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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- September 2016

B.Tech/ M.Tech VII/I Semester

COURSE CODE: 10M11CI113 MAX. MARKS: 15

COURSE NAME: Advanced Database Systems

COURSE CREDITS: 3 MAX. TIME: 1Hr

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1. Prove or disprove the following inference rules for functional dependencies. A proof can be made either by a proof argument or by using inference rules. A disproof should be done by demonstrating a relation instance that satisfies the conditions and functional dependencies in the left hand side of the inference rule but do not satisfy the conditions or dependencies in the right hand side.

(a) {W ->Y, X ->Z} = {WX ->Y}
(b) {X ->Y} and Z subset-of Y = {X ->Z}
(c) {X ->Y, X ->W, WY ->Z} = {X ->Z}
(d) {XY ->Z, Y ->W} = {XW ->Z}
(e) {X ->Z, Y ->Z} = {X ->Y}

[5]

Q2. Consider the universal relation R = {A, B, C, D, E, F, G, H, I} and the set of functional dependencies F = { {A, B} -> {C}, {A} -> {D, E}, {B} -> {F}, {F} ->{G, H}, {D} -> {I, J} }. What is the key for R? Decompose R into 2NF, then 3NF relations.

[3]

Q3. Which of the following schedules is (conflict) serializable? For each serializable schedule, determine the equivalent serial schedules.

(a) r1 (X); r3 (X); w1(X); r2(X); w3(X)
(b) r1 (X); r3 (X); w3(X); w1(X); r2(X)
(c) r3 (X); r2 (X); w3(X); r1(X); w1(X)
(d) r3 (X); r2 (X); r1(X); w3(X); w1(X)

[2]

Q4. Prove that any relation schema with two attributes is in BCNF.

[2]

Q5. Design a generalization–specialization hierarchy for a motor vehicle sales company. The company sells motorcycles, passenger cars, vans, and buses. Justify your placement of attributes at each level of the hierarchy. Explain why they should not be placed at a higher or lower level. Your design should include an E-R diagram, a set of relational schemas, and a list of constraints, including primary-key and foreign-key constraints.

[3]