Hall Ticket Number:

Code No. : 31122

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (CSE) III Year I-Semester Main & Backlog Examinations, December-2017

Operating Systems

Time: **3** hours Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. What is the difference between a *program* and a *process*?
2. Draw a neat diagram to show the implementation of a system call.
3. If the size of physical memory is 4 GB and the size of virtual memory is 2 GB, how many page table entries will be there per process assuming a page size of 4 KB?
4. Write about the fields in File Control Block (FCB).
5. What is the necessary condition for a critical section problem to arise?
6. Is it possible for a deadlock to arise when resource preemption is allowed? Justify your answer.
7. Compare RAID level 0 with RAID level 1.
8. What is a device controller and device driver? How these two components are related to each other while performing I/O operation?
9. What are the goals of Operating system in ensuring protection?
10. List the design principles of Linux.

Part-B (5 × 10 = 50 Marks)
(All bits carry equal marks)

11. a) Explain two techniques for achieving load balancing in multiprocessor scheduling mechanisms.

    b) Compute turnaround time and waiting time for the following process given by using FCFS, SJF, SRTF and Round Robin CPU Scheduling algorithms, where time slice = 2msec

Process	Burst time	Priority	Arrival time
P1	2	2	0
P2	1	1	1
P3	8	4	2
P4	4	2	1
P5	5	3	2

12. a) What is the purpose of multi-level page table? Explain the utility using an example.

    b) A certain computer provides its users with a virtual memory space of 2^{32} bytes. The computer has 2^{22}bytes of physical memory. The virtual memory is implemented by using paging. The page size is 4096 bytes. A user process generates the virtual address 11123456. Explain how the system establishes the corresponding physical location.

13. a) Describe the solution for Readers-Writers problem with Semaphores

    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.

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14. a) Compare NAS and SAN to attach disk storage to the system with the help of a neat diagram.

    b) Describe the functions of Kernel I/O subsystem in detail.

15. a) Discuss the strengths and weaknesses of implementing an access matrix using capabilities that are associated with domains and access list associated with objects.

    b) Draw a neat diagram to show the implementation of Services in Android Operating system.

16. a) Explain the advantages of Multithreading. Also explain with neat sketches to map user threads to kernel threads.

    b) What is the use of TLB (Translation Look Aside buffer) in efficient implementation of Paging? Compute effective memory-access time if 80% is the TLB hit ratio and 100 nanoseconds require to access main memory.

17. Answer any *two* of the following:

    a) Explain what is a *test_and_set* instruction. Demonstrate how mutual exclusion can be achieved using this instruction.

    b) Describe the major issues in Disk management.

    c) Explain major components of Windows Operating system with a neat diagram.