

37 (Sem-3) IT/MCA 3.4

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IT/MCA

Paper : 3.4

(Operating System)

Full Marks : 70

Time : 3 hours

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

1. Choose the correct answers from the following : 1×7=7
- (a) Layers of a computer system (from top to bottom) are
- (i) Application Programs > Utilities > O/S > Hardware
 - (ii) Application Programs > O/S > Utilities > Hardware
 - (iii) Both (i) and (ii)
 - (iv) None of the above
- (b) Resource management includes multiplexing (sharing) resources in two ways
- (i) in time and in space
 - (ii) in hardware and in time
 - (iii) Both (i) and (ii)
 - (iv) None of the above

- (c) A process can be uniquely characterized by
 - (i) identification
 - (ii) state
 - (iii) priority
 - (iv) All of the above
- (d) Usage of threads is
 - (i) responsiveness
 - (ii) economy
 - (iii) resource sharing
 - (iv) All of the above
- (e) Which is not a state of a process?
 - (i) Blocked
 - (ii) Running
 - (iii) Ready
 - (iv) Privileged
- (f) `../mydata/prog1.c` is the example of
 - (i) absolute path
 - (ii) relative path
 - (iii) effective path
 - (iv) None of the above
- (g) In UNIX system, directories are treated as
 - (i) a special file
 - (ii) a special container
 - (iii) Both (i) and (ii)
 - (iv) None of the above

2. Fill in the blanks :

1×7=7

- (a) Buffering is a basic — function of device-independent I/O software.
- (b) Mutual exclusion is a — of deadlock.
- (c) The state of a process after it encounters an I/O instruction is —.
- (d) A thread is a — process.
- (e) CPU utilization is a — of scheduling algorithms.
- (f) DMA stands for —.
- (g) Not recently used is — algorithm.

3. Match Column—A with Column—B :

1×7=7

Column—A	Column—B
(a) Fatal error	(i) Process termination
(b) Access to I/O devices	(ii) Path name
(c) Fork	(iii) Standard I/O
(d) Readdir	(iv) Java I/O package
(e) Disks	(v) Block device
(f) Circular wait	(vi) Child process
(g) Absolute path	(vii) Directory system call
	(viii) Deadlock condition
	(ix) O/S service

4. State whether the following sentences are True or False : 1×7=7

- (a) Data that are present in registers in the processor while a process is being executed are called context data.
- (b) Fatal error is not a condition for termination of a process.
- (c) A blocked process is waiting for the completion of some event, such as I/O operation.
- (d) Shortest Job First is a deadlock avoidance technique.
- (e) The part of a program where the shared memory is accessed is called critical section.
- (f) Disabling interrupts is not a mutual exclusion technique.
- (g) getpid() is a UNIX system call.

5. (a) What is an Operating System? Explain the main features of the first generation Operating System. 4
- (b) Mention the three important services that are provided by an Operating System. 3

6. Give answers to any *five* of the following questions : 7×5=35

- (a) What do you mean by a process?
Explain the process model.
- (b) Mention few possible reasons for a process termination.
- (c) What is a thread? How does it differ from a process? Explain pictorially.
- (d) Briefly describe the goals of scheduling algorithms.
- (e) Make a comparison between round-robin scheduling and priority scheduling.
- (f) What is deadlock? Explain the Banker's algorithm for deadlock avoidance.
- (g) Write a program (preferably in C language) which will first print its process-id and then creates a child process.

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