

Total No. of printed pages = 4

MCA 182301

Roll No. of candidate

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M/2/21 2021

BINA CHOWDHURY CENTRAL LIBRARY
BIMT & BIPS
Bina Hall, Kharapara,
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M.C.A. 3rd Semester End-Term Examination

OPERATING SYSTEMS

(New Regulation (w.e.f. 2017-18) &

New Syllabus (w.e.f 2018-19)

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks
for the questions.

Answer question No. 1 and any *four* from the rest.

1. Choose the correct answer from the following:

(10 × 1 = 10)

(i) Page fault occurs when,

- (a) The page is present in memory
- (b) The deadlock occurs
- (c) The page is not present in memory
- (d) The buffering occurs

(ii) Which of the following is a process synchronization tool in a operating system?

- (a) semaphore
- (b) thread
- (c) socket
- (d) dispatcher

(iii) A thread is a

- (a) data.
- (b) heavyweight process.
- (c) program stored in secondary memory.
- (d) lightweight process.

[Turn over

- (iv) A critical section is a program segment
- (a) which should run in a certain specified amount of time.
 - (b) which avoids dead locks.
 - (c) where shared resources are accessed.
 - (d) where no shared resources are accessed
- (v) In reference to computer files and directories, what does FAT stands for?
- (a) Free answer table
 - (b) File allocation table
 - (c) Free allocated table
 - (d) File asset table
- (vi) Which of the following present a uniform device-access interface to the I/O subsystem, much as system calls provide a standard interface between the application and the operating system?
- (a) Devices
 - (b) Buses
 - (c) Device Drivers
 - (d) I/O Systems
- (vii) Which of the following scheduling algorithm is non-preemptive?
- (a) Shortest Remaining Time First Scheduling
 - (b) First-Come, First-Served Scheduling
 - (c) Priority Scheduling
 - (d) Round-Robin Scheduling
- (viii) In segmentation, each address is specified by,
- (a) a value only
 - (b) an offset only
 - (c) a key only
 - (d) a segment number and an offset
- (ix) A set of resources' allocations such that the system can allocate resources to each process in some order, and still avoid a deadlock is,
- (a) Unsafe state
 - (b) Safe state
 - (c) Starvation
 - (d) Greedy allocation

- (x) Two type of latencies that affect the performance of real time systems are?
 (a) Interrupt latency and dispatch latency
 (b) Service latency and feedback latency
 (c) Fulltime latency and halftime latency
 (d) Long latency and short latency

2. (a) What are the issues for concurrent processes accessing a shared piece of data? How you can solve those issues. Discuss. (5)

(b) Consider the following processes three processes P_1, P_2 and P_3 : (5)

Process	CPU burst time (in Millisecond)
P_1	12
P_2	6
P_3	3

Draw a Gantt chart and calculate the average waiting time for the processes in first-in first-out and in shortest job first algorithm. Which algorithm has better performance?

(c) Discuss multiprogramming with fixed partition and variable partition scenario. (5)

3. (a) What are the different threading models? What are Pthreads? (5)

(b) In which situation shared memory is better than message passing technique? (2)

(c) What are the events that occurs when a context switching occurs in an operating system? (3)

(d) Explain state transition of a process with a neat diagram. (5)

4. (a) What are the necessary conditions for a deadlock to occur? What is a safe state, unsafe and deadlocked state? (6)

(b) What are the advantages and disadvantages of counting semaphore over binary semaphore? (3)

(c) Explain linked and indexed allocation of file system. (6)

5. (a) What is the role of interrupt in a operating system? What is the difference between a character stream device and a block transfer device? (5)

(b) Explain about paged segmentation and segmented paging. (5)

(c) How many page faults occur in FIFO page replacement policy for the following reference string, for four page frames?

1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2 (5)

6. (a) What is a Real-time Operating System? Explain the criteria to be fulfilled for an operating system to be a real time operating system. (6)
- (b) Consider a system consisting of four resources of the same type that are shared by three processes, each of which needs at most two resources. Show that the system is deadlock-free. (4)
- (c) What is a logical time and logical clock used in distributed system? List out various uses of timers in embedded system. (5)
7. (a) What is the role of access matrix in system protection domain? Explain. (5)
- (b) What is the difference between deadlock prevention and deadlock avoidance algorithms? (4)
- (c) What are the first-fit, best-fit, and worst-fit strategies in dynamic memory allocation? (6)

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