

**THIRD SEMESTER B.Sc. DEGREE (SUPPLEMENTARY) EXAMINATION
NOVEMBER 2016**

(UG—CCSS)

Computer Science

CS 3B 05—FUNDAMENTALS OF OPERATING SYSTEMS

(2012 Admission onwards)

Maximum : 30 Weightage

Time : Three Hours

I. Answer all *twelve* questions.

- 1 _____ controls and co-ordinates the use of hardware among the various application programs for the various users.
- 2 In _____ type operating system rigid time constraints are placed on the operation of a processor or the flow of data.
- 3 The processes that are residing in main memory and are waiting to execute are kept on a list called _____.
- 4 The number of processes residing in memory in a unit amount of time is known as _____.
- 5 In UNIX, a new process is created by _____ system call.
- 6 The process waiting to be assigned to a processor is in _____ state.
- 7 _____ module that gives control of the CPU to the process selected by the short-term scheduler.
- 8 The section of code implementing a request for getting permission to enter its critical section is _____.
- 9 A situation where a waiting process never get a chance to execute because the resources that process requested are held by other waiting processes is termed as _____.
- 10 The address seen by the memory unit is called _____.
- 11 In memory management, the process of merging adjacent holes to form a single large hole is known as _____.
- 12 A dirty bit is known as _____.

(12 × ¼ = 3 weightage)

II. Answer all *nine* questions.

- 13 What are the various process states ?
- 14 What is critical region ?
- 15 What is race condition ?
- 16 When we can say that a sequence of processes $\langle P_1, P_2, \dots, P_n \rangle$ is in safe sequence ?
- 17 List any two methods to recover from a deadlock situation.
- 18 What is external fragmentation ?

Turn over

- 19 A paging system takes 20 nanoseconds to search TLB and 100% nanoseconds to access memory. What is the effective access time for a 98% hit ratio ?
- 20 What is Trojan horse ?
- 21 What is a system call ?

(9 × 1 = 9 weightage)

Answer any five question.

- 22 Write short notes on real time operating systems.
- 23 Differentiate between direct communication and indirect communication.
- 24 Write the code to implement mutual exclusion condition in critical section problem using a test and set instruction.
- 25 Differentiate between binary semaphore and counting semaphore.
- 26 How memory protection and allocation are implemented in contiguous memory allocation.
- 27 With the help of an example, explain the process of address translation from logical address to physical address in paging.
- 28 Explain with examples FIFO and LRU page replacement algorithms.

(5 × 2 = 10 weightage)

Answer any two questions.

- 29 Discuss about various classic problems of synchronization.
- 30 Consider the following set of processes, with a length of the CPU burst time given in milliseconds.

Process	Burst time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The process are assumed to have arrived in the order P1, P2, P3, P4 and P5 all at time 0.

- (a) Draw Gantt charts illustrating the execution of these process using FCFS, SJF, a nonpre-emptive priority (a smaller priority number implies a higher priority) and R R (quantum = 1) scheduling.
- (b) What is the turnaround time of each process for each of the scheduling algorithms specified in a.
- (c) What is the waiting time of each process for each of the scheduling algorithms in a.
- 31 Explain in detail, the demand paging system with emphasis to handle page faults.

(2 × 4 = 8 weightage)