

The course code:  
 ECS2108

This course intend the following iLOS according to (NARS 2009):  
 a (4, 5, 7, 8, 11) - b (2, 3, 8, 9, 12) - c (3, 9) - d (2, 6, 7, 8)

**Answer the following question: (in Two pages)**

**Question 1 (25 Marks)**

- (a) Draw a block diagram for the Systems waterfall Life Cycle.
- (b) **SELECT** statement is one of the important statements in SQL language. Write the parts of this statement in order.
- (c) In the university system, the entity type **STUDENT** in used. a student is either **Undergrad Student** or **Graduate Student**. He has the following attributes: **Student Name, Address, Phone, Age, Activity, and No of Years**. The **Undergrad Student** has an attribute: class number and **Graduate Student** has an attribute: test score.

*Activity* represents some campus-based student activity, and *No of Years* represents the number of years the student has engaged in this activity. A given student may engage in more than one activity.

- i. Would you consider creating a supertype/subtype relationship for this problem?
- ii. Draw an Entity-Relationship schema for this situation. (Remember to include a subtype discriminator. ("d" or "o") )
- iii. What attribute or attributes did you designate as the identifier for the **Student** entity? Why?

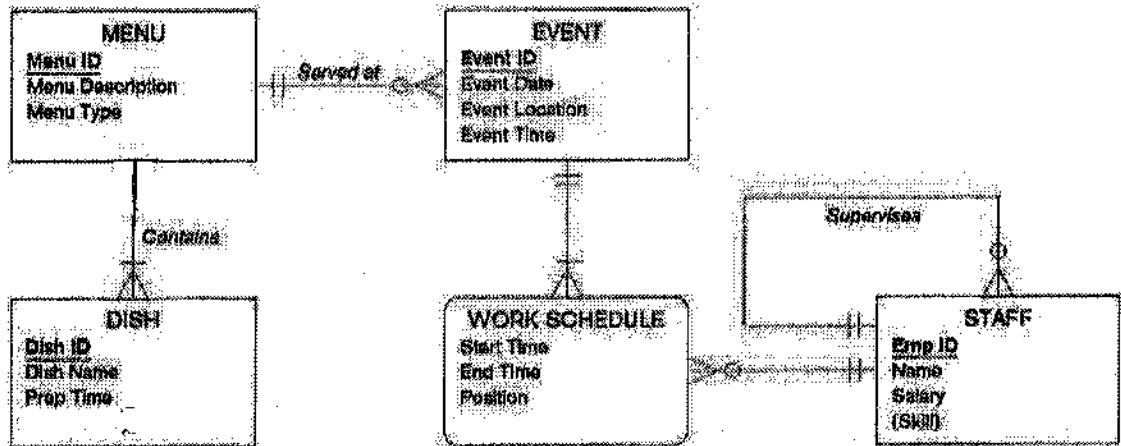
**Question 2 (20 Marks)**

- (a) What is meant by Data Normalization? Construct the three main steps in *Normalization*. Mention the main steps in Data Normalization.
- (b) The following table shows a relation called **PART SUPPLIER** for a university.
  - i. In what normal form is this relation? (Is it in 1NF or not? If Not, convert into 1NF.)
  - ii. Draw the functional dependencies in the relation
  - iii. Decompose **PART SUPPLIER** into a set of 3NF relations.
  - iv. Draw a relational schema for your 3NF relations and show the referential integrity constraints.

Part No	Description	Vendor Name	Address	Unit Cost
1234	Logic chip	Fast Chips	Cupertino	10.00
		Smart Chips	Phoenix	8.00
5678	Memory chip	Fast Chips	Cupertino	3.00
		Quality Chips	Austin	2.00
		Smart Chips	Phoenix	5.00

**Question 3** (25 Marks)

- (a) What is the "E-R Model" referred to? What are the main components of ER model?
- (b) In the Physical Design Process, what is meant by Data Volume and Usage Analysis.
- (c) Study the following model and answer the following question:
  - i. What database is the system stands for?
  - ii. Draw the *full* Relational Model for the given schema.
  - iii. Mention *all referential integrity* constraints that would ensure that any dependent relation found referred to its parent relation.
  - iv. Write the SQL code for creating the entity called "Kitchen".



**Question 4** (20 Marks)

- (a) What is meant by Denormalization? Mention the common denormalization opportunities.
- (b) (i) Transfer each of the following two schemas to *Relational Database schema*, then,
  - (ii) Denormalize each of them in suitable relations.

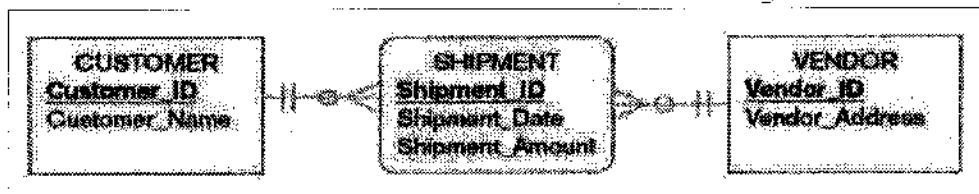


Fig (a)

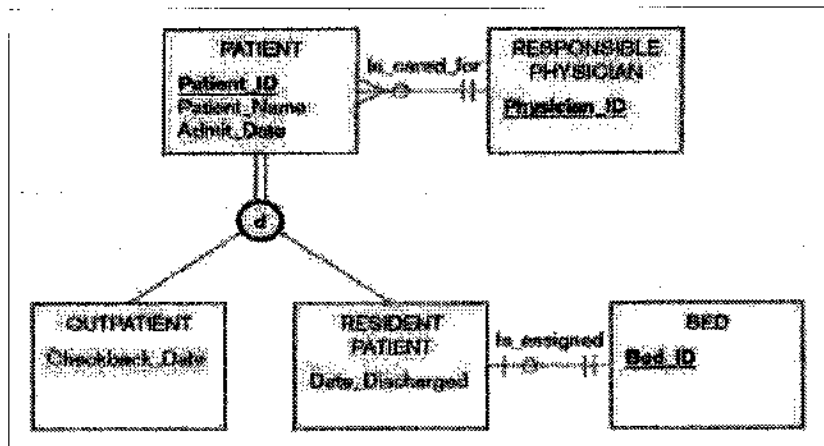


Fig (b)

*With my best wishes*

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