2 0 1 5

(3rd Semester)

BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA–302 (OC)

(Fundamental of Operating System)

(Old Course)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 15)

1. Select the correct answer by putting a Tick (✓) mark in the brackets provided :   1×10=10

    (a) Parallel system is also known as

    (i) loosely coupled system   (   )

    (ii) multiprocessor system   (   )

    (iii) cluster system   (   )

    (iv) real-time system   (   )

(b) A _____ has well-defined, fixed time constraints.

    (i) single-user system ( )

    (ii) multiuser system ( )

    (iii) real-time system ( )

    (iv) distributed system ( )

(c) _____ process(s) can be running on any processor at any instant.

    (i) One ( )

    (ii) Many ( )

    (iii) Unlimited ( )

    (iv) Zero ( )

(d) CPU utilization may range from

    (i) 0–50 percent ( )

    (ii) 0–100 percent ( )

    (iii) 5–100 percent ( )

    (iv) 40–90 percent ( )

(3)

(e) An address generated by the CPU is commonly referred to as a

   (i) logical address ( )

   (ii) physical address ( )

   (iii) register address ( )

   (iv) home address ( )

(f) Roll out, roll in is a term used in

   (i) paging ( )

   (ii) deadlock ( )

   (iii) semaphore ( )

   (iv) swapping ( )

(g) A series of code sections that the loader can bring into memory and execute is

   (i) text file ( )

   (ii) source file ( )

   (iii) executable file ( )

   (iv) object file ( )

(h) Both sequential and direct accesses can be supported by

    (i) contiguous allocation ( )

    (ii) linked allocation ( )

    (iii) indexed allocation ( )

    (iv) All of the above ( )

(i) Operation that writes the new information at the end of a file is

    (i) open ( )

    (ii) write ( )

    (iii) new ( )

    (iv) append ( )

(j) _____ provides a file system interface where clients can create, update, read and delete files.

    (i) Client-server system ( )

    (ii) Peer-to-peer system ( )

    (iii) Computer-server system ( )

    (iv) File-server system ( )

2. State whether the following statements are *True* (T) or *False* (F) by putting a Tick (✓) mark : 1×5=5

(a) Kerner threads are supported directly by the operating system.

(T / F)

(b) Physical memory is broken into fixed-sized blocks called pages.

(T / F)

(c) The direct access method is based on a disk model of a file, since disks allow random access to any file block.

(T / F)

(d) A relative path name begins at the root and follows a path down to the specified file, giving the directory names on the path.

(T / F)

(e) The system uses the extension to indicate the type of the file and the type of the operations that can be done on that file.

(T / F)

SECTION—II

(*Marks* : 10)

3. Answer the following questions :   2×5=10

    (a) What is an operating system?

(b) What do you mean by turnaround time in the scheduling criteria?

(c) Explain virtual memory.

(d) List out the most common schemes for defining the logical structures of a directory.

(e) List out the seven file attributes.

★★★

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(3rd Semester)

BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA–302 (OC)

(Fundamental of Operating System)

(Old Course)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

*The figures in the margin indicate full marks
for the questions*

1. Explain the different types of operating
   system.   10

   Or

   Explain the services provided by an operating
   system with example.

2. *(a)* Explain the process state with a neat
   diagram.   5

   (b) Explain process control block.   5

G16/**193a**   (*Turn Over*)

Or

(c) What are the benefits of multithreaded programming? 4

(d) Consider the following set of processes with the length of CPU burst given in milliseconds (the processes are assumed to have arrived in the order P_1 to P_5 all at time 0) :

Process	Burst time	Priority
P_1	10	3
P_2	1	1
P_3	2	1
P_4	2	4
P_5	5	2

Draw a Gantt chart illustrating the execution of these processes using priority scheduling, FCF scheduling and SJF scheduling. Also find out the average waiting time of the above scheduling algorithm. 6

3. (a) Differentiate between logical and physical address spaces. 4

(b) With a neat diagram, explain swapping. 6

(3)

Or

(c) Explain segmentation hardware. 4

(d) What is paging? Explain the paging model showing the page table, logical memory and physical memory. 6

4. (a) Define deadlock. What are the necessary conditions for a deadlock to occur? 5

(b) Explain the various methods of recovery from a deadlock. 5

5. (a) What is authentication? Explain the different methods of user authentication. 10

Or

(b) Briefly explain the different types of program and system thread.

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2 0 1 5

(3rd Semester)

BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA–303

(Operating Systems)

(New Course)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 15)

I. Tick (✓) the correct answer in the brackets provided :

1×10=10

1. The _____ model multiplexes many user-level threads to a smaller or equal number of kernel threads.

    (a) many-to-one ( )

    (b) one-to-one ( )

    (c) many-to-many ( )

    (d) one-to-many ( )

2. The creating process is called

   (a) parent process ( )

   (b) children process ( )

   (c) process identifier ( )

   (d) All of the above ( )

3. Which of the following is not an operating system service?

   (a) Program execution ( )

   (b) Communication ( )

   (c) Error detection ( )

   (d) System call ( )

4. Clustering can be structured

   (a) symmetrically ( )

   (b) asymmetrically ( )

   (c) asymmetrically or symmetrically ( )

   (d) All of the above ( )

5. An address generated by the CPU is

  (a) memory address   ( )

  (b) address binding   ( )

  (c) physical address   ( )

  (d) logical address   ( )

6. The percentage of times that a particular page number is found in the TBL is called

  (a) TBL miss   ( )

  (b) page table   ( )

  (c) page number   ( )

  (d) hit ratio   ( )

7. Writing new information at the end of the file is

  (a) execute   ( )

  (b) append   ( )

  (c) list   ( )

  (d) read   ( )

(4)

8. Choose the odd one from the following :

   (a) Contiguous allocation   ( )

   (b) Linked allocation   ( )

   (c) Indexed allocation   ( )

   (d) Fixed allocation   ( )

9. A situation where several processes access and manipulate the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place is called

   (a) critical section   ( )

   (b) Peterson's solution ( )

   (c) remainder section   ( )

   (d) race condition   ( )

10. Choose the odd one from the following :

    (a) The bounded-buffer problem   ( )

    (b) The reader-writers problem   ( )

    (c) The dining-philosopher problem ( )

    (d) The monitor-semaphores problem ( )

(**5**)

II. Indicate *True (T)* or *False (F)* by a Tick (✓) mark :

1×5=5

1. System calls provide an interface to the service made available by an operating system.

(*T* / *F*)

2. A process is a program in execution.

(*T* / *F*)

3. The size of a page is a power of 2.

(*T* / *F*)

4. An absolute pathname defines a path from the current directory.

(*T* / *F*)

5. A code segment that misuses its environment is called a Trojan horse.

(*T* / *F*)

(**6**)

SECTION—II

(*Marks* : 10)

III. Answer the following questions :   2×5=10

1. What are different types of operating system?

III/BCA/303/**181**

2. Differentiate between turnaround time and waiting time.

3. Define virtual memory.

4. Define UFD and MFD.

5. What is the important feature of critical section problem?

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(3rd Semester)

BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA–303

(Operating Systems)

(New Course)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* What is an operating system? 4

    (b) Define the concept of multiprogrammed system and multitasking system. 6

Or

(a) What is parallel system? 4

(b) Describe distributed system and real-time system. 6

2. *(a)* What is process? Explain different states of a process with transition diagram.   6

   (b) What is interprocess communication?   4

Or

   (a) Define priority scheduling and first-come first-served (FCFS) scheduling algorithm.   4

   (b) Draw the Gantt chart and calculate average waiting time and turnaround time from the table below :   6

Process	Burst Time
P_1	24
P_2	3
P_3	3

3. *(a)* What is meant by fragmentation? Differentiate between internal fragmentation and external fragmentation.   4

   (b) What is memory allocation? Explain the strategies first fit, best fit and worst fit.   6

Or

   (a) What is page replacement? Describe any one page replacement.   6

G16/181a   *(Continued)*

   (b) Determine the total swap time for a user process of size 10 MB where the backing store is a standard hard disk with a transfer rate of 40 MB per second and latency time of 8 msec.   4

4. (a) What is file? List any three attributes.   4

   (b) Explain the six file operations.   6

Or

   (a) What is directory? What are the operations that can be performed on a directory?   4

   (b) Describe the tree-structured directories.   6

5. (a) What is deadlock? What are the necessary conditions for a deadlock situation?   6

   (b) Explain any one strategy of deadlock recovery.   4

Or

   (a) Explain banker's algorithm for deadlock avoidance.   6

   (b) Draw a resource allocation graph for the following situation and check if the system is in deadlock :   4

Process P_1 is (holding) using resource R_2 and waiting for resource R_1

P_2 is using R_1 and waiting for R_3, R_4 and R_5

P_3 is using R_4 and waiting for R_5

P_4 is using R_5 and waiting for R_2

P_5 is using R_3

★ ★ ★