TOTAL PAGES : 2

23DAU314N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Third Semester)

Branch - **COMPUTER SCIENCE WITH DATA ANALYTICS**

OPERATING SYSTEMS

Time: Three Hours Maximum: 75 Marks

SECTION - A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which component acts as an interface between user and hardware? (a) Compiler (b) Operating System (c) Loader (d) Linker	K1	CO1
	2	Identify which system call in operating systems is responsible for creating a new process. (a) fork() (b) exec() (c) wait() (d) kill()	K2	CO1
2	3	In process scheduling, turnaround time is defined as: (a) Waiting time + Burst time (b) Arrival time – Exit time (c) Completion time – Arrival time (d) Burst time – Waiting time	K1	CO2
	4	Classify the IPC mechanism that uses a shared buffer for data exchange between processes. (a) Message Passing (b) Shared Memory (c) Signals (d) Sockets Process	K2	CO2
3	5	Recall for which Circular wait is a necessary condition (a) Swapping (b) Paging (c) Deadlock (d) Scheduling	K1	CO3
	6	Interpret the condition under which a system is said to be in a safe state. (a) Deadlock has occurred (b) The system can allocate resources without deadlock (c) All processes are terminated (d) Only one process is in the system	K2	CO3
4	7	Which memory allocation suffers from external fragmentation? (a) Paging (b) Segmentation (c) Contiguous allocation (d) Virtual memory	K1	CO4
	8	Explain why thrashing occurs in an operating system. (a) CPU utilization is high (b) Too many processes are waiting in the ready queue (c) Processes spend more time in paging than execution (d) There is no deadlock	K2	CO4
5	9	Which of the following is a directory implementation method? (a) Contiguous (b) Linear List (c) Paging (d) Segmentation	K1	CO5
	10	Distinguish the I/O technique that requires CPU intervention for every data transfer. (a) Programmed I/O (b) DMA (c) Interrupt Driven I/O (d) Spooling	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Categorize the different types of operating system structures with suitable examples.	K4	CO1
		(OR)		
	11.b.	Analyze system calls and explain how they differ from system programs with examples.		
2	12.a.	Classify the process control block and illustrate its components with a neat diagram.	K4	CO2
		(OR)		
	12.b.	Examine the message-passing IPC mechanism with an example and analyze its role in interprocess communication.		
3	13.a.	Explain the various deadlock prevention techniques with examples, highlighting their strengths and limitations.	K5	CO3
		(OR)		
	13.b.	Determine different deadlock recovery techniques and assess their effectiveness in system stability.		
4	14.a.	Evaluate contiguous memory allocation methods with the help of diagrams and judge their efficiency.	K5	CO4
		(OR)		
	14.b.	Explain the concept of virtual memory and justify how it supports efficient execution in modern operating systems.		
5	15.a.	Design and create a comparative study of different directory structures in file systems, highlighting their advantages and disadvantages.	K6	CO5
		(OR)		
	15.b.	Design a structured note on the kernel I/O subsystem and its functions, integrating suitable examples		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Analyze in detail the services provided by an operating system and examine the role of linkers and loaders in program execution.	K4	CO1
2	17	Analyze process scheduling in detail and compare FCFS, SJF, Priority, and Round Robin algorithms with suitable examples.	K4	CO2
3	18	Examine deadlock avoidance using Banker's Algorithm with a step-by-step worked example.	K5	CO3
4	19	Evaluate the concepts of paging and page replacement algorithms with explanatory notes and examples.	K5	CO4
5	20	Design a detailed explanation of file system structure and implementation, integrating allocation methods and free-space management techniques.	K6	CO5

Z-Z-Z END