Seat No. : _____

DB-123

December -2017

S.Y. M.Sc. (CA & IT) Integrated

Concepts of Operating System

Time : 3 Hours] **[Max. Marks : 100**

1. Explain the following : (Any **Four**) **20**
   (a) Explain Processor registers in detail.
   (b) What is Interrupt? Explain types of Interrupts in detail.
   (c) Differentiate multi programming and multi processing.
   (d) Draw and explain five state process models with its transitions.
   (e) List and explain five reasons for process termination.

2. (a) Define the following terms : **5**
   (i) Mutual Exclusion
   (ii) Starvation
   (iii) Deadlock
   (iv) Critical section
   (v) Race condition

   (b) What is Monitor? Write a solution to the Bounded-buffer producer/consumer problem using monitor. **5**

   OR

   Explain dining philosophers problem. Write a solution to the dining philosophers problem using semaphore.

   (c) Considering a system with four processes P1 through P4 and four resources types Rl to R4. **Using Banker's deadlock avoidance algorithm** check is the system in safe state ? If yes, then what is the safe sequence ? **10**

Process	Request				Allocation				Available			
	R1	R2	R3	R4	R1	R2	R3	R4	R1	R2	R3	R4
P1	0	0	1	2	0	0	1	1	3	2	0	2
P2	2	7	5	0	2	0	0	0				
P3	4	3	5	6	2	3	5	3				
P4	0	6	5	2	0	3	3	2				

3. Explain the following : **20**

(a) Write a short note on fixed partitioning.

(b) Consider a system with 1MB of memory being partitioned using the buddy system. Draw a diagram showing the allocation of memory after each of the following requests have been granted :

Request A : 100K; Request B : 400K; Request C : 60K; Release A ; Request D : 200K; Release C; Release D; Release B;

(c) What is virtual memory ? Explain TLB (Transaction Lookaside Buffer) in detail.

(d) If the reference string is : 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3,

we have taken the physical memory of three frames, then solve by **LRU** and **FIFO** Page Replacement Algorithm.

4. Answer the following :

(a) Explain the following : (Any **Two**) **10**

(i) Differentiate User level Thread and Kernel level Thread.

(ii) What is Micro kernel? Explain its benefits in detail.

(iii) What is SMP (symmetric multiprocessor)? Explain SMP architecture.

(b) Apply **SRT, Round robin (q=1), HRRN** for the following information. Also calculate the turnaround time and waiting time : **10**

Process	Arrival Time	Service Time
A	0	3
B	1	6
C	4	4
D	6	2

5. Explain the following : **20**

(a) Explain I/O buffering techniques in detail.

(b) List and explain record blocking methods.

(c) Consider the following sequence of Disk track request

5, 25, 18, 3, 39, 8, 35

With Disk head initially positioned over 20. Show the next track allocation using (i) **FIFO** (ii) **C-SCAN**

(d) List and explain elements of file directory.