6 Databases (KM)

(a) Codd’s 1970 paper introduced the Relational Model of data to address the difficulties of building database applications using the technology that was available at the time.

(i) What problems were encountered by database developers before Codd introduced the Relational Model? [1 mark]

(ii) Describe the basic elements of the Model, and explain what is meant by a relational schema. [4 marks]

(iii) Explain how a formal schema can assist both the application database designer and a database application programmer. What if any are the disadvantages of adopting a mathematical description of database structure? [5 marks]

(b) In 1976 Peter Chen introduced the Entity Relationship (E-R) Model to support a more natural description of real world data.

(i) Describe the basic elements of the Model, and explain some of the choices available to the database designer. [4 marks]

(ii) Explain what is meant by a foreign key in the relational model. How could you use foreign keys to represent a database described by an E-R model in relational form? To what extent are the two approaches to data modelling complementary? [6 marks]