**Birla Institute of Technology & Science, Pilani**

**Work-Integrated Learning Programmes Division**

**Second Semester 2019-2020**

**Comprehensive Examination**

**(EC-3 Regular)**

Course No. : CSI ZG518

Course Title : DATABASE DESIGN AND APPLICATIONS

Nature of Exam : Open Book

No. of Pages = 2

# No. of Questions = 9

Weightage : 45%

Duration : 2 Hours

Date of Exam : Sunday, 12/07/2020 (AN)

Note:

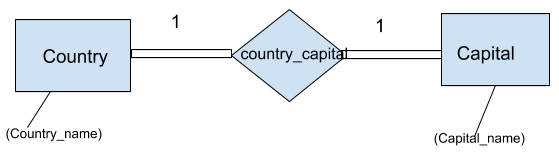
1. Please follow all the *Instructions to Candidates* given on the cover page of the answer book.
2. All parts of a question should be answered consecutively. Each answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.
4. Consider schedules S1, S2, and S3 below. Determine whether each schedule is strict, cascadeless, recoverable, or non-recoverable. (Determine the strictest recoverability condition that each schedule satisfies). Answers without proper reasoning will not fetch marks. [6]

S1: r1 (X); r2 (Z); r1 (Z); r3 (X); r3 (Y); w1 (X); c1; w3 (Y); c3; r2 (Y); w2 (Z); w2 (Y); c2;

S2: r1 (X); r2 (Z); r1 (Z); r3 (X); r3 (Y); w1 (X); w3 (Y); r2 (Y); w2 (Z); w2 (Y); c1; c2; c3;

S3: r1 (X); r2 (Z); r3 (X); r1 (Z); r2 (Y); r3 (Y); w1 (X); c1; w2 (Z); w3 (Y); w2 (Y); c3; c2;

1. You need to explain to you friend about how the view serializability is different from conflict serializability? Give example to support the difference between them? You can explain the supporting terms as well. [5]
2. Your friend enquires you about the usage of bitmap indexing. Explain him the advantages with suitable example to justify the advantage. [5]
3. Reduce the following ER diagram to relational model. Give the relational schema so as to avoid redundancies by following the principles of reduction. [4]



1. Figure below shows the log corresponding to a particular schedule at the pointof a system crash for four transactions T1, T2, T3, and T4. Suppose that weuse the immediate update protocol with checkpointing. Describe the recoveryprocess from the system crash. Specify which transactions are rolledback, which operations in the log are redone and which (if any) are undone,and whether any cascading rollback takes place. What are the values of A,B, C, and D at time of system crash and after the system crash. [6]



1. Your organization conducts the survey from various faculty members of different universities. You need to reveal only the statistical information about the survey without exposing the data related to individual faculty. Which security mechanism would be used for this? How you would ensure the security? Discuss the pitfalls of your solution technique. Examples supporting your answer are helpful. (No diagram required) [6]
2. One of your friends thinks that the soft copy of his signature is digital signature. You need to explain him briefly your understanding of digital signature. Answer in your own words. [5]
3. Elaborate on the link between ER diagram, Relational model, Normalization, and Indexing. Explain the steps that are generally followed while designing a Database. You can take an example to explain your understandings. Answers in own works are appreciable [5]
4. A Functional dependency (f.d. 1) says AB🡪C. Does f.d.1 mean A🡪 C and B🡪C? Why or why not. Another f.d.; f.d.2 says A🡪BC. Does f.d.2 mean A🡪B and A🡪C? Why or why not. [3]

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