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B.Tech.
PET6J011

6th Semester Regular Examination 2017-18
OPERATION SYSTEM
BRANCH : ECE, ETC
Time : 3 Hours
Max Marks : 100
Q.CODE : C444

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1 Answer the following questions: *multiple type or dash fill up type* : (2 x 10)

- a) The Memory Buffer Register (MBR)**
- a. is a hardware memory device which denotes the location of the current instruction being executed.
 - b. is a group of electrical circuits (hardware), that performs the intent of instructions fetched from memory.
 - c. contains the address of the memory location that is to be read from or stored into.
 - d. contains a copy of the designated memory location specified by the MAR after a "read" or the new contents of the memory prior to a "write".
 - e. None of the above
- b) Fork is**
- a. the dispatching of a task
 - b. the creation of a new job
 - c. the creation of a new process
 - d. increasing the priority of a task
 - e. None of the above
- c) Which of the following statements is false?**
- a. the technique of storage compaction involves moving all occupied areas of storage to one end or other of main storage
 - b. compaction does not involve relocation of programs
 - c. compaction is also known as garbage collection
 - d. the system must stop everything while it performs the compaction
 - e. None of the above
- d) Thread synchronization is required because:**
- a. all threads of a process share the same address space
 - b. all threads of a process share the same global variables
 - c. all threads of a process can share the same files
 - d. all of the mentioned
- e) Dispatch latency is :**
- a. the speed of dispatching a process from running to the ready state.
 - b. the time of dispatching a process from running to ready state and keeping the CPU idle
 - c. the time to stop one process and start running another one
 - d. None of these

- f) The relocation register helps in :
 - a. providing more address space to processes
 - b. a different address space to processes
 - c. to protect the address spaces of processes
 - d. None of these
- g) Working set model for page replacement is based on the assumption of:
 - a. modularity
 - b. locality
 - c. globalization
 - d. random access
- h) Thrashing can be avoided if
 - a. the pages, belonging to the working set of the programs, are in main memory
 - b. the speed of CPU is increased
 - c. the speed of I/O processor is increased
 - d. all of the above
 - e. None of the above
- i) Which one of the following is not true?
 - a. kernel is the program that constitutes the central core of the operating system
 - b. kernel is the first part of operating system to load into memory during booting
 - c. kernel is made of various modules which cannot be loaded in running operating system
 - d. kernel remains in the memory during the entire computer session
- j) The memory allocation scheme subject to "external" fragmentation is
 - a. segmentation
 - b. swapping
 - c. pure demand paging
 - d. multiple contiguous fixed partitions
 - e. None of the above

Q2

Answer the following questions: *Short answer type* :

(2 x 10)

- a) Do time-sharing differs from multi-programming? If so, How?
- b) Why API's needed to be used rather than system calls?
- c) List out the data fields associated with process control blocks.
- d) How does the system detect Thrashing?
- e) Why rotational latency is usually not considered in disk scheduling?
- f) In memory management consider the program named as stack 1 which size is 100 KB. This program is loaded in the main memory from 2100 to 2200 KB. Show the content of the page map table for the given scenario.
- g) What resources are required to create threads?
- h) What is starvation?
- i) Why is it important to scale up system-bus and device speeds as CPU speed increases?
- j) A disk has 26310 cylinders, 16 tracks and 63 sectors. The disk spins at 7200 rpm. Seek time between adjacent tracks is 1 ms. How long does it take to read the entire disk?

Part – B (Answer any four questions)

- Q3** a) Explain the various types of system calls with an example for each. (10)
 b) Discuss about the functionality of system boot with respect to operating system. (5)

- Q4** a) Explain the FCFS, preemptive and non-preemptive versions of shortest-job-first and round robin (time slice=2) scheduling algorithm with Gantt chart for the four processes given below. Compare their average turnaround time and average waiting time. (10)

Process	Arrival time	Burst time
P1	0	10
P2	1	06
P3	2	12
P4	3	15

- b) Explain briefly the major functions of operating system. (5)

- Q5** a) Consider the following snapshot of a system: (10)

Allocation MaxAvailable

	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	4	3	2	3	0
P1	3	0	2	0	2	0			
P2	3	0	2	6	0	0			
P3	2	1	1	0	1	1			
P4	0	0	2	4	3	1			

Answer the following questions using banker's Algorithm:

- (i) What is the content of matrix need?
 (ii) Is the system in safe state?
 (iii) If a request from process P1 arrives for (0, 2, 0), can the request be granted immediately?

- b) Draw the process state diagram and explain the state transaction. (5)

- Q6** a) Explain semaphore. How can semaphore be used to enforce mutual exclusion? Give suitable example to explain. (10)

- b) .How concurrency problems are solved with producer and consumer problems? (5)

- Q7** a) Consider the following page reference string 1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 4, 5, 3. How many page faults would occur for the following replacement algorithms? Assume four frames are initially empty. (10)

- (i) LRU replacement
 (ii) optimal page replacement

- b) Explain the difference between internal and external fragmentation. (5)

