PG/IIIS/COS-301/19

M.Sc. 3rd Semester Examination, 2019

COMPUTER SCIENCE

(*Advanced OS*)

PAPER—COS-301

Full Marks : 50

Time : 2 hours

Answer **all** questions

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

GROUP – A

1. Answer any *four* quetions : 2 × 4

(*a*) Define seek time and latency time. 2

(*b*) What is the difference between thread and process ? 2

(*c*) Explain the function of RAID 0 and RAID 1 levels. 2

(*d*) What is semaphore ? What do you mean by critical section ? 1 + 1

(*e*) Explain the situation for transition of a process from different states of a process. 2

(*f*) When a process is called synchronized and when not ? 2

(*g*) Compare LOOK and C-LOOK algorithm. 2

(*h*) What do you mean by locality of reference ? 2

GROUP – B

Answer any **four** questions : 4 × 4

2. Given five partitions of size 10 K, 8 K, 6 K, 12 K and 4 K respectively and a job queue with job requiring size of 11 K, 9 K, 6 K, 7 K and 5 K respectively. Allocate the job in best fit and first fit policy. 2 + 2

3. Using the Round Robin scheduling find the average waiting and average turn around time for the following :

Jobs	Arrival Time	Run Time
J_1	4	4
J_2	2·5	2
J_3	0	3
J_4	1	1·5

TS = 1. 4

4. Find the total number of track movement in SCAN and C-SCAN algorithm for the following request :

Request sequence : {176, 79, 34, 60, 92, 11, 41, 114}

Initial head position = 50

Track Range = 0 to 199

Direction = Right to Left. 2 + 2

5. (*a*) A semaphore variable p has initial value of 0. It executes five v operations and ten p operation. What is the find value of p ?

(*b*) What are the necessary conditions of dead lock ? 2 + 2

6. (*a*) What are the major drawbacks of paging system ?

   (*b*) Why the page size is a power of *z* ? 2 + 2

7. (*a*) What do you mean by buddy allocation ?

   (*b*) What is inverted page table ? 2 + 2

8. Solve the producer consumer problem using semaphore. 4

9. (*a*) If the number of process at any time is one, can a deadlock situation arise ?

   (*b*) What do you mean by CPU bound and I/O bound process ? 2 + 2

GROUP – C

Answer any **two** questions : 8 × 2

10. (a) Find the number of track movement in SSTF, LOOK and C-LOOK algorithm with neat diagram for the following :

Request sequence = {45, 21, 67, 90, 4, 50, 89, 52, 61, 87, 25}

Head Position = 50

Track Ranging 0 to 99.

(*b*) What is segmentation ? 6 + 2

11. (*a*) Find the average memory access time for a processor with 2ns clock cycle time, a miss rate of 0·04 misses per instruction, a miss penalty of 25 clock cycles and a cache access time (including hit detection) of 1 clock cycle. Also assume that the read and write miss penalties are same and ignore other write stalls.

(*b*) What is absolute miss and relative miss rate ?

(*c*) What is convoy effect ? Who suffers in it ? 4 + 2 + 2

12. (*a*) Find the total number of page faults in LRU and *optimal page replacement* algorithm

for the following page reference stream :
1, 2, 3, 2, 15. 2, 1, 6, 2, 5, 6, 3, 1, 3, 6, 1, 2, 4, 3
Initially 3 empty frames.

(*b*) What is race condition ? (3 + 3) + 2

13. (*a*) What are the tasks performed by the file management of OS ?

(*b*) Write a short note on 'Protection and Security in operating system'. 4 + 4

[*Internal Assessment* : 10 Marks]