7236

BOARD DIPLOMA EXAMINATION, (C-20)

NOVEMBER/DECEMBER—2022

DCME – THIRD SEMESTER EXAMINATION

OPERATING SYSTEMS

Time : 3 hours] [*Total Marks* : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Define the term system call in operating system.

2. Define the term multithreading in OS.

3. List various process states in process diagram.

4. What resources are shared by all of the threads of a process?

5. Define the term deadlock.

6. State the need of process synchronization.

7. List the methods used to select a free hole in continuous memory allocation.

8. What is the difference between paging and demand paging?

9. List various allocation methods.

10. Define the terms seek time and latency time.

PART—B

8×5=40

Instructions : (1) Answer **all** questions.

(2) Each question carries **eight** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. *(a)* Explain batch operating systems.

(OR)

(b) Explain the components of an operating system.

12. (a) Identify the advantage of having different time-quantum sizes at different levels of a multilevel queuing system.

(OR)

(b) For the processes given in table, draw a Gantt chart illustrating their execution using priority scheduling (both preemptive and non-preemptive). A higher priority number has higher priority. Find out average waiting time of each process.

Process	Burst Time	Arrivas	Priority
P1	4	1	3
P2	3	2	4
P3	3	0	6
P4	5	3	5

13. (a) Illustrate how a binary semaphore can be used to implement mutual exclusion among n processes.

(OR)

(b) Make use of resource allocation graph to check the system is in safe state or not. Draw the reduced resource allocation graph. Given processes, resource usage and availability as described in the following table :

Process	Current Allocation			Requests			Resource Available		
	A	B	C	A	B	C	A	B	C
P0	2	0	0	1	1	0			
P1	3	1	0	0	0	0			
P2	1	3	0	0	0	1	0	0	0
P3	0	1	1	0	1	0			

14. (a) Make use of LRU page replacement policies. Find total number of page faults for the page reference string given below. Assume that the page frame size is three.

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

(OR)

(b) Initially usage of memory is allocated as specified in Figure below. After receiving additional requests : 20K, 10K, and 5K, at what starting address will each of the additional requests be allocated by applying first-fit allocation method?

Used	Hole	Used	Hole	Used	Hole	Used	Hole	Used	Hole
10K	10K	20K	30K	10K	5k	30K	20K	10K	15K

15. *(a)* Explain any five file operations.

(OR)

(b) A disk queue with requests for I/O to blocks on cylinders 98, 87, 160, 40, 140, 36, 72, 66, 15. The head is initially at cylinder number 60. The cylinders are numbered from 0 to 199. Starting from the current head position, calculate the total distance (in number of cylinders)that the disk arm moves to satisfy all the pending requests by applying FIFO disk scheduling policy.

PART—C

10×1=10

Instructions : (1) Answer the following question.

(2) The question carries **ten** marks.

(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

16. Is it possible to have a deadlock involving only one single-threaded process? Justify your answer with an example.

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