 C/18/B.Sc./Part-II/3T(N)/COSG/2A

NEW

2018

Part II 3-Tier

COMPUTER SCIENCE

PAPER—IIA

(General)

Full Marks : 50

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers whenever necessary

Group—A

(Operating System)

Answer any *two* questions. 2×10

1. (a) What is process control block ? Explain its contents with the help of a diagram.

(b) Why do we need scheduling ?

(c) Consider the following snap-shot of processes and compute average Turn Around Time and Waiting time

of proceses for FCFS, SJF Algorithms.

Process	*Arrival time (ms)*	*Next CPU Burst (ms)*
P_0	0	10
P_1	1	6
P_2	3	2
P_3	5	4

[3+2+(2+3)]

2. (a) What is critical section problem ? Write down the necessary condition to solve a critical section problem ?

   (b) What is a semaphore variable ?

   (c) How semaphore variable can solve critical section problem ? 4+2+4

3. (a) What is Deadlock ? What are the necessary conditions for deadlock ?

   (b) Draw process state diagram and describe all the states.

   (c) Consider a system with five processes P_0 through P_4 and three resource types A, B and C. Suppose at time t_o following snapshot of the system has been taken.

Process	Allocation	Max	Available
	A B C	A B C	A B C
P_0	0 1 0	7 5 3	3 3 2
P_1	2 0 0	3 2 2	
P_2	3 0 2	9 0 2	
P_3	2 1 1	2 2 2	
P_4	0 0 2	4 3 3	

(i) What will be the need matrix ?

(ii) Is the system in safe state ? If yes, then what is the safe sequence ? 3+3+4

4. (a) What is internal and external fragmentation ?

(b) What is Paging ? Write down the disadvantages of Paging ?

(c) What is Belady's anomaly ? Give an example. 3+4+3

Group—B

(Database Management System)

Answer any *two* questions. 2×12½

5. (a) Write the differences between the Logical and Physical data independence.

(b) Compare Network and Hiererchial data model.

(c) What are the advantages of DBMS over file oriented approach ?

(d) What do you mean by database anomalies ?
[6+1½+3+2]

6. (a) What is RDBMS ? What are the differences of RDBMS with DBMS ?

(b) Why normalization is needed ? Explain.

(c) Write a short note on Generalization. [5+4+3½]

7. (a) What is aggregation in DBMS ?

(b) Write down the different mapping cardinality in DBMS.

(c) What is Candidate Key ? Find out the Candidate Key from the following relation.
R(A, B, C, D, E) with FD'S F = {AB $\rightarrow$ CD, D $\rightarrow$ A, BC $\rightarrow$ DE}. 4+4+4½

8. (a) What is single valued and multivalued attribute ? Give an example.

(b) Write a short note about DML.

(c) What is E-R diagram in DBMS ? Explain different components of it. 5+3½+4

[Internal Assessment : 5 Marks]

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