TE CMPN Sem-V
Theory of computer Science

11 . 2nd half.11-AM(f)

Con. 6617-11. **MP-3844**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from the **remaining** questions.

1. (a) Design finite state machine which accepts exactly the two strings baa and ab. **5**
(b) Convert the following NFA to a DFA **5**

	0	1
→p	{p, q}	{p}
q	{r, s}	{t}
r	{p, r}	{t}
*s	ϕ	ϕ
*t	ϕ	ϕ

(c) Convert the following regular expression to NFA with ϵ-transitions : **5**
$R = (1(00)^*1 + 0\ 1^*\ 0)^*$
(d) Write a short note on Ambiguity Resolution. **5**

2. (a) Obtain DFA to accept the strings which contains exactly three a's over $\Sigma = \{a, b\}$ **8**
(b) Give Mealy and Moore machine to change each occurence of substring 120 to 121 over $\Sigma = \{0, 1, 2\}$ **10**
(c) Give the statement of Pumping Lemma for regular Languages. **2**

3. (a) Minimize the following DFA, where q_0 is the start state and q_3 and q_5 are final states — **10**

	a	b
→ q_0	q_1	q_3
q_1	q_0	q_3
q_2	q_1	q_4
* q_3	q_5	q_5
q_4	q_3	q_3
* q_5	q_5	q_5

(b) Using Pumping Lemma, show that following grammars are not regular :— **10**

(i) $L = \{a^n b a^n \mid n \geq 1\}$

(ii) $L = \{O^i 1^j \mid i \geq j\}$

[TURN OVER

4. (a) Consider the grammar :— **10**

$S \rightarrow OB \mid 1A$

$A \rightarrow O \mid OS \mid 1AA$

$B \rightarrow 1 \mid 1S \mid OBB$

For the string 00110101 find the following :—

(i) Leftmost derivation

(ii) Rightmost derivation

(iii) Parse tree.

(b) Convert the following grammar into CNF :— **10**

$S \rightarrow ASB \mid \in$

$A \rightarrow aAS \mid a$

$B \rightarrow SbS \mid A \mid bb$

5. (a) Convert the following grammar in GNF :— **8**

$S \rightarrow AA \mid 0$

$A \rightarrow SS \mid 1$

(b) Construct PDA for the following Language :— **8**

$$L = \left\{ O^m 1^n O^{m+n} \mid m, n \geq 1 \right\}$$

(c) Differentiate between DPDA and NPDA. **4**

6. (a) Define PDA and construct PDA for the grammar :— **10**

$E \rightarrow E+E \mid E-E \mid (E) \mid id$

(b) Design Turing machine for recognising the following Languages :— **10**

(i) $L = \left\{ a^n b^n c^n \mid n \geq 1 \right\}$

(ii) $L = \left\{ x \mid n_a(x) = n_b(x) \right\}$

7. Write short notes on any **four** of the following :— **20**

(a) Chomsky hierarchy

(b) Post correspondence problem

(c) Universal turing machine

(d) Halting problem

(e) Closure properties of context free language.

9/12/11 TE CMPN Sem-V
Computer Network

VT-Sept.-11- 157

Con. 6484–11. **MP–3850**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from the remaining **six** questions.

1. Answer following questions in brief :– **20**
   (a) What is the principle difference between connectionless communication and connection oriented communication ? **(5x4)**
   (b) Consider the delay of pure ALOHA versus slotted ALOHA at low load. Which one is less ? Explain four answer.
   (c) Give one advantage of RPC on UDP over transactional TCP. Give one advantage TCP over RPC.
   (d) Compare and contrast a circuit switching and packet switching network.

2. (a) Define fragmentation and explain why the IPV_4 and IPV_6 protocols need to fragment some packets. Is there any difference between the two protocols in this matter ? **10**
   (b) An 8 bit byte with binary values 10101111 is to be encoded using an even parity Hamming code. What is the binary value after encoding ? **10**

3. (a) What is the function of TCP protocol ? Discuss it's header format. **20**
   (b) Explain sliding window protocol using Go Back-M Techniques.

4. (a) Explain Dijkstra's algorithm as shortest path routing with example. **20**
   (b) Explain working of following network components and state in which layer they work. Repealers, Hubs, Bridges, Routers and Switches and Gateways.

5. (a) What is IPV_4 protocol ? Explain the IPV_4 Header format with diagram. **20**
   (b) What is purpose of Digital Subscriber Line (DSL) ? Explain ADSL.

6. (a) What are transport service primitives ? **20**
   (b) Explain framing, flow and error control in data Link layer.

7. Write short notes on (any **four**) of the following :– **20**
   (a) SONET
   (b) ADHOC Networking
   (c) Bluctooth Architecture
   (d) Comparison of 802·3 and 802·11
   (e) Berkeley Socket.

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29/11/11 T.E. Sem-V Comp N
Advanced Database Managgment System

Con. 5981-11. **MP–3847**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** from Q. **2** to Q. **7**.
(3) **Figures** to the **right** indicate **full** marks.

Q.1. A) Construct an EER diagram for the airline database. The airline database contains information about passengers, flights, departure, employees and aircrafts. For passengers name, address, phone number and related flight information is recorded. For employees name, address, salary, an identification number, and flight information is recorded. Not all employees can fly aircraft; just the pilots. For such employees their qualifications, i.e. what kind of planes they can fly is recorded. For planes the model number and make is recorded. The airline has many aircrafts of a certain type. For flights it is required to keep the following information: the flight number, origin, destination, departure time and arrival time. Note that for the same source-destination, there can be many flights per week. Relevant assumptions, if required, can be made. 08

B) Convert above EER diagram into relational schema. 07

C) Explain the terms unstructured data in XML and fragmentation in distributed database. 05

Q.2. A) Explain various parallel database architectures. 10

B) Explain query processing in Distributed database system 10

Q.3. A) Explain EER-to-relational model mapping. 10

B) What is XML DTD. 10

Q.4. A) What is heuristic rule in query optimization? Explain transformation rules. 10

B) Explain nested loop join and block nested loop join algorithms in query processing. 10

Q.5. A) Explain macro life cycle in database design methodology. 10

B) What is equijoin, natural join, outer join, self join? Explain with suitable example. 10

Q.6. A) Write SQL expressions considering the following relations with the given fields. 10

DEPT (Dno, Dname, Location, Numstaff)
EMP (Eno, Ename, Salary, Supno, Dno)
WORKS (Eno, Pno, Role)
PROJ (Pno, Pname, Ptype, Budget)

i) Get the number of employees having salary more than Rs. 50,000/ and working on more than 1 project.
ii) List the employees working on more than 2 projects.
iii) List the projects on which more than 7 employees are working.
iv) Find the names and budgets of projects which have more than 7 employees working on them.

B) Explain external merge sorting in query processing. 10

Q.7 Write detailed notes on (any two) : 20

i) XML schema.
ii) Client server architecture.
iii) Object relational features in SQL3.

3/12/11 TE CMPN Sem-V Microprocessor

104: 2nd Half-Exam.-11 mins (a).

Con. 6159-11. **(REVISED COURSE)** **MP-3842**

(3 Hours) **[Total Marks : 100**

N. B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questions from the **remaining**.
(3) Draw **necessary** diagram wherever **necessary**.
(4) **Figures** to the **right** indicate **full** marks.

Q.1)
A) Explain in brief the interrupts in Intel 8085 µp. (5)
B) Draw the circuit diagram for generation of RESET signal and explain it's working. (5)
C) Design an interface for 8255 with the following requirements: 1, 16-bit I/P and 1, 16-bit O/P port. Starting address is 2000H. (5)
D) Differentiate between the Memory mapped I/O and I/O mapped I/O. (5)

Q. 2)
A) Design 8086 based system with following specifications: (10)
a) Interface 32 KB SRAM. Use IC 6264.
b) Interface 16 KB DRAM. Use 8 KB Chips.
B) Explain the following Intel 8086 assembly language instructions giving example: (10)
a) SAL, b) TEST, c) DAA, d) JA, e) NOP.

Q. 3)
A) Explain the operation of IC 8254 as a square wave generator with the control word and timing diagram for count value of 4. (5)
B) IC 8255 is interfaced with Intel 8086 at an address 2006H. Write a set of statements in Assembly language to initialize it such that Port A will be in mode 2, Port B will be in Mode 1 Output. (5)
C) Explain the operation of IC 8259 with the block diagram. Explain all the signals in detail. (10)

Q. 4)
A) Write an Assembly language program for Intel 8086 processor to perform the division of 2 digit BCD number which is in unpacked form. (5)
B) Explain the fully nested mode of PIC 8259. (5)
C) Explain the modes of operation of a DMA Controller. (10)

Q. 5)
A) Explain following addressing modes of Intel 8086. Write an instruction for each mode: (5)
a) Direct addressing mode, b) Relative base indexed.
B) Draw the flowchart for initialization sequence of PIC 8259. (5)
C) What do you understand by bus arbitration? Explain the different bus arbitration techniques with diagram. (10)

Q. 6)

A) Explain the memory segmentation in Intel 8086 processor with it's advantages & disadvantages. (5)

B) Explain the status signals of Intel 8086 processor. Show all the possible combinations along with the processor state and 8288 command associated with each combination. (5)

C) Explain the operational command words of PIC 8259. (10)

Q. 7) Explain the following in brief: (20)

A) RS 232C interface

B) Fixed and Variable port addressing formats

C) Address decoding techniques

D) Difference between Software and Hardware interrupts.

19/12/2011 L TE CMPN Sem-I (REV
Web Engg.

AGJ 2nd half (g+) 12

Con. 6718-11. **MP–3853**

(3 Hours) **[Total Marks : 100**

N.B. (a) Questions No. 1 is **compulsory**

(b) Attempt any **four** questions out of remaining six questions.

Q.1. (a) Explain the qualities of web applications. [10]

(b) Differentiate between HTML and DHTML. [5]

(c) Explain architecture of web document management system. [5]

Q.2. (a) Explain Principles of Requirement engineering for web application. [10]

(b) Explain Interaction design by considering all aspects of web engineering. [10]

Q.3. (a) Explain JavaScript built in objects. [8]

(b) Write HTML code which includes table, hyperlink, character formatting Order and unordered list & CSS to display course information. [12]

Q.4. (a) Explain Hypertext , Hyper structure and presentation modeling of web application. [10]

(b) Explain DTD,XML Schema and XSL with example. [10]

Q.5. (a) Explain information design of web application. [10]

(b) Explain server side technologies. [10]

Q.6. (a) What are streaming technologies? Explain streaming media architecture using Point to point connection and broadcasting infrastructure. [10]

(b) Explain SMIL with example. [10]

Q.7. Write short note on any two of following : [20]

(a) Project Risk Management

(b) Test schemes for web applications

(c) Layered architecture

(d) Evolution of web applications.