TE/Insem.-642

T.E. (Information Technology)
DATABASE MANAGEMENT SYSTEMS
(2015 Pattern) (Semester - I)

Time : 1 Hours]

[Max. Marks : 30

Instructions to the candidates:-

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right side indicate full marks.*
4) *Use of calculator is allowed.*
5) *Assume suitable data, if necessary.*

Q1) a) Explain the distinctions among the terms primary key, candidate key, and super key with example. **[4]**

b) List different components used in E-R diagram with their meaning and construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars, and has one or more premium payments associated with it. Each payment is for a particular period of time, and has an associated due date, and the date when the payment was received. **[6]**

OR

Q2) a) Explain Specialization, generalization and aggregation with example. **[5]**

b) What is schema definition? Explain the types of attributes with an example. **[5]**

Q3) a) Explain different DDL and DML commands with example. **[5]**

b) State the need of normalization? Explain 1NF, 2NF and 3NF with example. **[5]**

OR

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Q4) a) Explain good database design properties. **[5]**

b) State and explain Armstrong's axioms and its properties. **[5]**

Q5) a) What is Transaction? Explain ACID properties of transaction. **[5]**

b) What is serializable schedule? Explain with suitable example the types of serializable schedules. **[5]**

OR

Q6) a) What is cursor? Explain types of cursor with suitable example. **[5]**

b) What is trigger? Explain trigger with suitable example. **[5]**

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T.E./Insem.-644
T.E. (Information Technology)
OPERATING SYSTEM (Semester - I)
(2015 Pattern)

Time :1 hour] *[Max. Marks :30*

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3or Q.4, Q.5 or Q.6.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Assume suitable data, if necessary.*

Q1) a) State and explain different services provided by an Operating System.**[6]**

b) Explain the following shell commands with example. **[4]**

i) Chmod   ii) Grep   iii) Cat   iv) Sort

OR

Q2) a) Explain the concept of virtual machine with its benefits. **[4]**

b) Write a shell script for sorting a given list of numbers using any sorting strategy. **[6]**

Q3) a) For the table given below calculate average waiting time and average turnaround time and draw a Gantt Chart illustrating the process execution using following scheduling algorithms. **[8]**

i) RR (Time slice-2units)   ii) SJF (non-preemptive)

Process	Arrival Time	Burst Time
P1	0	8
P2	1	5
P3	3	3
P4	4	1
P5	6	4

b) Differentiate between process and thread. **[2]**

P.T.O.

Q4) a) For the table given below, calculate average waiting time and average turnaround time, also draw a Gantt Chart illustrating the process execution using following scheduling algorithms. **[8]**

    i)   FCFS   ii)   SJF (preemptive)

Process	Arrival Time	Burst Time
P1	0	9
P2	1	1
P3	2	7
P4	3	1
P5	4	6

    b) Define Context Switch. **[2]**

Q5) a) Consider the following snapshot of a system: **[6]**

	Allocation				Maximum				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following questions using banker's algorithm.

i)   What are the contents of Need matrix?

ii)   Is the system in a safe state?

    b) Explain busy waiting with appropriate example? **[4]**

Q6) a) Write a pseudo code for producer-consumer problem using semaphores.**[6]**

    b) Explain the necessary and sufficient conditions for the occurrence of a deadlock. **[4]**

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T.E./Insem.-645
T.E (Information Technology)
HUMAN COMPUTER INTERACTION
(2015 Pattern)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:-
1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right side indicate full marks.*
4) *Assume suitable data, if necessary.*

Q1) a) Explain principles of Human Computer Interaction? **[5]**

b) Explain Design of everyday things with example? **[5]**

OR

Q2) a) Explain disciplines contributing to Human Computer Interaction. **[5]**

b) Why empathy is important for human centered design? **[5]**

Q3) a) List human Input-output channels and discuss briefly about it. **[5]**

b) Write a long term memory model script for case given below An Owner went to veterinary hospital along with dog. **[5]**

OR

Q4) a) What is reasoning? Explain different types of reasoning with examples?**[5]**

b) Explain the role of Senses which plays an important role in HCI? **[5]**

Q5) a) Enlist different interaction styles and describe different interaction styles used to accommodate the dialog between user and computer. **[5]**

b) Explain Donald Norman's seven stages of Interaction. **[5]**

OR

Q6) a) What is Ergonomics? **[5]**

b) What is WIMP? Explain elements of WIMP interfaces? **[5]**

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T.E./Insem.-643

T.E (Information Technology)

SOFTWARE ENGINEERING & PROJECT MANAGEMENT

(2015 Pattern) (Semester - I)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:-

1) *Solve any 1 out of Q1 or Q2 and.*
2) *Solve any 1 out of Q3 or Q4 and.*
3) *Solve any 1 out of Q5 or Q6.*
4) *Draw neat diagrams and assume suitable data wherever necessary.*
5) *Figures to the right indicate full marks.*

Q1) a) What is the difference between hardware and software? Explain bath tub curve. **[5]**

b) Explain the generic process model of software development with the diagram. **[5]**

OR

Q2) a) Explain with an example spiral model with its merits and demerits. **[5]**

b) Robert was hired to create a new purchasing system. He completed the project in the following order. **[5]**

• analyzed the existing system

• designed a new system

• wrote the code

• bought the hardware

• built the system

After testing he presented the new system to the client.

Which process model is suitable for above example? Justify your answer.

Q3) a) Explain in detail Requirement Engineering functions. **[5]**

b) Explain various stakeholders involved in the project along with their viewpoints. **[5]**

P.T.O.

OR

Q4) a) Explain with an diagram prioritizing software requirements based on Kano Analysis. **[5]**

b) Draw and explain use case diagram for library management system. **[5]**

Q5) An R & D project has a list of task to be performed whose time estimates are given in the table as follows: **[10]**

Activity	Activity Name	Optimistic	Most Likely	Pessimistic
1 - 2	A	4	6	8
1 - 3	B	2	3	10
1 - 4	C	6	8	16
2 - 4	D	1	2	3
3 - 4	E	6	7	8
3 - 5	F	6	7	14
4 - 6	G	3	5	7
4 - 7	H	4	11	12
5 - 7	I	2	4	6
6 - 7	J	2	9	10

Calculate expected time and variance. Draw project network diagram. Find critical Path, and find the probability that the project is completed in 19 days. Assume $Z(1.34) = 0.4099$

OR

Q6) a) Explain Work Breakdown Structure with an example. **[5]**

b) Explain typical problems with IT cost estimates. **[5]**

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TE/Insem.-641
T.E. (IT) (Semester-I)
THEORY OF COMPUTATION
(2015 Pattern)

Time : 1 Hour]   *[Maximum Marks : 30*

Instructions to the candidates:
- *1)*   *Figures to the right indicate full marks.*
- *2)*   *Attempt questions Q.1 or Q.2 Q.3 or Q.4 Q.5 or Q.6.*
- *3)*   *Neat diagrams must be drawn wherever necessary.*
- *4)*   *Assume suitable data if necessary.*

Q1) a)   Construct FA for the following Language L   **[8]**

$$L = \begin{cases} W|W \text{ is a binary word of length} \\ 4i, i>=1 \text{ such that each consecutive} \\ \text{Block 4 bits contains at least 2 0's} \end{cases}$$

     b)   Distinguish between NFA & DFA   **[2]**

OR

Q2) a)   Construct Mealy machine for the following Language   **[6]**

$$L = \begin{cases} \text{for input from } \Sigma^* \text{ where } \Sigma=\{0, 1\} \\ \text{if the input ends in 101 output is x,} \\ \text{if the input ends in 110 output is y,} \\ \text{otherwise output z} \end{cases}$$

     b)   Define   **[4]**
- i)   Alphabet
- ii)   String
- iii)   Language
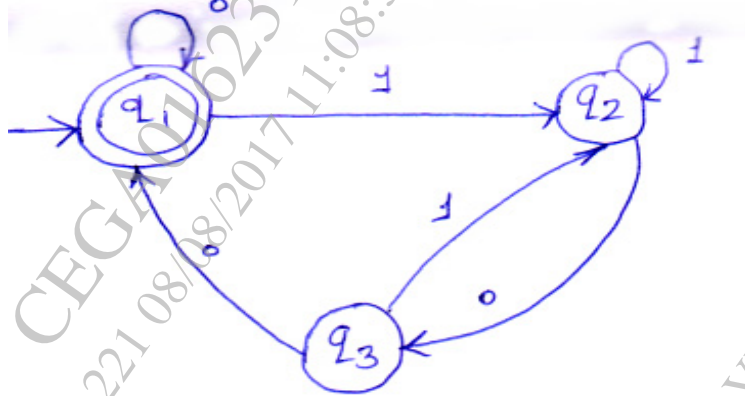- iv)   Formal Language

Q3) a) Using identity Laws prove that **[4]**

$(1+011)* = \in +1^*(011)*(1*(011*)*$

b) Construct regular expression for the following FA using Arden's Theorem

[6]

OR

Q4) a) Write regular expression for **[4]**

i) Strings consisting of a's and b's without any combination of double letters over $\sum = \{a, b\}$

ii) Strings that either contain all b's or else, there is an 'a' followed by some b's; the set also contain $\in$ over $\sum = \{a, b\}$

b) Construct DFA for following r.e. **[6]**

$r = (1(00)* 1+010*)*$ using direct method

Q5) a) Consider the following CFG: **[4]**

$G = \{(S, A), (a, b), P, S\}$

Where P consists of :

$S \rightarrow aAs|a$

$A \rightarrow SbA|ss|ba$

Derive string 'aabbaa' using leftmost & right most derivation

b) Convert given CFG into GNF [6]

S → Bs|Aa

A → Bc

B → Ac where,

V = {S, A, B} & T = {a, c}

OR

Q6) a) Eliminate the ∈ - productions from the Grammar G which is defined as: [6]

S → ABA

A → aA|∈

B → bB|∈

b) Write CFG for the following Languages [4]

i) $L = \left\{ a^j \, b^j \, c^k \, / \, i \, j + k \right\}$

ii) $L = \left\{ a^{2n} \, bc/ \, n \geq 1 \right\}$

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