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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, Master of Computer Applications (MCA)

Semester End Examination; October - 2022

Operating Systems

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:
CO1: Define operating system calls utilities services and structures.
CO2: Explain process concepts, communication and evaluate various CPU scheduling algorithm problems.
CO3: Understand process synchronization and identify methods for handling deadlocks.
CO4: Analyze and Explain different memory management techniques.
CO5:Explainhow files are organized,manipulated data on disk is organized scheduled&LINUX Operating system.

Note: I) *Answer any* ***FIVE*** *full questions, selecting* ***ONE*** *full question from each unit.*
II) *Any* ***THREE*** *units will have internal choice and remaining* ***TWO*** *unit questions are compulsory.*
III) *Each unit carries 20 marks.*

Q. No.	Questions	Marks	BLs	COs	POs
	UNIT - I	**20**			
1 a.	Summarize the activities connected with process management and memory management.	10	L2	CO1	PO2,3,7
b.	Define system call. Mention the categories of system calls.	10	L1	CO1	PO2,3,7
	OR				
1 d.	Classify operating system services which are helpful to the user and operation of the system.	10	L4	CO1	PO2,3,7
e.	Demonstrate with figure, storage device hierarchy according to speed and cost.	10	L2	CO1	PO2,3,7
	UNIT - II	**20**			
2 a.	Explain inter process communication.	10	L2	CO2	PO2,3,9
b.	Compare different types of multithreading models. Write any four challenges in programming for multicore systems.	10	L4	CO2	PO2,3,9
	OR				
2 d.	Construct a Gantt chart for SJF and Round Robin with time Quantum =15 ms for the following set of process with CPU burst time in milliseconds.				

Process	Burst time
P_0	80
P_1	20
P_2	45
P_3	15
P_4	30

Calculate average waiting time and turnaround time for the same. 10 L5 CO2 PO2,3,9

e. With figure Explain different states of a process 10 L4 CO2 PO2,3,9

UNIT - III **20**

3 a. What is semaphore? Discuss the three requirements for solution to critical section problem. 10 L6 CO3 PO1,2,3,8

b. Using the following snapshot of a system answer the questions using bankers and safety algorithm. 10 L5 CO3 PO1,2,3,8

i) What is the content of need matrix?

ii) Is the system in safe state?

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	7	5	3	3	3	2
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			

UNIT - IV **20**

4 a. With neat sketch, explain paging hardware. 10 L6 CO4 PO1,2,3

b. 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

Assume there are three frames initially empty. How many page fault occurs in the case; 10 L5 CO4 PO1,2,3

i) FIFO

ii) Optimal

iii) LRU algorithms

UNIT - V **20**

5 a. Discuss two level and tree-structured directories. 10 L4 CO5 PO1,2,5,7

b. Explain different file attributes and various operations on a file. 10 L2 CO5 PO1,2,5,7

OR

5 d. Discuss components of Linux system with figure. 10 L6 CO5 PO1,2,5,7

e. Explain contiguous allocation and linked allocation methods. 10 L1 CO5 PO1,2,5,7

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