Reg. No. | | | | | | | | | | | | |

Question Paper Code : JK4207

M.C.A. DEGREE EXAMINATION, FEBRUARY/MARCH 2017.

(From Academic year –2015– New question paper pattern)

Second Semester

DMC 7202 – OPERATING SYSTEM

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the role of operating system in computers?

2. Define thread. State the differences between thread and process.

3. What are critical regions?

4. Define throughput and turnaround time in the context of processor scheduling.

5. What is a segment and what is the role of segment tables?

6. What is thrashing?

7. Define boot block and bad blocks in disk.

8. What are access control lists?

9. What is the role of kernel in Linux operating system?

10. Name any four inter process communication mechanisms in Linux.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the types of system calls and categories of system programs with suitable examples. (13)

Or

(b) Describe process scheduling and explain the various operations on processes. (13)

12. (a) Explain any five CPU scheduling algorithms with examples. (13)

Or

(b) Explain the methods for handling deadlocks. (13)

13. (a) Explain the concept of paging with an example and the necessary hardware support for paging. (13)

Or

(b) Discuss the need for page replacement and explain the page replacement algorithms. (13)

14. (a) Explain the three major file allocation methods. (13)

Or

(b) Explain the disk scheduling algorithms and describe the criteria for selection of a disk scheduling algorithm. (13)

15. (a) Explain process management in Linux system. (13)

Or

(b) Explain the file system in Windows 7 operating system. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Compare the design principles of Linux and Windows 7 operating systems. (15)

Or

(b) Explain the classic problems of synchronization and discuss their solutions. (15)

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Question Paper Code : KJ1358

M.C.A. DEGREE EXAMINATION, FEBRUARY/MARCH 2017.

Second Semester

DMC 7202 — OPERATING SYSTEM

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the purpose of system calls, and how does system call relate to the OS.

2. Differentiate between Time-sharing systems and Multi programmed Batch systems.

3. List four characteristics of a suspended process.

4. Differentiate between User-level Threads and Kernel-level Threads.

5. What are the advantages of dynamic linking of libraries compared to static linking?

6. What is semaphore?

7. What is inverted page table? Why it is needed?

8. What are the functions of logical file system?

9. What should a fault handler do if the system runs of out of pages?

10. Differentiate Windows 7 and Linux OS.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the advantages of a microkernel design with a monolithic design. (8)

(ii) Discuss the characteristics of Modern Operating Systems. (8)

Or

(b) (i) Discuss the various issues involved in Real Time Systems. (8)

(ii) What are the differences between Single Threaded and Multithreaded Process Models? Under what circumstances is one type better than the other? (8)

12. (a) Consider the following snapshot of a system. Using Banker's algorithm solves the following :

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P1	0	1	4	0	0	1	5	2	1	4	2	1
P2	1	0	0	1	3	4	2	1				
P3	1	3	5	2	4	5	1	3				
P4	0	2	3	3	4	5	2	4				
P5	0	0	2	1	5	4	1	1				

(i) What is the content of need matrix? Is the system is in safe state? If the system is safe, show how all the process could complete their execution successfully. If the system is unsafe, show how deadlock might occur. Explain your answers. (8)

(ii) If a request (0, 2, 1, 1) from process P1 arrives, can the request be granted? Explain. (8)

Or

(b) (i) Consider a system with three smoker processes and one agent process. Each smoker continuously rolls a cigarette and then smokes it. But to roll and smoke a cigarette, the smoker needs three ingredients: tobacco, paper, and matches. One of the smoker processes has paper, and another has tobacco, and the third has matches. The agent has an infinite supply of all three materials. The agent places two of the ingredients on the table. The smoker who has the remaining ingredient then makes and smokes a cigarette, signaling the agent completion. The agent then puts out another two of the three ingredients and the cycle repeats. Write a program to synchronize the agent and the smokers. (10)

(ii) Prove that the safety algorithm requires an order of m X n^2 operations. (6)

13. (a) (i) Explain the most common techniques for structuring the Page Table. (8)

(ii) Why segmentation and paging are sometimes combined into one scheme? (8)

Or

(b) Consider the following page reference string : 1, 2, 3, 4, 2, 6, 5, 1, 2, 3, 2, 7, 3, 6, 1, 5, 2, 3, 2. Calculate the number of page faults that would occur for the following page replacement algorithm with frame size of 3 and 4. (i) LRU (ii) Optimal. (16)

14. (a) Suppose a disk drive has 10000 cylinders, numbered from 0 to 9999, the drive is currently serving a request at cylinder 1142, and the previous request was at cylinder 1125. The queue of pending requests in FIFO order is 185, 4169, 3912, 2773, 4947, 5508, 8021, 4749 and 9129. What is the total distance that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling algorithms? (16)

(i) SSTF (ii) SCAN (iii) FCFS (iv) LOOK.

Or

(b) (i) Explain the linked and indexed file allocation schemes and discuss the advantages and disadvantages of these schemes. (10)

(ii) Discuss the layered architecture of file system. (6)

15. (a) (i) Discuss the purpose of a prototype page-table entry in Windows OS. (8)

(ii) Discuss the various security issues in Linux OS. (8)

Or

(b) (i) Explain the components of Linux OS. (8)

(ii) Discuss the distributed-processing mechanisms in Windows OS. (8)

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Question Paper Code : K1358

M.C.A. DEGREE EXAMINATION, AUGUST/SEPTEMBER 2016.

Second Semester

DMC 7202 — OPERATING SYSTEM

(Regulations 2013)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why is virtual memory support needed in multi-programmed operating system?

2. Differentiate between independent processes and cooperating processes.

3. What do you mean by race condition?

4. What is the difference between deadlock prevention and avoidance?

5. Calculate the number of bits in the logical and physical address for a system with logical address space of 8 pages of 1024 words each, mapped onto a physical memory of 32 frames.

6. What do you mean by thrashing?

7. What are the criteria for the selection of disk scheduling algorithms?

8. What are the functions of basic file system?

9. Mention the features of NTFS.

10. Write the main components of a Linux system.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Illustrate the various categories of system calls in details. (8)

(ii) Explain the various services provided by operating system. (8)

Or

(b) (i) What is meant by process scheduling? Explain the various type of process scheduling with suitable example. (8)

(ii) Discuss the various issues involved in inter process communications. (8)

12. (a) Assume the following processes arrives for execution at the time indicated and also mention with length of the CPU burst lime given in milliseconds.

Job	Burst time (ms)	Priority	Arrival time (ms)
P1	4	2	0
P2	4	1	1
P3	5	1	1
P4	2	3	2
P5	1	4	2

(i) Give a Gantt chart illustrating the execution of these processes using SJP (preemptive and non preemptive) and priority (preemptive and non preemptive) scheduling.. (8)

(ii) Calculate the average waiting time and average turn around time for each of the above scheduling algorithms. (8)

Or

(b) (i) Write a monitor which solves Dinning-Philosophers problem. (8)

(ii) Explain banker's algorithm for deadlock detection and avoidance. (8)

13. (a) (i) Given memory partitions of 100K, 500K, 200K and 600K (in order) how would each of the First-fit, Best-fit and Worst-fit algorithms place processes of 212K, 417K, 112K and 426K (in order) which algorithm makes the most efficient use of memory? (8)

(ii) Elucidate how paging can be achieved with TLB. (8)

Or

(b) Consider the following page reference string 7, 3, 1, 2, 6, 5, 1, 2, 3, 2, 7, 3, 6, 1, 5, 2, 3, 2, 6. Calculate the number of page faults that would occur for the following page replacement algorithm with frame size of 4 and 5.

(i) LRU (ii) Optimal (16)

14. (a) (i) Explain sequential and direct file access methods with suitable example. (8)

(ii) List the three major methods for disk block allocation. Briefly explain them with example. (8)

Or

(b) (i) Describe the various methods used for free space management. (8)

(ii) Explain the international principles against damaging of computer evidence. (8)

15. (a) (i) How is process management done in Linux OS? Explain. (8)

(ii) What are the security mechanisms available in Linux OS? Explain. (8)

Or

(b) (i) Explicate the various system components of Windows 7 OS. (8)

(ii) How memory is implemented in Windows 7 OS? Explain. (8)

Reg. No. | | | | | | | | | | | | |

Question Paper Code : J1397

M.C.A. DEGREE EXAMINATION, AUGUST/SEPTEMBER 2016.

(From Academic Year – 2015 – New Question Paper Pattern)

Second Semester

DMC 7202 – OPERATING SYSTEM

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How is DMA useful?

2. List the differences between blocking and non-blocking methods to message passing.

3. What is meaning of the term "busy wait"?

4. Give the examples of deadlock that are not related to a computer system environment.

5. What are the differences between internal and external fragmentation?

6. Compare lazy swapper with a pager.

7. What is relative path name? Give an example.

8. What is CAV?

9. What are autoprobes?

10. What does it mean to cascade windows?

PART B — (5 × 13 = 65 marks)

11. (a) Explain in brief about the goals of an operating system. (13)

Or

(b) Write the various threading issues related to multithreades programs. (13)

12. (a) What is a critical section problem? Explain the algorithms related to two process solutions. (13)

Or

(b) What are semaphores? Explain in detail about their usage and implementation. (13)

13. (a) Explain the various issued related to contiguous memory allocation. (13)

Or

(b) Explain the working of the following page replacement methods :

(i) Optimal page replacement (6)

(ii) LRU approximately page replacement. (7)

14. (a) Discuss in brief about the various aspects of file sharing. (13)

Or

(b) Explain the working of any three disk scheduling algorithms with examples. (13)

15. (a) Explain about the memory management in LINUX operating system with a neat diagram. (13)

Or

(b) Explain about the file system and networking support in WINDOWS 7 OS. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Compare the performance of C-SCAN scheduling, assuming an uniform distribution of requests, considering the average response time, variation in response time and the effective bandwidth. Explain how will the performance depend on the relative sizes of seek time and rotational latency.

Or

(b) Consider a scenario wherein a paging algorithm that requires a reference bit is to be designed but the hardware does not support it. Illustrate how to simulate the reference bit and calculate the cost involved in this.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : S1358

M.C.A. DEGREE EXAMINATION, FEBRUARY/MARCH 2016.

Second Semester

DMC 7202 — OPERATING SYSTEM

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List any five services provided by an operating system.

2. Write short notes on process control block.

3. What are the key issues with scheduling for shared-memory multiprocessor?

4. What is a context switch?

5. Why are page sizes always powers of 2?

6. Explain the difference between internal and external fragmentation.

7. What is a file? List few file operations.

8. What is paging? What is the difference between a page and a frame?

9. Give the various disk scheduling methods.

10. Discuss any four Linux commands.

PART B — (5 × 16 = 80 marks)

11. (a) What is the purpose of system calls? Explain its five major categories. (16)

Or

(b) (i) What is a process? Explain various operations on processes. (10)

(ii) Write a short notes on Inter process communication. (6)

12. (a) Consider the following set of processes arrive at 0 milliseconds, with the length of the CPU-burst time given in milliseconds. (16)

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The smaller priority number implies a higher priority

Draw Gantt charts illustrating the execution of the processes using

(i) FCFS scheduling

(ii) SJF scheduling

(iii) Priority scheduling.

What is the average turn around time for each of the scheduling algorithms?

Or

(b) What is meant by a deadlock? What are the necessary conditions for a deadlock? Explain how dead lock is modeled using resource allocation graph. (16)

13. (a) Explain paging technique in detail with neat diagram. (16)

Or

(b) Consider the following page reference string: (16)

{1, 2, 3, 4, 2, 1, 5, 6, 2, 4, 1, 2, 3, 2, 3 ,7, 4, 6, 3, 2, 1,2, 3, 6, 7}

How many page faults would occur for the following replacement algorithms, assuring there are three frames? All frames are initially empty.

(i) LRU replacement

(ii) FIFO replacement

(iii) Optimal replacement.

14. (a) (i) Discuss the structure and the operations implemented on directory. (10)

(ii) Explain various file access methods. (6)

Or

(b) Explain the free space memory management with neat diagram. (16)

15. (a) Discuss the features of windows operating system. (16)

Or

(b) Explain the process management of Linux operating system. (16)

Reg. No. : [ ]

Question Paper Code : 80358

M.C.A. DEGREE EXAMINATION, AUGUST 2015.

Second Semester

DMC 7202 — OPERATING SYSTEM

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by dual-mode operation of operating system?

2. Define context switch.

3. List various criteria for comparing CPU scheduling algorithms.

4. What is meant by monitor?

5. Mention the solutions for fragmentation.

6. Define demand paging.

7. Give an example for graph directory structure.

8. What is the purpose of swap space management?

9. List the features of Linux file system.

10. How is networking supported in Windows 7 operating system?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain various models of distributed systems in detail. (8)

(ii) Explain various process scheduling algorithms with appropriate examples. (8)

Or

(b) (i) Explain how various processes communicate in client-server systems. (8)

(ii) Explain the issues to be considered with multi-threaded programs. (8)

12. (a) Consider the following set of processes with the length of CPU burst given in milliseconds.

Process	Burst Time (ms)	Priority	Arrival Time (ms)
P1	10	3	0
P2	1	1	1
P3	2	4	1
P4	1	5	2
P5	5	2	2

Draw Gantt charts to illustrate the execution of these processes using FCFS, SJF, non-preemptive priority and RR (quantum = 1) scheduling algorithms. (16)

Or

(b) (i) Explain how semaphores support synchronization. (8)

(ii) Explain Banker's algorithm for deadlock avoidance. (8)

13. (a) (i) Given five memory partitions 50K, 200K, 70K, 115K and 15K (in order), how would best-fit algorithm place processes of 100K, 10K, 35K, 15K, 23K and 6K (in order)? (8)

(ii) Explain segmentation with paging in detail. (8)

Or

(b) Consider the page reference 7, 0, 4, 2, 0, 3, 0, 4, 1, 3, 0, 3, 0, 1, 2, 1, 2, 0, 1, 7, 0, 4 for a memory with three frames. How many page faults occur for the following page replacement algorithms?

(i) First In First Out. (5)

(ii) Optimal Page Replacement. (5)

(iii) Least Recently used page replacement. (6)

14. (a) (i) Explain various file access methods with suitable examples. (8)

(ii) Explain various methods of allocating disk space. (8)

Or

(b) (i) Describe various methods for free space management. (8)

(ii) Explain any two disk scheduling algorithms with suitable examples. (8)

15. (a) (i) Explain various kernel modules of Linux system. (8)

(ii) Explain how memory management is performed in Linux system. (8)

Or

(b) (i) Explain various system components of Windows 7 operating system. (8)

(ii) Explain the file system of Windows 7 operating system. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 22360

M.C.A. DEGREE EXAMINATION, FEBRUARY/MARCH 2015.

Second Semester

DMC 7202 — OPERATING SYSTEM

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate microkernel based approach and layered approach to system design.

2. What is meant by many-to-one multithreading model? Give an example.

3. How is queuing analysis useful in comparing scheduling algorithms?

4. Briefly explain how critical section is solved in multiprocessor environment using hardware.

5. How is context switch time during swapping affected by the size of the processes?

6. What is the relationship between working set and page fault rates?

7. How are files organized in acyclic graph directory structure?

8. What are the criteria for the selection of disk scheduling algorithms?

9. Which scheduling is used in Linux operating system?

10. Mention the features of NTFS.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain various categories of system calls in detail. (8)

(ii) Explain the various services provided by operating system. (8)

Or

(b) (i) What is meant by process scheduling? Explain various types of process scheduling with suitable examples. (8)

(ii) Explain the various strategies for communication in client server systems. (8)

12. (a) (i) Consider the processes P1, P2, P3, P4 and P5 which arrive in the same order. Their burst time and priority are as given below :

Process	Burst Time	Priority
P1	12	3
P2	2	1
P3	5	4
P4	2	5
P5	6	2

Draw the Gantt chart for these processes using FCFS, SJF, Priority scheduling algorithms. Also calculate the average turn around time and waiting time for each. (12)

(ii) How is scheduling done in real time operating systems? Explain. (4)

Or

(b) (i) Write a monitor which solves Dining-Philosophers problem. (6)

(ii) Explain Bankers algorithm for deadlock avoidance. (10)

13. (a) (i) Explain various contiguous memory allocation strategies in detail. (8)

(ii) Explain segmentation with paging memory management scheme. (8)

Or

(b) (i) Describe demand paging concepts in detail. (10)

(ii) Consider the following reference string with 4 frames :

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0

How many page faults occur if FIFO algorithm is used? (6)

14. (a) (i) Explain sequential and direct file access methods with suitable examples. (8)

(ii) List the three major methods for disk block allocation. Briefly explain them with examples. (8)

Or

(b) (i) Describe the various methods used for free space management. (8)

(ii) Explain disk management in detail. (8)

15. (a) (i) How is process management done in Linux operating system? Explain. (8)

(ii) What are the security mechanisms available in Linux operating system? Explain. (8)

Or

(b) (i) Explain various system components of Windows 7 operating system. (10)

(ii) How is networking supported by Windows 7 operating system? Explain. (6)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 46357

M.C.A. DEGREE EXAMINATION, AUGUST 2014.

Second Semester

DMC 7202 — OPERATING SYSTEM

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What will happen if the long-term scheduler selects CPU bound processes?

2. Differentiate between the fork and vfork.

3. Differentiate between independent processes and cooperating processes.

4. What resources are used when a thread is created? How do they differ from those when a process is created?

5. How can you avoid deadlock in a system of single instance of each resource type?

6. What is race condition?

7. What is segment table? Why it is needed?

8. What are the functions of basic file system?

9. Differentiate demand paging and swapping.

10. List the security features of Linux OS.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain and compare the short term, medium term and long term schedulers. (8)

(ii) Discuss the various services provided by an OS. Explain how each of the services are provided to the users? (8)

Or

(b) (i) Discuss the various issues involved in Inter Process Communication. (10)

(ii) What are the differences between user-level threads and kernel-level threads? Under what circumstances is one type better than the other? (6)

12. (a) Assume the following processes arrive for execution at the time indicated and also mention with the length of the CPU-burst time given in milliseconds.

Job	Burst time (ms)	Priority	Arrival time (ms)
P1	4	2	0
P2	4	1	1
P3	5	1	1
P4	2	3	2
P5	1	4	2

(i) Give a Gantt chart illustrating the execution of these processes using SJF (Preemptive and Non Preemptive), and Priority (Preemptive and Non Preemptive) scheduling. (8)

(ii) Calculate the average waiting time and average turn around time for each of the above scheduling algorithms. (8)

Or

(b) (i) A Barber shop consists of a waiting room with n chairs and the barber room containing the barber chair. If there are no customers to be served, the barber goes to sleep. If a customer enters the barbershop and all the chairs are occupied, then the customer leaves the shop. if the barber is busy but chairs are available, then the customer sits in one of the free chairs. If the barber is asleep, the customer wakes up the barber. Write a program to coordinate the barber and the customer. (10)

(ii) Explain how wait-for graph can be used to detect deadlock in a system with single instance resources. (6)

13. (a) (i) Given memory partitions of 100 K, 500 K, 200 K, and 600 K (in order), how would each of the First-fit, Best-fit, and Worst fit algorithms place processes of 212 K, 417 K , 112 K and 426 K (in order)? Which algorithm makes the most efficient use of memory? (8)

(ii) Explain how paging can be achieved with TLB (8)

Or

(b) Consider the following page reference string : 7, 3, 1, 2, 6, 5, 1, 2, 3, 2, 7, 3, 6, 1, 5, 2, 3, 2, 6. Calculate the number of page faults that would occur for the following page replacement algorithm with frame size of 4 and 5.

(i) LRU

(ii) Optimal. (16)

14. (a) Suppose a disk drive has 5000 cylinders, numbered from 0 to 4999, the drive is currently serving a request at cylinder 1142, and the previous request was at cylinder 1125.The queue of pending requests in FIFO order is 185, 1469, 3912, 1773, 4947, 2508, 2021, 1749, 1129. What is the total distance that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling algorithms? (16)

(i) SSTF

(ii) SCAN

(iii) FCFS

(iv) LOOK.

Or

(b) (i) Explain the various file allocation schemes and discuss the advantages and disadvantages in those schemes. (10)

(ii) Explain the free space management using bit vector and counting methods. (6)

15. (a) (i) How the process and threads are executed in Linux and Windows OS? (8)

(ii) How memory and file system are implemented in Windows OS. (8)

Or

(b) Explain the components of a Linux OS. (16)