

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086
(For candidates admitted from the academic year 2023 – 2024 & thereafter)

B.C.A. DEGREE EXAMINATION – APRIL 2026
FOURTH SEMESTER

COURSE : MAJOR CORE
PAPER : OPERATING SYSTEMS
SUBJECT CODE : 23CS/MC/OS45
TIME : 3 HOURS

MAX. MARKS: 100

Q. No.	SECTION A Answer all the questions (20 x 1 = 20)	CO	KL
1 (i)	The program that manages computer hardware and software resources is called the _____.	CO1	K1
(ii)	The program loaded during system startup to initialize hardware is called the _____ program.	CO1	K1
(iii)	The structure that stores process information such as state, program counter and registers is the _____.	CO1	K1
(iv)	The algorithm proposed for two-process synchronization using shared variables is called _____ solution.	CO1	K1
(v)	The scheduling algorithm that allocates CPU to processes in equal time intervals is _____ scheduling.	CO1	K1
(vi)	The circular waiting condition among processes leads to a situation called _____.	CO1	K1
(vii)	In paging, physical memory is divided into fixed size blocks called _____.	CO1	K1
(viii)	A situation where a referenced page is not present in main memory is called a _____.	CO1	K1
(ix)	The disk organization technique that improves reliability using multiple disks is called _____.	CO1	K1
(x)	The structure used to organize and store files in a hierarchical manner is called a _____.	CO1	K1
2. (i)	The operating system acts as an interface between user programs and _____. a) Application software b) Computer hardware c) Network devices d) Database system	CO2	K2
(ii)	System calls enable application programs to request services from the _____. a) Compiler b) Operating system kernel c) Assembler d) Linker	CO2	K2
(iii)	Multiple processes exchanging data during execution demonstrate the concept of _____. a) Interprocess communication b) Memory segmentation c) Disk scheduling d) Virtual memory	CO2	K2

5	a. Analyse the causes of deadlock by examining the four necessary conditions with suitable illustrations. (OR)	CO4	K4
	b. Analyse the difference between contiguous memory allocation and paging techniques.	CO4	K4
6	a. Analyse the performance of FCFS scheduling algorithm with respect to waiting time and turnaround time using an example. (OR)	CO4	K4
	b. Analyse the advantages and limitations of contiguous memory allocation and indexed file allocation methods.	CO4	K4
Q. No.	SECTION C Answer all the questions (5 x 12 = 60)	CO	KL
7	a. Recall and explain the structure of an operating system and the roles of kernel, system programs and user programs. (OR)	CO1	K1
	b. Recall and explain the concept of inter-process communication and describe message passing and shared memory models.	CO1	K1
8	a. Explain CPU scheduling criteria with examples. (OR)	CO2	K2
	b. Describe preemptive vs non-preemptive scheduling with examples.	CO2	K2
9	a. Apply Banker's algorithm in a scenario and explain deadlock avoidance. (OR)	CO3	K3
	b. Apply deadlock detection and recovery methods to a sample case.	CO3	K3
10	a. Analyse the role of monitors in process synchronization and examine how they ensure mutual exclusion. (OR)	CO4	K4
	b) Explain the working of demand paging and the role of copy-on-write in virtual memory management.	CO4	K4
11	a. Evaluate different directory structures used in file systems and justify their advantages and limitations. (OR)	CO5	K5
	b. Evaluate RAID levels and justify their advantages.	CO5	K5
