

- N.B.: (1) All questions are compulsory.  
(2) Answer to the same questions must be written together.  
(3) Numbers to the right indicate marks.  
(4) Draw neat labeled diagrams wherever necessary.

1. Attempt the following (any THREE) : [15]

- (a) Explain OS. What are the different functions of OS?  
(b) Explain the brief history of OS from the 1950's till the present.  
(c) Explain readers writers problem.  
(d) What are the different types of scheduling criteria and find the average waiting time of the following processes using FCFS, SJF, Priority scheduling and Round Robin (time slice as 4 ms).

| Process | CPU Burst time | Priority |
|---------|----------------|----------|
| P1      | 6              | 2        |
| P2      | 8              | 4        |
| P3      | 7              | 3        |
| P4      | 3              | 1        |

- (e) What do you mean by critical section problem? Explain its solutions associated?  
(f) Explain difference between process and thread.

2. Attempt the following (any TWO) : [15]

- (a) What is no memory abstraction ? Explain the concept of no memory abstraction and its advantages over no memory abstractions.  
(b) What do you mean by address spaces ? State and explain the types of address spaces.  
(c) Explain page replacement algorithms. Write a note on paging.  
(d) Explain the concept of file and specify its different operations.  
(e) Explain MS-DOS file system.  
(f) State and explain UNI X V7 file system.

3. Attempt the following (any THREE) : [15]

- (a) Short note on issues of power management .Explain in brief about direct memory access.  
(b) Explain role of clocks and timers and explain in brief about the principles of input and output.  
(c) Explain preemptable and non-preemptable resources.  
(d) Mention the conditions for resource deadlocks.  
(e) State the dead lock prevention methods.  
(f) Explain the role of device drivers. Explain direct memory access.

4. Attempt the following (any THREE) [15]

- (a) What are the requirements of virtualization?  
(b) State and explain type 1 and type 2 hypervisors.  
(c) State the different techniques for virtualization.  
(d) Explain different types of multiprocessor systems.  
(e) Distinguish between loosely coupled and tightly coupled systems.  
(f) Write short notes on virtual appliances.

5. Attempt the following (any THREE)

[15]

- (a) Explain memory management in Linux.
- (b) Explain security in Linux.
- (c) Write a short note on android.
- (d) Explain in processes and threads in windows.
- (e) Explain in detail caching and I/O in windows.
- (f) Explain process management in linux.

Paper Discussion Schedule for all Subjects

| Date        | Day       | Timing                  | Centre  |
|-------------|-----------|-------------------------|---------|
| 1 Nov. 2016 | Tuesday   | 6.00 p.m. to 7.00 p.m.  | Nerul   |
| 2 Nov. 2016 | Wednesday | 9.00 a.m. to 11.00 a.m. | Andheri |
| 2 Nov. 2016 | Wednesday | 12.00 p.m. to 2.00 p.m. | Dadar   |
| 2 Nov. 2016 | Wednesday | 3.00 p.m. to 5.00 p.m.  | Thane   |

