

**2018**  
**COMPUTER SCIENCE**  
**[HONOURS]**  
**Paper : IIA**  
**(Group-A)**

Full Marks : 50

Time : 2 Hours

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*Answer **Q. No.1** and any **three** from the rest.1. Answer any **four** questions: 2×4=8

- a) What is spooling?
- b) What do you mean by context switching?
- c) Write the differences between application software and system software.
- d) What is a process?
- e) What is buffering?
- f) What is kernel?
- g) What is process scheduling?

2.
  - a) Describe different phases of a process.
  - b) Describe the differences among short-term, medium-term and long-term scheduling.
  - c) Discuss scheduling criteria. 4+5+5
3. a) Consider the following process, with the CPU burst time given in milliseconds:

Process	Burst time	Priority
P <sub>1</sub>	16	3
P <sub>2</sub>	1	1
P <sub>3</sub>	2	3
P <sub>4</sub>	1	4
P <sub>5</sub>	5	2

Process are arrived in P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>, P<sub>4</sub>, P<sub>5</sub> order of all at time 0.

- i) Draw the Gantt chart to show execution using FCFS, SJF, non-preemptive priority and RR (quantum=1) scheduling.
- ii) Also calculate the average waiting time for each scheduling criteria.
- iii) What is the average turn around time for each scheduling?

- b) Discuss multilevel feedback queue scheduling. (4+3+3)+4

4. a) Describe Banker's algorithm.  
b) Describe deadlock prevention.  
c) Consider the following snapshots:

Process	Allocation		Max		Available	
	R <sub>1</sub>	R <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>
P <sub>1</sub>	7	2	9	5		
P <sub>2</sub>	1	3	2	6		
P <sub>3</sub>	1	1	2	2		
P <sub>4</sub>	3	0	5	0		

- i) Calculate the content of a matrix need.  
ii) System is safe or unsafe.

$$4+4+(2+4)$$

5. Write short notes on: 4+4+3+3=14

- i) Race condition  
ii) Semaphore  
iii) LRU page replacement policy  
iv) Dispatcher

6. a) What is Belady's Anomaly?

- b) Consider the following reference string:

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1.

How many page faults will occur for 3-page frames for each of the following algorithms?

FIFO, LRU and optimal page replacement.

- c) Consider a disk queue with I/O requests on the following cylinders in their arriving order:

67, 12, 15, 45, 48, 50, 109, 89, 56, 59, 34, 88, 130, 24, 109, 22.

The disk head assumed to be at cylinder 80 and moving in the direction of increasing number of cylinders. The disk consist of total 150 cylinders. Calculate the total head movement and show with diagram the disk movement using FCFS and SCAN.

$$2+(2+2+2)+(3+3)=14$$