

b. Describe cache principles and its design issues.

29. a. Explain process states with suspended states. Write the reasons for all possible state transitions.

(OR)

b. Explain the different categories in which threads are implemented.

30. a. Illustrate readers/ writers problems using semaphores.

(OR)

b. Describe in detail the deadlock avoidance with example.

31. a. Explain the virtual address translation in paging system.

(OR)

b.i. Illustrate the given page replacement policies. Optimal, LRU, FIFO.

ii. A process contains eight virtual pages on disk and is assigned a fixed allocation of four page frames in main memory. The following page trace occurs: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. Show the successive pages residing in the 4 frames using LRU and FIFO replacement policies.

32. a.i. Describe any three disk scheduling policies.

ii. Illustrate the disk arm movement with FIFO, SSTF and SCAN. Assume a disk with 200 tracks. The requested tracks in the order received are: 65, 67, 49, 28, 100, 170, 145, 48, 195.

(OR)

b. Explain file organization in detail.

\*\*\*\*\*

Reg. No.

B.Tech. DEGREE EXAMINATION, JUNE 2016

Fifth Semester

CS1011 – OPERATING SYSTEMS

(For the candidates admitted during the academic year 2013 – 2014)

Note:

(i) Part - A should be answered in OMR sheet within first 45 minutes and OMR sheet should be handed over to hall invigilator at the end of 45<sup>th</sup> minute.

(ii) Part - B and Part - C should be answered in answer booklet.

Time: Three Hours

Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Answer ALL Questions

- When an interrupt occurs, an Operating System  
(A) ignores the interrupt (B) always changes the state of the interrupted process after processing the interrupt  
(C) Always resumes execution of the interrupted process after processing the interrupt (D) may change the state of the interrupted process to "Blocked" and schedule another process
- Which of the following applications are well suited for batch processing?  
(A) Process control (B) Video game control  
(C) Preparing pay bills of employees (D) All of the above
- Which of the scheduling policy is well suited for a time-shared operating system?  
(A) Shortest Job First (B) Round Robin  
(C) First Come First Serve (D) Elevator
- Which of the following is single-user operating system?  
(A) MS-DOS (B) UNIX  
(C) LINUX (D) OS/2
- Process state is a part of  
(A) Process control block (B) Inode  
(C) File allocation table (D) Memory table
- A thread is a \_\_\_\_\_ process  
(A) Heavy weight (B) Multi process  
(C) Inter thread (D) Light weight
- The kernel is \_\_\_\_\_ of user threads  
(A) a part of (B) creator of  
(C) unaware of (D) aware of
- Using priority scheduling algorithm, find the average waiting time for the following set of processes given with their properties in the order: process: burst time: priority  
P1:10:3, P2:1:1, P3:2:4, P4:1:5, P5:5:2  
(A) 8 (B) 8.2  
(C) 7.75 (D) 3

9. The following program consists of 3 concurrent processes and 3 binary semaphores. Semaphores are initialized as  $S_0=1, S_1=0, S_2=0$ .

<b>Process P0</b>	<b>Process P1</b>	<b>Process P2</b>
while (true)	wait (S1);	wait (S2); release (S0);
{ wait (S0); print '0';	release (S0);	
release (S1); release (S2);		

how many times will P0 print '0'?

- (A) Atleast twice (B) Exactly twice  
(C) Exactly thrice (D) Exactly once
10. An operating system contains 3 user processes each requiring 2 units of resources R. What is the minimum number of units of R such that no deadlock will ever occur?  
(A) 3 (B) 4  
(C) 5 (D) 6
11. Locality of reference implies that the page reference being made by a process  
(A) will always be to the page used in the previous page references (B) is likely to be one of the pages used in the last few page references  
(C) will always be one of the pages existing in memory (D) will always lead to a page fault
12. The correct matching for the following pairs:  
(A) Disc scheduling : (1) Round robin  
(B) Batch processing : (2) Scan  
(C) Time sharing : (3) LIFO  
(D) Interrupt processing: (4) FIFO  
(A) A-3, B-4, C-2, D-1 (B) A-4, B-3, C-2, D-1  
(C) A-2, B-4, C-1, D-3 (D) A-2, B-1, C-4, D-3
13. Virtual memory is  
(A) an extremely large main memory (B) an extremely large secondary memory  
(C) an illusion of an extremely large memory (D) a type of memory used in super computers
14. Page fault occurs when  
(A) the page is corrupted by application software (B) the page is in main memory  
(C) the page is not in main memory (D) one tries to divide a number by '0'
15. Find the number of page fault in LRU, when page references are: 1, 2, 4, 5, 2, 1, 2, 4. Assume that main memory can accommodate 3 pages and main memory already has the pages 1 and 2, with page 1 having been brought earlier than page 2.  
(A) 3 (B) 5  
(C) 4 (D) 6
16. A process refers to five pages, A, B, C, D and E. in the order: A B C D A B E A B C D E. If the page replacement algorithm is FIFO, the number of pages which transfer with an empty internal store of 3 frames is  
(A) 8 (B) 10  
(C) 9 (D) 7
17. The time taken to move the disk arm to the desired cylinder is called the  
(A) Positioning time (B) Random access time  
(C) Seek time (D) Rotational latency

18. Consider a disk queue with requests for input/ output to blocks on cylinders: 98, 183, 37, 122, 14, 124, 65, 67. Considering FCFS scheduling, what is the total number of head movements, if the disk head is initially at 53?  
(A) 600 (B) 620  
(C) 630 (D) 640

19. RAID level \_\_\_\_\_ is also known as block interleaved parity organization and uses block level striping and keeps a parity block on a separate disk.  
(A) 1 (B) 2  
(C) 3 (D) 4
20. For raid level 3 to support a lower number of input/ output per second  
(A) Every disk has to participate in every I/O request (B) Only one disk participates per I/O request  
(C) I/O cycle consumes a lot of CPU (D) Some disks participate in I/O request time

**PART - B ( $5 \times 4 = 20$  Marks)**  
Answer ANY FIVE Questions

21. Write the advantages of batch processing system over time sharing system.
22. What is process switching and mode switching? When does an operating system perform these switching?
23. What is mutual exclusion? Mention the requirements for mutual exclusion.
24. Draw the Gantt chart/ execution pattern for the following processes using round robin scheduling algorithm. Quantum time  $q = 4$ .

Process	Arrival time	Service time
A	0	3
B	2	6
C	4	4
D	6	5
E	8	2

25. What is the purpose of translation look aside buffer?
26. What is external fragmentation? How does an operating system overcome external fragmentation?
27. Write in brief about the file allocation methods.

**PART - C ( $5 \times 12 = 60$  Marks)**  
Answer ALL Questions

28. a. Explain interrupts and the types of interrupts in detail.

(OR)