Q.6 Attempt any two:

i. (a) What is directory? What are the various operations performed on a File? **5**

(b) Find Effective Memory Access Time if the miss ratio is 30%. Time to look up in TLB is 10ns and time to access memory is 100ns.

ii. Assume the following request of tracks is given. Find the total no. of head movements in SSTF and LOOK strategies if the head served 24th track position and currently on 45th position among 200 tracks. **5**

28, 6, 42, 98, 62, 29, 99, 58, 145, 82, 176, 63, 180, 198, 39

iii. Explain disk structure. Also discuss the following- **5**

(a) Rotational latency (b) Seek time

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering / Science

End Sem (Even) Examination May-2022

CA3CO12 Operating System

Programme: BCA / BCA-MCA (Integrated) Branch/Specialisation: Computer Application

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Which one of the following is the innermost element of OS structure? **1**

(a) Shell (b) Kernel

(c) Operating System (d) Hardware

ii. Which one of the following is not a service of operating system? **1**

(a) File manipulation (b) Program execution

(c) Resource allocation (d) Memory management

iii. Which one is not a type of schedulers? **1**

(a) Medium term (b) Long term

(c) Dispatcher (d) None of these

iv. In multilevel feedback queue, what is the order of all queues except the lowest queue- **1**

(a) SJF (b) FCFS

(c) RR (d) PRIORITY

v. Which one of the following is not a necessary condition for deadlock? **1**

(a) Mutual exclusion (b) Starvation

(c) No pre-emption (d) Circular wait

vi. A semaphore written for handling more than 5 instances of a resource is called- **1**

(a) Binary semaphore (b) Counting semaphore

(c) Multiple semaphore (d) Both (b) and (c)

vii. Which one of the following is true about the size of page and frame? **1**
(a) Page>Frame (b) Frame>Page
(c) Frame=Page (d) Either (a) or (b)

viii. Compaction is the solution of- **1**
(a) Internal fragmentation (b) External fragmentation
(c) Hole fragmentation (d) All of these

ix. Which one of the following is not a part of a Disk? **1**
(a) Head assembly (b) Cylinder
(c) Sector (d) Plot

x. Which one of the following is not a way for free space management? **1**
(a) Bit vector (b) Linked List
(c) Aging (d) Grouping

Q.2 i. Discuss components of operating systems. **2**
ii. Write various functions of operating system. **3**
iii. Briefly discuss shell, kernel, system call, trap and interrupts. **5**
OR iv. Explain multitasking, multiprogramming and batch processing with an example. **5**

Q.3 i. Discuss PCB and its attributes. **2**
ii. How a program is converted into a process? Write steps. Explain various stages of a process during its execution. **8**
OR iii. Assume the system of following processes is given along with other information. Find the average turnaround time, average waiting time, response time and the sequence of completion of processes. Apply RR algorithm with TQ is 4ms. **8**

PROCESS	CPU BURST (ms)	ARRIVAL TIME (ms)
P1	5	1
P2	3	0
P3	6	0
P4	7	4
P5	4	6

Q.4 i. Discuss concurrent, cooperative and parallel processes. **3**
ii. Consider the following information- **7**

Process	Max				Allocated				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	6	8	4	7	1	2	1	2	1	2	2	1
P1	4	3	6	4	2	0	3	3				
P2	2	2	2	1	1	1	2	0				
P3	6	8	9	5	2	2	3	1				
P4	7	3	3	4	4	2	4	3				

(a) Find total number of instances of resource A, B, C, D.
(b) Find safe sequence of the processes.
(c) If an additional request of P2 for (1 1 0 0) is immediately granted then find whether the system is in safe state or not.

OR iii. Explain the following with an example- **7**
(a) RAG (b) Claim edge
(c) Assignment edge (d) Request edge

Q.5 i. Suppose a 21 bit long logical address consist 1024 pages and physical memory divided into 128 equal no. of partitions. Find the no. of bits in physical address and the frame size of memory if each character requires a byte for storage. **4**
ii. Let's assume that there are 150KB, 550KB, 250KB, 350KB and 650KB memory partitions are available in order. Apply Worst fit, First fit and Best Fit algorithm to grant the request of processes of size 262KB, 467KB, 162KB, 476KB in order. **6**
OR iii. Assume that the reference string for the request of pages given below- **6**
1, 2, 3, 2, 1, 5, 2, 1, 6, 2, 5, 6, 3, 1, 3, 6, 1, 2, 4, 3
Find the total page faults if there are 4 empty frames are available and the policy to allocate frames is FCFS, LRU and Optimal page replacement.

Marking Scheme
CA3CO12 Operating System

Q.1	i.	(d) Hardware		**1**
	ii.	(d) Memory management		**1**
	iii.	(d) None of these		**1**
	iv.	(c) RR		**1**
	v.	(b) Starvation		**1**
	vi.	(b) Counting semaphore		**1**
	vii.	(c) Frame=Page		**1**
	viii.	(b) External fragmentation		**1**
	ix.	(d) Plot		**1**
	x.	(c) Aging		**1**
Q.2	i.	Definition		**2**
	ii.	Functions of operating system		**3**
		Any 3 function 1 Mark for each	(1 Mark*3)	
	iii.	Shell, kernel, system call, trap and interrupts.		**5**
		1 Mark for each	(1 Mark*5)	
OR	iv.	Definition	3 Marks	**5**
		Example.	2 Marks	
Q.3	i.	Definition of PCB and its attributes.		**2**
	ii.	Program is converted into a process	2 Marks	**8**
		Steps	3 Marks	
		Stages of a process during its execution	3 Marks	
OR	iii.	The average turnaround time, average waiting time, response time.		**8**
		Solution & Steps for sequence of completion of processes		
Q.4	i.	Definition of concurrent, cooperative and parallel processes.		**3**
		1 Mark for each	(1 Mark*3)	
	ii.	Steps and Solution		**7**
OR	iii.	Explain the following		**7**
		(a) RAG	(b) Claim edge	
		(c) Assignment edge	(d) Request edge	
		1.5 Marks for each	(1.5 Mark*3)	
			4.5 Marks	
		2.5 Marks for RAG	2.5 Marks	
Q.5	i.	Steps and Solution.		**4**
	ii.	Steps and Solution.		**6**
OR	iii.	Total page faults if there are 4 empty frames are available	2 Marks	**6**
		The policy to allocate frames is FCFS, LRU	2 Marks	
		Optimal page replacement.	2 Marks	
Q.6		Attempt any two:		
	i.	(a) Directory	3 Marks	**5**
		(b)	2 Marks	
	ii.	SSTF and LOOK		**5**
		2.5 Marks for each	(2.5 Marks*2)	
	iii.	Disk structure	1 Mark	**5**
		(a) Rotational latency	(b) Seek time	
		2 Marks for each	(2 Marks*2)	
			4 Marks	

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