Question One

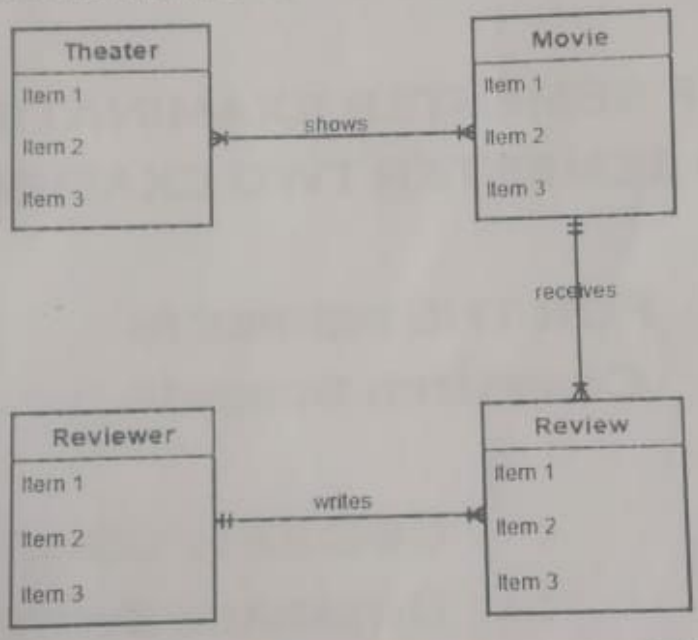
a) Evor chemist in Bungoma town acquires drugs from various wholesalers in bulk. The chemist staff then unpackages these drugs and sells them to individual customers at retail prices. If the chemist was to design a database for its operations, list FOR entities that will be included in the design. **[4 marks]**

b) Define the following terms **[6 Marks]**

i) Database
ii) Database application
iii) Database System
iv) Database Management System

c) Clearly explain the key functions of a database management system **[10 Marks]**

d) Write the business rules that are reflected in the ERD shown below **[4 Marks]**



e) You have been employed as an ICT manager for fast-growing fashion shop. You have proposed that they implement an information system to management the huge capacity of data they are generating each and every day. Briefly discuss types of databases that you will present to the management for consideration. **[6 Marks]**

Question Two

a) Using a diagram, explain the 3-tier database architecture outlining its benefits **[5 Marks]**

b) Differentiate between the following. **[4 Marks]**

a. Relational Model and the Entity-Relational Model.
b. Database schema and database instance.

c) With the help of a diagram describe the network model **[3 Marks]**

d) A DBMS is partitioned into several software components (or *modules*), each of which is assigned a specific operation. Briefly describe the role of the following components: **[8 Mark]**

a) Database Manager
b) File Manager
c) Query Processor
d) Catalog Manager

Question Three

Mana Ltd. keeps records of the products it stores in a warehouse and the factories that make the products. Each product is identified by a unique product number and has a name and description. A product is made by a single factory but a factory can make more than one product. A factory is recognized by a factory code and has an address and telephone number. A product can be stored in one or more warehouses and a warehouse can stock a number of products. The quantity of a product stored at a warehouse needs to be recorded. A warehouse is identified by a warehouse code and the address is also held.

i) Identify the entities in the case study. **[2 Marks]**
ii) Draw an ER diagram for the case study. **[4 Marks]**
iii) Show the cardinality and participation constraints in the E-R. **[2 Marks]**

b) Discuss three types of relationships that can be implemented in databases using well labelled diagrams. **[6 marks]**

c) Jack wants to design tables to be used in a given database. Using illustrations outline symbols that he can use in the design. **[6 marks]**

Question Four

a)
A university registrar's office maintains data about the following entities:

- courses, including number, title, credits, syllabus, and prerequisites;
- course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom;
- students, including student-id, name, and program; and
- instructors, including identification number, name, department, and title.

Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled.

- Construct an E-R diagram for the registrar's office **[8 marks]**
- Document all assumptions that you make about the mapping constraints. **[2 marks]**

b) Explain the difference between physical and logical data independence **[4 marks]**

c) Models are used to represent the architecture of various systems. Discuss four types of database models that can be implemented in database design. **[6 marks]**

Question Five

a) State six advantages of a computerized database over the traditional file system. **[6 marks]**

b) With the use of suitable diagrams, illustrate the difference between the file system and a database system. **[4 marks]**

c) Describe the five components of the DBMS environment and discuss how they relate to each other. **[10marks]**