₂	2	0	3	4	3	3			
P ₃	1	2	4	3	4	4			

- (i) Is the current allocation state safe?
- (ii) Would the following request be granted in the current state?
- (a) Process P₁ request (1, 1, 0)
 - (b) Process P₂ request (0, 1, 0)

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- (c) What is deadlock and how we can recover from deadlock? 7
- (d) Explain resource allocation graph algorithm and how to avoid deadlock by them. 7

Unit-IV

4. (a) Define logical Vs physical address space with example. 2
- (b) What is segmentation? Explain virtual to physical address mapping in segmented system with the help of diagram. 2+5
- (c) Assume that the main memory has the following 5 fixed partitions with the following size : 100 kB, 500 kB, 200 kB, 300 kB and 600 kB (in order). 3+3+1
- (i) How would each of the first fit, best fit and worst fit algorithms place processes of 212 kB, 417 kB, 112 kB and 426 kB (in order)?
- (ii) Compute the total memory size that is not used for each algorithm.
- (iii) Which algorithm makes the efficient use of the memory?

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- (d) In reference string 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5. How many page faults occur using 3 frames for FIFO, optimal and LRU page replacement algorithm. $2\frac{1}{2}+2\frac{1}{2}+2=7$

Unit-V

5. (a) What are different attributes of file available? 2
- (b) Explain file organization and its access mechanism. $2\frac{1}{2}+2\frac{1}{2}+2=7$
- (c) Suppose that a disk drive has 181 cylinders, numbered 0 to 180. The drive is currently serving a request at cylinder 60 and previous request was at cylinder 50. The queue of pending requests in FIFO order is 87, 170, 40, 150, 36, 72, 66, 15. Starting from the head position, what is the average head movement and what is the total no of head movement needed to satisfy these requests for the following disk scheduling algorithm. 7
- (i) FCFS
- (ii) SSTF
- (iii) SCAN

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(d) Write short notes on : $3\frac{1}{2}+3\frac{1}{2}$

(i) Disk directory

(ii) Virtual machine operating system