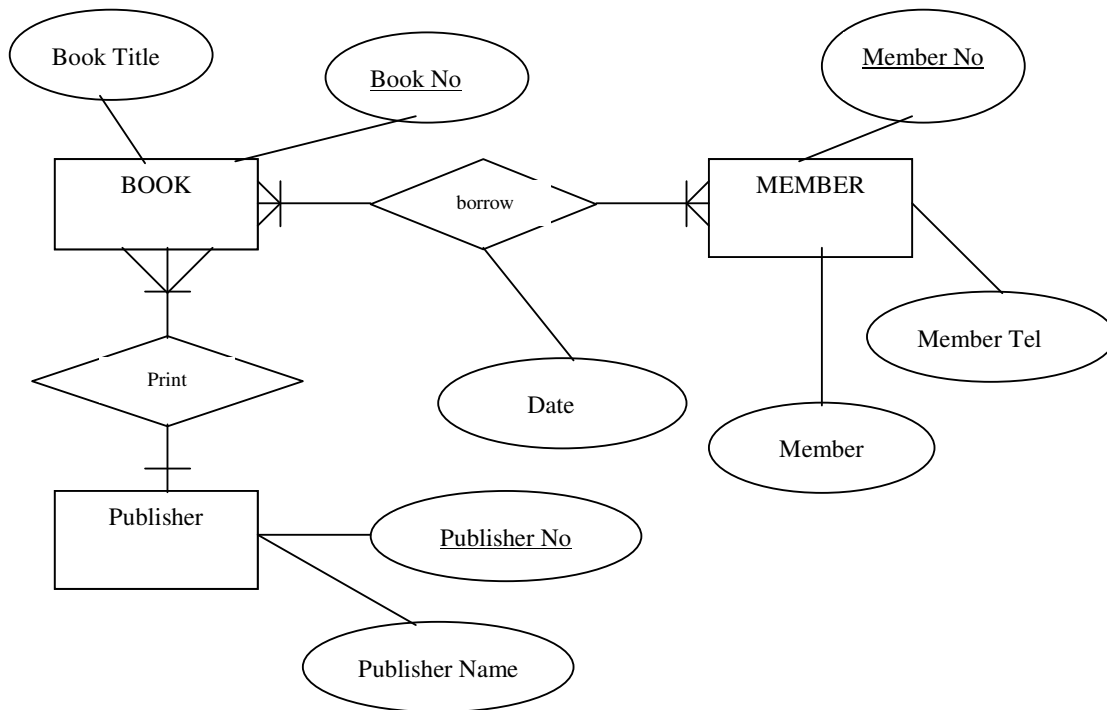


Question 1 (Compulsory)

- (a) Convert the following entity relationship diagram (ERD) into relations: [6]



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- (b) In the context of database management systems, give a definition of each of the following terms: [16]

- (i) Database
- (ii) Database management system
- (iii) Unary relationships
- (iv) Entity
- (v) Attribute
- (vi) Normalization
- (vii) Functional dependency
- (viii) Ternary relationships

- (c) Based on the names of the fields shown, suggest suitable Data Types for the Columns indicated. [8]

Table	Column	DataType
Festival	Name	(i)
	Month	(ii)
	Location	(iii)
	Country	(iv)
Taxi	Registration Number	(v)
	Driver	(vi)
	Registration Date	(vii)
	Company	(viii)

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Question 2

- (a) List **seven** steps in building the Data Model in the development of a database system. [7]
- (b) Describe **four** reasons for creating a data model. [4]
- (c) Give **four** drawbacks of using file processing approach. [4]

Please turn over

Question 3

(a) What is an index? Why are indexes used in databases? [2]

(b) Consider the following two relations for a database of student registrations:

STUDENT (STUDENT_ID, STUDENT_NAME, CAMPUS_ADDRESS, GPA)

REGISTRATION (STUDENT_ID, COURSE_ID, GRADE)

A typical query against these relations might be as follows:

```
SELECT SUTDENT.STUDENT_ID, STUDENT_NAME, COURSE_ID, GRADE
FROM STUDENT, REGISTRATION
WHERE STUDENT.STUDENT_ID = REGISTRATION.STUDENT_ID AND GPA
> 3.0
ORDER BY STUDENT_NAME;
```

On what attributes should indexes be defined in order to speed up queries like the one above? Justify your answer. [7]

(c) Using examples, explain and illustrate the two referential integrity rules, which are concerned with insertions and deletions. [6]

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Question 4

Draw E-R diagram for each of the following situations domain of criminal court cases and place minimum and maximum cardinalities on the diagram.

Each judge has a list of outstanding case over which he will preside. Only one judge presides per case. For each case one prosecuting counsel is appointed to represent the Department of Public Prosecutions. Cases are scheduled at one Crown Court for an estimated duration from a given start date. A case can try more than one crime. Each crime can have one or more defendants. Each defendant can have one or more defending barristers. If a crime has multiple defendants, each defendant can have one or more defense counsel defending. Defendants may have more that one outstanding case against them. [15]

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Question 5

A table of records in a flat file is given below. With reference to the table, answer the following:

- (a) Define the 1NF, 2NF and 3NF. [3]
- (b) Normalize the relation below to meet the requirements of 3NF. (You are expected to show the UNF, 1NF, 2NF and 3NF in detail.) [12]

Student Number	Student Name	Course Number	Course Title	Course Length	Exam Date	Grade
01014547	John	CS211	System Analysis & Design	8	6 Dec 2002	A
01014547	John	CS260	Advance Networking	8	4 Dec 2002	B
01014567	Mary	CS211	System Analysis & Design	8	6 Dec 2002	C
01014567	Mary	CS260	Advance Networking	8	4 Dec 2002	A
01014567	Mary	CS298	Advance C++	9	1 Dec 2002	B
01014500	Peter	CS260	Advance Networking	8	4 Dec 2002	A
01014500	Peter	CS298	Advance C++	9	1 Dec 2002	B
01018799	Robinson	CS211	System Analysis & Design	8	6 Dec 2002	C
01018799	Robinson	CS260	Advance Networking	8	4 Dec 2002	D

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