No. of Printed Pages—3

**1014 (M3OPS)**

**[ 22 HKPD3SN-23F ]**

# M.Sc IT 3rd Semester (New) Exam. 2022 (W)

## MSCIT

[ PGScIT S3-03 ]

( *Operating System* )

*Full Marks* : 70/80

*Time* : 3 hours

*The figures in the right-hand margin indicate marks.*

**[ Learners admitted in and after 2020 need to answer only Q.No. 1 to Q.No. 4 (total 70 marks)]**

1. Answer any *five* of the following questions : $2 \times 5 = 10$

   (*a*) What is memory access time and seek time ?

   (*b*) What are the objectives of operating system ?

   (*c*) What is real time operating system ?

   (*d*) What is race condition and mutual exclusion ?

   (*e*) Define deadlock.

   (*f*) What is cache memory ?

2. Answer any *four* of the following questions : $3 \times 4 = 12$

   (*a*) What are the functional units of a computer system ?

   (*b*) What is a process ? How can a process can be uniquely identified ?

*(Turn Over)*

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(*c*) What is sleep and wakeup ? What is semaphore ?

(*d*) What are internal and external fragmentation ? How is it related to paging ?

(*e*) Give the differences between contiguous and non-contiguous memory allocation ?

(*f*) What are meant by the terms openness and concurrency in Distributed operating system ?

3. Answer any *four* of the following questions : $6 \times 4 = 24$

(*a*) Explain the associative mapping technique in cache memory.

(*b*) Explain how tree-structured directory works ?

(*c*) What are the advantages and disadvantages of distributed operating system ?

(*d*) Explain in detail any two password protection mechanisms.

(*e*) Explain the concept of demand paging.

4. Answer any *three* of the following questions : $8 \times 3 = 24$

(*a*) Explain the ways by which deadlock can be prevented.

(*b*) Describe the working of SJF scheduling algorithm using an example. Explain why it is considered as a special case of priority scheduling algorithm.

(*c*) Consider there to be three frames in the physical memory. Find the number of page faults for FIFO, LRU and optimal page replacement algorithms for the following page references : [1, 2, 3, 4, 2, 3, 5, 1, 2, 4].

(*d*) Explain all the change operations that are allowed in the access matrix with suitable examples.



(*Continued*)

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## ( Q. No. 5 is only for learners admitted before 2020 )

**5.** Answer any *one* from the following questions : $10 \times 1 = 10$

(*a*) Explain the terms- miss, hit, hit ratio, page fault, locality of reference.

(*b*) Explain different objectives of device independent I/O software.

(*c*) Consider the following processes along with their CPU bursts.

| Process | CPU Burst | Priority |
|---|---|---|
| P1 | 5 | 4 |
| P2 | 3 | 2 |
| P3 | 8 | 1 |
| P4 | 10 | 3 |

Draw the Gantt charts to illustrate the execution of these processes using FCFS, SJF and priority scheduling algorithm. Also, calculate the waiting time for each process. Find out which scheduling algorithm has the minimum average waiting time ?



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