



**Bangladesh University of Business & Technology (BUBT)**  
**Department of Computer Science and Engineering**  
**Mid Term Examination: Spring 2021**  
**Course Code: CSE 417 | Course Title: Distributed Database Management Systems**  
**Intake: 38<sup>th</sup>, Shift: Day**

**Marks – 30**

*[Answer all the questions]*

- CO1 1 a) Discuss the scopes of distributed database in the present time of application systems. What are the main challenges to build distributed database system? 5
- b) Discuss the various types of system design alternatives. Explain when it is appropriate to design peer to peer system. 5
- CO1 2 a) What do you mean by minterm predicates, their access frequencies and their minterm selectivity? Explain those using your own example. 5
- CO2 b) Consider relation ASG in Figure 2b. Suppose there are two applications that access ASG. The first is issued at three sites and attempts to find the duration of assignment of the employees given their numbers. Assume that managers, analysts, and programmers are located at three different sites. The second application is issued at two sites where the employees with assignment duration of less than 28 months are managed at one site, whereas those with longer duration are managed at a second site. Derive the primary horizontal fragmentation of ASG using the foregoing information. 5

ENO	PNO	RESP	DUR
E1	P1	Manager	12
E2	P1	Analyst	24
E2	P2	Analyst	6
E3	P3	Consultant	10
E3	P4	Engineer	48
E4	P2	Programmer	18
E5	P2	Manager	24
E6	P4	Manager	48
E7	P3	Engineer	36
E8	P3	Manager	40

Figure-2b: ASG relation

- CO2 3 a) Discuss how we can optimally allocate fragmented tables for our applications. 3

b) Let  $Q = \{q_1; \dots; q_5\}$  be a set of queries,  $A = \{A_1; \dots; A_5\}$  be a set of attributes, and  $S = \{S_1; S_2; S_3\}$  be a set of sites. The matrix of Figure (3a) describes the attribute usage values and the matrix of Figure (3b) gives the application access frequencies. Suppose attribute  $A_1$ ,  $A_2$  is already placed in clustered affinity matrix. Now calculate the clustered affinity matrix for placing attribute  $A_4$ .

	$A_1$	$A_2$	$A_3$	$A_4$	$A_5$		$S_1$	$S_2$	$S_3$
$q_1$	0	1	1	0	1	$q_1$	10	20	0
$q_2$	1	1	1	0	1	$q_2$	5	0	10
$q_3$	1	0	0	1	1	$q_3$	0	35	5
$q_4$	0	0	1	0	0	$q_4$	0	10	0
$q_5$	1	1	1	0	0	$q_5$	0	15	0

(a)
(b)

Fig 3: Attribute Usage Values and Application Access Frequencies