

CBCS SCHEME

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20MCA12

First Semester MCA Degree Examination, Feb./Mar. 2022 Operating System with UNIX

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- a. What is an operating system? Explain the dual mode operation of operating system with a neat diagram. (10 Marks)
b. Explain the operating system services with a neat diagram. (10 Marks)

OR

- a. Define a System Call. Explain the types of system calls. (10 Marks)
b. Consider the following processes, which have arrived at the ready queue with the burst and the arrival time given in milliseconds as shown below. Draw the Gantt chart and calculate the average waiting time using the following scheduling algorithms.
(i) FCFS (ii) SJF (Preemptive) (iii) RR (Q = 4)

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

(10 Marks)

Module-2

- a. What is a deadlock? What are the necessary conditions for a deadlock to occur? (10 Marks)
b. Consider the following snapshot of a system :

	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			

Answer the following questions using Bankers Algorithm.

- (i) Construct the need matrix.
(ii) Is the system in a safe state? If yes, what is the safe sequence?
(iii) If process P₁ makes a request (1, 0, 2), can the request be granted? (10 Marks)

OR

- a. What is segmentation? With a neat diagram explain the segmentation hardware. (10 Marks)
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

How many page faults would occur in case of

- (i) FIFO (ii) Optimal (iii) LRU algorithms

Assuming 3 frames. Note initially all frames are empty.

(10 Marks)

Module-3

- 5 a. Explain the different modes of a vi editor with a neat diagram. (10 Marks)
 b. What is a file? Explain the *ls -l* in detail. (10 Marks)

OR

- 6 a. What is an inode? Explain hard links and symbolic links. (10 Marks)
 b. Write a note on :
 (i) Escaping and quoting
 (ii) find command
 (iii) Command substitution. (10 Marks)

Module-4

- 7 a. What is a process? Explain the 2 important attributes of a process. Also explain internal, external commands and shell scripts. (10 Marks)
 b. Explain the following commands:
 (i) set - - (ii) expr (iii) shift (10 Marks)

OR

- 8 a. Explain how file-related test are performed. (10 Marks)
 b. Create a script file called file_properties that reads a file name entered and outputs its properties. (10 Marks)

Module-5

- 9 a. What is awk filtering? What are associative and environment arrays in awk? Also how are these arrays different from the ones used in other programming languages? (12 Marks)
 b. Write an awk script to find out total number of books sold in each discipline as well as total books sold using associative array.

MCA	115
CS	22
Civil	24
MCA	25
CS	28

(08 Marks)

OR

- 10 a. What is conditional parameter substitution? Also explain the exec statement. (10 Marks)
 b. Write an awk script to compute gross salary of an employee according to the rule given below.
 If basic salary < 10000 then HRA = 15% of basic and DA = 45% of basic.
 If basic salary is >= 1000 then HRA = 20% of basic and DA = 50% of basic. (10 Marks)
