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GATE Computer Science Engineering Coaching by IGC
Operating System Assignment - 1

Q1. Consider the following system state :-

Process	Max	Allocated
P1	7	2
P2	6	2
P3	7	4

Total resources are 11. The system will be in a safe state if

a) Process P1 is allocated one additional resource
b) Process P2 is allocated two additional resources
c) Process P3 is allocated three additional resources
d) Process P2 is allocated one additional resource

Q2. When a page references a page that is not in main memory, the processor generates a

a) TLB miss
b) Page fault
c) General protection fault
d) Missing segment fault

Q3. Virtual memory fetch strategies determine when a page or segment should be moved from _____ to _____

a) Main memory, the TLB
b) Secondary storage, main memory
c) Main memory, secondary storage
d) The TLB, registers

Q4. When a computer is switched on, where is the operating system located ?

a) BIOS
b) ROM
c) POST
d) RAM

Q5. POST stands for

a) Power On Self Test

b) Power Only Standard Test
c) Program Optimum Self Test
d) Program Optimum Starting Time

Q6. Consider a set of n tasks with known runtimes r_1, r_2, r_3 …. R_n to be run on a uniprocessor machine. Which of the following processor scheduling algorithms will result in the maximum throughput ?

a) Round-robin
b) Shortest-job-first
c) Highest-response-ratio-next
d) First-come-first-serve

Q7. A memory page containing a heavily used variables that were initialized very early and in constant use is removed when

a) LRU page replacement algorithm is used.
b) FIFO page replacement algorithm is used
c) LFU page replacement algorithm is used
d) None of these

Q8. Which of the following is an advantage of virtual memory ?

a) Faster access to memory on an average
b) Process can be given protected address spaces
c) Linker can assign address independent of where the program will be loaded in physical memory.
d) None of these

Q9. The boot process happens in the order

a) POST test, activate BIOS, check settings, load OS into RAM
b) Activate BIOS, POST test, load OS into RAM, check settings
c) Check settings, load OS into RAM, activate BIOS, POST test
d) Load OS into RAM, check settings, activate BIOS, POST test

Q10. This occurs when several full-fledged processors work together on the same tasks, sharing memory.

a) Multi-tasking
b) Multiprogramming
c) Parallel processing
d) Serial processing

Q11. Consider a process 'p_1' is currently running on a CPU in a single processor machine. When a timer interrupt occurs, then the process 'p_1' will be placed in

a) Wait Queue
b) Ready queue
c) job queue
d) None of these

Q12. A page fault rate for a certain algorithm on a reference string is n with a certain number of frames. After increasing number of frames it was observed that the set of pages in memory from earlier case is always a subset of the later case (after increasing frames). The algorithm is not necessarily

a) Stack algorithm
b) LRU
c) Optimal
d) FIFO

Q13. In order to allow one process to enter its critical section, binary semaphore are initialized to

a) 0
b) 1
c) 2
d) 3

Q14. An operating system contains 3 user processes each requiring 2 units of resource R. The minimum number of units of R such that no deadlock will ever occur is

a) 3
b) 4
c) 5
d) 6

Q15. Which of the following scheduling algorithms gives minimum average waiting time ?

a) FCFS
b) Shortest Job First
c) Round-robin

d) Priority

Q16. Which of the following statements comparing the context of a thread with that of a process is true ?

a) Two processes will not share any context; two threads of the same process will only share the data and the code (text) areas of the context.
b) Two processes will not share any context; two threads of the same process will share the data, code (text) and the stack areas of the context.
c) Two processes will share the data and the code (text) areas of the user context; two threads of the same process will only share the register context.
d) The overhead involved in context switching for threads is much higher than that for processes.

Q 17. Semaphores can be used to enforce mutual exclusion and synchronization between processes interacting over shared data and variables. Which of the following statement is true about semaphores in this regard ?

a) The operations SIGNAL(S) and WAIT(S) need to be atomic.
b) A process exiting the critical section will call SIGNAL(S) which will WAKEUP() a blocked process awaiting entry to the critical section.
c) 'Busy-wait' solutions to the critical section are typically implemented using machine instructions that execute in the kernel mode.
d) All of the above

Q18. Consider the following pseudo code fragment.

```
print('hello');
if (fork() == 0)
print('world');
```

Which of the following statements best explains the outcome when the code is executed ?

a) Prints the word 'hello' only
b) Prints the words 'hello' and 'world' in any order
c) Prints the words 'hello' followed by 'world' in that order
d) Prints the words 'hello' followed by two words of 'world' in that order.

Q19. 3 jobs are to be executed on a single processor system arrive at zero time in the order A, B, C. Their CPU burst time requirements are 4, 1, 3 time units

respectively. What is the completion time of job under round robin scheduling with time slice of 1 unit ?

a) 8
b) 7
c) 6
d) 5

Q20. In round-robin scheduling there are 'n' no. of processes in ready queue and time slice is 'q' units in worst case, the interrupted process will get CPU again after

a) (n - 1)q units
b) nq units
c) (q - 1)n units
d) (q + 1)n units

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Answers :-

1. C
2. B
3. B
4. D
5. A
6. B
7. B
8. C
9. A
10. C
11. B
12. D
13. B
14. B
15. D
16. A
17. D
18. C
19. A
20. A