Total No. of Questions : 8]

SEAT No. :

PA-1295

[Total No. of Pages : 3

[5925]-326

S.E. (Artificial Intelligence and Data Science)

OPERATING SYSTEMS

(2019 Pattern) (Semester - III) (217521)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve questions Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) What is deadlock detection and recovery? Explain two options of deadlock recovery. **[6]**

b) What is the producer consumer problem? How to solve it using semaphore and Mutex? **[6]**

c) What are different types of classical synchronization problems? Explain any one in detail. **[6]**

OR

Q2) a) What is Inter Process Communication? Why it is important for operating system. **[6]**

b) Write short note on critical section, Monitors and mutex. **[6]**

c) What do you mean by pipe? Explain anonymous and named/FIFO pipe. **[6]**

Q3) a) Explain the following term : **[6]**

i) Compaction

ii) Belady's anomaly

iii) Thrashing

P.T.O.

b) Why is the principle of locality crucial to use of virtual memory? Explain with example. **[6]**

c) Reference String 1 2 3 2 1 5 2 1 6 2 5 6 3 1 3 6 1 2 4 3. Execute LRU and OPR on above string. Consider page frame of 3 pages Write page hit and page faults if any. **[5]**

OR

Q4) a) Write and explain algorithms for : **[6]**

i) Allocating region

ii) Freeing region

b) Differentiate between : **[6]**

i) Internal and external fragmentation

ii) Fixed and variable size partitioning

c) Explain in brief what is paging and segmentation. How logical physical Address Translation is done in both. **[5]**

Q5) a) What is file system? Explain File system implementation in detail. **[6]**

b) Explain following term with respect to directory structure **[6]**

i) Two level directory structure (with diagram)

ii) Tree structured Directories (with diagram)

c) Define following term with respect to disk access **[6]**

i) Seek time

ii) Rotational Latency

iii) Data transfer time

OR

Q6) a) Explain directory structure with types its types. Also discuss directory implementation in details. **[6]**

b) What is free space management (FSM)? Explain how bit vector and linked list performs on FSM. **[6]**

c) What is the advantage of the double buffering scheme over single buffering? **[6]**

Q7) a) Explain scheduling in **[6]**

i) Linux Operating Systems

ii) UNIX free BSD OS

b) Explain grep utility and its variations with examples. **[5]**

c) Explain system calls exec() and brk(). **[6]**

OR

Q8) a) What are the requirements for Linux system administrator? Define the design principles of LINUX systems. **[6]**

b) Explain different types of hypervisors. **[5]**

c) Explain in detail the memory management in LINUX system. **[6]**

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