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T.E. (Computer) (Semester – II) Examination, 2009
SOFTWARE ENGINEERING
(2003 Course)

Time : 3 Hours Max. Marks : 100

Instructions: *1) Answers to the **two** Sections should be written in **separate** answer books.*
*2) Figures to the **right** indicate **full** marks.*
*3) From Section **I**, answer (Q. **1** or Q. **2**) and (Q. **3** or Q. **4**) and (Q. **5** or Q. **6**)*
*4) From Section **II**, answer (Q. **7** or Q. **8**) and (Q. **9** or Q. **10**) and (Q. **11** or Q. **12**)*
*5) Neat diagrams must be drawn **wherever** necessary.*
*6) Make suitable assumptions **wherever** appropriate and relevant.*

SECTION – I

1. a) Explain the generic process framework activities. **5**

   b) Explain with neat diagram, the prototyping model for software development. What are its drawbacks ? **6**

   c) Explain in detail the various phases of the unified process. **6**

OR

2. a) Explain the umbrella activities which are applied throughout the software process. **5**

   b) Explain with neat diagram, the spiral model for software development. **6**

   c) Write short note on Rapid Application Development (RAD) model. **6**

3. a) Explain data architecture, applications architecture and technology infrastructure, as part of Business Process Engineering. **7**

   b) What three domains are considered during analysis modelling ? Explain. **6**

   c) Explain the following factors that should be considered when constructing a system model : **4**

   i) Assumptions ii) Constraints

OR

4. a) Explain system engineering hierarchy with neat labeled diagram. **7**

   b) Discuss role/use of any three UML diagrams for system modelling. **6**

   c) In brief state what you understand by terms : **4**

      i) Pareto principle in software testing

      ii) System Simulation tools

5. a) Explain concept of entity classes and boundary classes. For "Banking System", give example of one entity class and one boundary class. **4**

   b) What are the various elements of use case template ? **4**

   c) What is meant by domain analysis ? Explain. **4**

   d) For "Library Management system", make your assumptions about the scope of the system, identify four use cases and depict them in a diagram. **4**

OR

6. a) Explain in detail, Class Responsibilities Collaborator (CRC) modelling. **4**

   b) In the context of behavioral modelling, explain state diagrams. **4**

   c) Explain negotiation and specification as the requirements engineering tasks. **4**

   d) Explain with examples, the Association and Dependency relationships between two analysis classes. **4**

SECTION – II

7. a) Explain the following design concepts : **4**

      i) Refactoring ii) Abstraction

   b) Explain the User Interface analysis and design process with diagram. **6**

   c) Explain the following : **7**

      i) Interface design elements

      ii) Deployment level design elements.

OR

8. a) Explain in short the following design concepts : **4**

      i) Refinement ii) Design patterns

   b) What is software architecture ? Why it is important ? **6**

   c) What is the purpose of architectural context diagram ? Explain with figure, the structure of architectural context diagram. **7**

9. a) Explain bottom-up integration testing strategy in detail. **6**

   b) Explain recovery testing as a type of system testing. **3**

   c) For the following program block, draw a flow graph, identify all the independent program paths from the flow graph and calculate cyclomatic complexity from the flow graph. **8**

   /* num_of_entries is an integer input parameter, sum is an integer output parameter and a is an integer array containing num_of_entries of elements*/

   Program block for Q. 9 c)

```
pos_sum(a, num_of_entries, sum)
    sum = 0
    int i = 1
    while (i<=num_of_entries)
        if a[i] > 0
            sum = sum + a[i]
        endif
        i=i+1
    end while
end pos_sum
```

OR

10. a) Explain the following : **6**
    i) Alpha and beta testing
    ii) Unit test environment

    b) Differentiate between black box and white box testing. **3**

    c) Explain how Loop testing and Regression testing are useful in the context of software testing. **8**

11. a) Explain in detail the Function Point (FP) metric. **6**

b) Explain the following concepts : **6**

i) Measures and measurement

ii) Goal oriented software measurement

c) Explain the following class based design metrics for

Object Oriented (OO) systems : **4**

i) Depth of the inheritance tree (DIT)

ii) Coupling between object classes (CBO)

OR

12. a) Write short note on McCall's quality factors. **6**

b) Give short explanation for following : **6**

i) Average number of parameters per operation as an operation-oriented metric

ii) Size as a measurable characteristic of an object oriented design

c) Explain the following design metrics, which have a direct influence on the testability of an Object Oriented (OO) system : **4**

i) Percent public and protected (PAP)

ii) Public access to data members (PAD).

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T.E. (Computer) (Sem. – II) Examination, 2009
SYSTEMS PROGRAMMING
(2003 Course)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **any three** questions from **each** Section.*
*2) Answers to the **two** Sections should be written in **separate** answer books.*
*3) **Neat** diagrams must be drawn **wherever** necessary.*
*4) Figures to the **right** indicate **full** marks.*
*5) Assume suitable data, **if necessary**.*

SECTION – I

1. a) Give the difference between literal and symbol. How these are treated by assembler ? **6**

   b) What feature of assembly language makes it mandatory to design a two pass assembler ? Explain with example. **6**

   c) Enlist the different types of errors that are handled by PASS-I and PASS-II of TWO PASS assembler. **6**

OR

2. a) Consider the definition of Macro B nested within Macro A. Comment on the following statements : **4**
      i) Can a call to macro B also appear within Macro A
      ii) Can a call to macro A also appear within Macro B.

   b) State **true** or **false** : **2**
      i) MDT contains Macro names.
      ii) Keyword parameters can be used in Macro.

   c) With suitable example, explain need of a stack in Macro processor. **6**

   d) Draw a neat flowchart for macro processor to handle nested macro definitions. **6**

P.T.O.

3. Write the entries of ESD, TXT, RLD and Global External Symbol Table (GEST), for PG1 and PG2 given below: **16**

Relative Address		Source Program	
0	PG1	START	
		ENTRY	PG1ENT1, PG1ENT2
		EXTERN	PG2ENT1, PG2
20	PG1ENT1	--------	

30	PG1ENT2	--------	

40		DC	A(PG1ENT2)
44		DC	A(PG1ENT1 + 15)
48		DC	A(PG1ENT2 - PG1ENT1- 3)
52		DC	A(PG2)
56		DC	A(PG2ENT1 + PG2 - PG1ENT1 + 4)
		END	
0	PG2	START	
		ENTRY	PG2ENT1
		EXTERN	PG1ENT1, PG1ENT2
16	PG2ENT1	---------	

24		DC	A(PG1ENT2)
28		DC	A(PG1ENT1)
32		DC	A(PG1ENT2-PG1ENT1-3)
		END	

OR

4. a) State **true** or **false :** **4**

   i) Loader loads and executes object code.

   ii) Linkers and loaders are not needed with re-locatable programs.

   iii) Transfer vector is used by direct linking loader.

   iv) In absolute loader relocation is done by assembler.

b) Explain design of a direct linking loader. Also explain all required data structures. **8**

c) What is a callback function ? With example explain where it is used. **4**

5. a) What is the significance use of Uniform Symbol Table ? Explain. **4**

b) With example explain Recursive-Descent parser. **8**

c) Define the terms : **4**
   i) Cross Compiler
   ii) Bootstrap Compiler.

OR

6. a) State **true** or **false** : **2**
   i) Bottom-up parser is more efficient than top down parser.
   ii) To down parser is much easier to implement as compared to bottom-up parser.

b) Explain concept of front-end and Back-end with respect to Compiler. **8**

c) Consider the following grammar : **6**

$S \rightarrow 0P$

$P \rightarrow S1$

$P \rightarrow 1$

Show stepwise procedure for recognizing the input string "0011" using bottom up parsing technique.

SECTION – II

7. a) Comment on : A program and a process are two different concepts. **4**

b) What are system calls ? Enlist major categories of system calls ? **4**

c) Write algorithm for First Come First Serve job scheduling algorithm. **8**

d) What is the main advantage of multiprogramming ? **2**

OR

8. a) What is long-term, short-term and medium-term scheduling ? Which one of these is used in process scheduling ? **4**

b) Justify the statement : "It is possible to support multiprogramming without using time sharing. However, it is impractical to support time sharing without using multiprogramming". **4**

c) Consider following set of processes :

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

Assume arrival time for all processes is at time 0 in order P1, P2, P3, P4, P5

i) Draw Gant chart to show execution of these processes using FCFS, SJF and non-preemptive priority. (Assume small priority number implies higher priority).

ii) Calculate turn-around and waiting time for each process using FCFS and SJF. **10**

9. a) Explain best-fit algorithm used for memory allocation. **6**

b) Compare segmentation and paging. **4**

c) What is a page fault ? Explain with an example. **6**

OR

10. a) Explain virtual memory management. **6**

b) Why is it that on a system with paging, a process cannot access memory that it does not own ? How could the operating system allow access to other memory ? Why should it or should it not ? **6**

c) Distinguish between logical address space and physical address space. **4**

11. a) Enlist different free space management techniques. Explain any one of these. **6**

b) What is I/O buffering ? Explain in brief different I/O buffering schemes. **6**

c) What are the advantages and disadvantages of C-SCAN scheduling algorithm. **4**

OR

12. a) Explain in brief interrupt driven I/O. Compare it with programmed I/O. **6**

b) Consider a disk system with 100 cylinders. The requests to access the cylinders occur in following sequence : **10**

4, 34, 10, 7, 19, 73, 2, 15, 6, 20

Assuming that the head is at cylinder 50, what is the total distance that disk arm moves to satisfy all the pending requests for the following disk scheduling algorithms :

i) SCAN ii) SSTF iii) FCFS.

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T.E. (Computer Engineering) (Semester – II) Examination, 2009
MANAGEMENT INFORMATION SYSTEMS
(2003 Course)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **three** questions from **each** Section.*
*2) Answers to the **two** Sections must be written on **separate** answer books.*
*3) Assume suitable data if **necessary**.*
*4) Draw sketches **wherever** necessary.*
*5) Figures to the **right** indicate **full** marks.*

SECTION – I

1. A) What are different levels of management ? Why does a manager need to understand these levels of management ? **9**

   B) Define information and information system. Enlist various types of information systems and compare them. **8**

   OR

2. A) What are different models of organization structure ? Which is the model suitable for educational sector ? **9**

   B) How does the use of information technology (IT) support business operations and decision-making of a manufacturing company ? **8**

3. A) Explain different business processes in banking systems used by leading banks. **9**

   B) What is Human Resource Management (HRM) ? What are main functions of HRM ? **8**

   OR

4. A) Explain the importance of MIS in automobile industry. **9**

   B) Differentiate between service and product. What is distinctive service ? **8**

5. A) What is ERP ? What resources do ERP systems manage ? **8**

   B) Why does ERP fail occasionally ? Explain it with suitable examples. **8**

   OR

P.T.O.

6. A) What is BPO ? Explain a contribution of BPOs in Indian economy. **8**

   B) What is call center ? What are the different activities perfomed in the call center ? **8**

SECTION – II

7. A) Explain the process of payment making in e-commerce with suitable examples. **9**

   B) What is CRM ? How does study of CRM help in different business applications ? **8**

OR

8. A) Discuss the role of supply-chain management in any domain of your choice. **9**

   B) Explain the challenges faced by integrated e-commerce business in Indian environment. **8**

9. A) What is DSS ? Compare DSS with ERP and MIS. **9**

   B) Discuss in details any application of DSS. Give the architecture of this DSS. **8**

OR

10. A) Explain knowledge-based expert system with a proper example. **9**

    B) What are the advantages and limitations of expert systems ? **8**

11. A) What are the legal issues involved in use of IT products ? How do we deal with them ? **8**

    B) What are major business drivers for global IT ? **8**

OR

12. A) What is cyber crime ? How can users protect themselves from cyber crimes ? **8**

    B) How can we implement biometric security ? Discuss limitations of biometric security. **8**

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T.E. (Computer) (Sem. – II) Examination, 2009
COMPUTER NETWORKS
(2003 Course)

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Answer* ***any 3*** *questions from* ***each*** *Section.*
2) Answer to the ***two*** *Sections should be written in* ***separate*** *books.*
3) ***Neat*** *diagrams must be drawn* ***whenever*** *necessary.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

1. a) What are service primitives ? Distinguish between services, protocols and interfaces. **8**

   b) What are the advantages and limitation of using frame relay over X.25 for communication ? What are the various steps in congestion control handling in frame relay network ? **8**

OR

2. a) List two ways in which the OSI reference model and the TCP/IP reference model are the same and list in which they are differ ? **8**

   b) How is an ATM virtual connection is identified ? **8**

3. a) Consider an error free 64 kbps satellite channel used to send 512 byte data frames in one direction, with very short acknowledgment coming back the other way. What is the maximum throughput for window sizes of 1, 7 ? **8**

   b) Explain the working of PPP. It is based closely on HDLC which uses bit stuffing to prevent accidental flag bytes within the payload from causing confusion ? Give reason why PPP uses character stuffing instead ? **8**

OR

4. a) Which sliding window ARQ is more popular ? Explain why ? **8**

   b) Frames of 1000 bits are sent over a 1 Mbps satellite channel. Acknowledgements are always piggybacked onto data frames. The header are very short. Three bit sequence number are used. What is the maximum channel utilization for ?

   1) Stop and Wait

   2) Go Back N **8**

P.T.O.

5. a) Consider the delay of pure ALOHA versus slotted ALOHA at low load. Which one is less ? Explain your answer. **9**

   b) What is a Bluetooth technology ? Discuss the different layers that Bluetooth uses. **9**

OR

6. a) Explain congestion. How do we control the same ? Which packets are used practically for this purpose ? At what layer this is done ? **9**

   b) A 64 Kbps pure ALOHA channel is to be shared among a number of stations, each sending a 1 k bit frame, on average one frame every 10 second. What is the maximum number of station this network can support ? **9**

SECTION – II

7. a) A company is granted the site address 181.56.0.0. The company needs 1000 subnets. Design the subnets. **8**

   b) How do IP addresses get mapped onto data link layer addresses, such as Ethernet ? **8**

OR

8. a) The token bucket scheme limits the length of time a traffic burst can enter a network. The token arrival rate is 4 M bytes/second and the maximum output rate is 3232 megabits/second. What bucket capacity is needed to limit the burst to 10 millisecond ? **8**

   b) What is tunneling ? Can tunneling be used in datagram subnets ? If so how ? **8**

9. a) Draw a diagram showing the connection establishment, flow of TCP segments, and connection setup and termination during a TCP session involving the transfer of 20 bytes request from client followed by the transfer of 3000 bytes from server. The server closes the connection after the last segment is acknowledged. **8**

   b) Waht is silly window syndrome problem ? Suggest two solutions to overcome the silly window syndrome problem. **8**

OR

10. a) In a network that has a maximum TPDU size of 128 bytes, a maximum TPDU lifetime of 30 second, and an 8bit sequence number. What is the maximum data rate per connection ? **8**

    b) What are the problems that the TCP may face with the emergency of high speed networks and how can these be addressed ? **8**

11. a) Can a computer has two DNS names that fall into two different level domains. If so give an example. If not explain why not ? **6**

b) What is an authoritative name server ? How can name server tell if a client wants a recursive query or not ? **6**

c) Explain Email architecture and services. **6**

OR

12. a) What is name server ? How does caching increase the efficiency of name resolution ? **6**

b) Why do we need POP3 and IMAP4 for electronic mail ? **6**

c) Does FTP and TFTP perform error recovery. If so, describe the basics of how this occurs ? **6**

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T.E. (Computer) (Semester – II) Examination, 2009
PRINCIPLES OF PROGRAMMING LANGUAGES
(2003 Course)

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Answer* ***any three*** *questions from* ***each*** *Section.*
2) Answers to these Sections should be written in ***separate*** *books.*
3) ***Neat*** *diagram must be drawn* ***wherever*** *necessary.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*
5) Assume ***suitable*** *data,* ***if necessary****.*

SECTION – 1

1. a) State and explain different phases of programming language life cycle. **8**

   b) What is significance of scalar and composite data types ? Explain the implementation of these data types. **10**

OR

2. a) What do you mean by programming paradigms ? State key features of following paradigms : **10**
      1) Procedural Programming
      2) Object Oriented Programming
      3) Logic Programming
      4) Functional Programming.

   b) What is the role of control flow statements ? List any four control statements. Explain control flow mechanism for these four control statements. **8**

3. a) Write a single program/code to produce different results with respect to following parameter passing methods. **10**
      1) Call by Value
      2) Call by Reference
      3) Call by Name.

   b) What do you mean by storage management ? Explain static and dynamic storage management. **6**

OR

4. a) Comment on : **8**

   1) Lexical scope and renaming of locals

   2) Macro expansion and dynamic scope.

   b) How Activation record serve as a run time image of a program ? With suitable diagram describe the representation of local, non local and global variables with respect to activation record. **8**

5. a) What do you mean by Punctuators ? How different Punctuators act as syntactic elements of Program design ? **4**

   b) Consider a Pointer 'P' and memory location 'M' pointed by pointer 'P'. Write a syntax for following operations : **4**

   1) to increase the value of pointer by one (to point 'M+1'th memory location)

   2) to increase value of location pointed by pointer 'P' (Contain of 'M' to be increased by 1)

   c) What do you mean by Operator ? Explain all types of Operator used in 'PASCAL'. **4**

   d) What are typical execution steps associated with program written in Procedural Programming Language ? **4**

OR

6. a) With suitable example, demonstrate how nested procedures and functions acts as a efficient program design construct. **8**

   b) Write short note on 'Block Oriented' structured programming. **4**

   c) What do you mean by type conversion ? When it is absolute necessary ? **4**

SECTION – 2

7. a) Differentiate between **8**

   1) Constructor and Static initializers

   2) Checked and Runtime Exception

   3) Web Server and an Application server

   4) Authorization and Authentication.

   b) List and explain different functions supported by C# for deligation and event handlers. **10**

OR

8. a) What do you mean by framework ? Explain role of following with respect to .NET framework : **10**

   1) CLR

   2) CTS

   3) Winforms

   4) Webforms.

   b) What are different access specification mechanisms supported by Java ? **4**

   c) Code reuse is the main purpose of Inheritance. Justify. **4**

9. a) Explain facilities and deficiencies of PROLOG. **4**

   b) Explain if-then-else control predicate of PROLOG. **4**

   c) With suitable example demonstrate merits and demerits of searching methods used in Logic Programming. **8**

OR

10. a) Explain following PROLOG statements. **8**

    1) Fact statement

    2) Rule statement

    3) Goal statement.

    b) Write short note on applications of Logic Programming. **4**

    c) Explain how recursive structures are supported by PROLOG. **4**

11. a) Define a LISP function to determine whether two given lists are equal. **6**

    b) Define following terms with respect to Functional Programming : **6**

    1) Ambiguity

    2) Free and bound identifier

    3) Reductions.

    c) Write short note on 'Concurrent Programming'. **4**

OR

12. a) How 'Expression Evaluation' and 'Type checking' is supported by LISP ? **8**

    b) What are different applications of Functional Programming ? **4**

    c) Write a bubble sort program in LISP to sort the numbers. **4**

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T.E. (Computer Engg.) (Sem. – I) Examination, 2009
THEORY OF COMPUTATIONS
(2003 Course)

Time : 3 Hours Max. Marks : 100

N.B. *: 1) Answer **three** questions from **each** Section.*
*2) Answer to the **two** Sections should be written in **separate** answer books.*
*3) **Neat** diagrams must be drawn **whenever** necessary.*
*4) Figures to the **right** indicate **full** marks.*
*5) Assume **suitable** data, **if necessary**.*

SECTION – I

1. a) Let L be a language. It is clear from the definitions that $L^+ \subseteq L^*$. Under what circumstances are they equal ? **4**

   b) Construct a NFA and then equivalent DFA accepting strings over {0, 1}, for accepting all possible strings of zeroes and ones not containing 101 as a substring. **10**

   c) If S = {aa, b} write all the string in S* which are having length 4 or less, also say the following is True or False. **4**

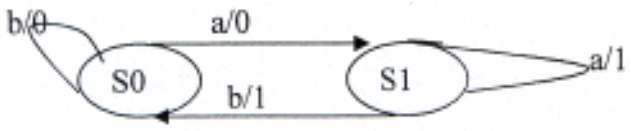
   i) $(S^+)^* = (S^*)^*$ ii) $(S^+)^+ = S^+$ iii) $(S^*)^+ = (S^+)^*$

OR

2. a) Prove for any sets A, B and C if $A \cap B = \phi$ and $C \subseteq B$, then $A \cap C = \phi$ **4**

   b) Construct a NFA and then equivalent DFA accepting strings over {0, 1}, for accepting all possible strings of zeroes and ones which does not contain 011 a a substring. **10**

   c) Convert the following Mealy machine to Moore machine **4**

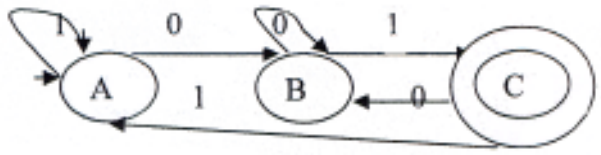


P.T.O.

3. a) Find a regular expression corresponding to each of the following subsets of {0, 1}* **6**

   1) The language of all strings containing exactly two 0's.
   2) The language of all strings containing at least two 0's.
   3) The language of all strings that do not end with 01.

   b) Consider the following transition diagram convert it to equivalent regular expression using Arden's theorem. **6**



   c) Prove for any integer a and b if a and b are odd, then ab (i.e. product of two integer) is odd. **4**

OR

4. a) Design the finite automata and then equivalent regular expression using Arden's theorem that accepts the set of all strings over the alphabet {a, b} with an equal number of a's and b's, such that each prefix has atmost one more a than b's and atmost one more b than a's. **10**

   b) Using pumping lemma for regular sets prove that which of the following languages are regular sets. **6**

   1. $\{0^m 1^n 0^{m+n} \mid m>=1 \text{ ans } n>=1\}$
   2. $\{0^n \mid n \text{ is a prime}\}$.

5. a) Give the context free grammars for the following languages. **12**

   a) (011+1)* (01)*
   b) $0^i 1^{i+k} 0^k$ where i, k >=0.

   b) Prove that the every regular language is regular. **4**

OR

6. a) For right linear grammar given below, obtain an equivalent left linear grammar. **4**

$S \rightarrow 10A|01$

$A \rightarrow 00A|1$

b) Describe the language generated by each of these following string and show the derivation of such a string from grammar. **12**

1) $S \rightarrow aA \mid bC \mid b$

$A \rightarrow aS \mid bB$

$B \rightarrow aC \mid bA \mid a$

$C \rightarrow aB \mid bS$

2) $S \rightarrow bS \mid aA \mid \in$

$A \rightarrow aA \mid bB \mid b$

$B \rightarrow bS$

SECTION – II

7. a) Design a PDA and then corresponding CFG for the language that accepts the simple palindromes $L = \{XCX^r \mid X \in \{a, b\}^*\}$ **14**

b) Write a note on closure properties of CFL's. **4**

OR

8. a) Construct pushdown automata for each of the following language : **12**

1) The set of all string over alphabet {a, b} with exactly equal number of a's and b's.

2) The set of all string over alphabet {a, b} with the language of even length palindromes.

3) The set of all string over alphabet {a, b} with the language of odd length palindromes.

b) Show that if L is accepted by a PDA in which no symbols are removed from the stack, then L is regular. **6**

9. a) Draw a transitions table for turing machine accepting each of the following languages. **8**
   a) $\{a^i b^j / i<j\}$
   b) The language of balanced strings of parentheses.

   b) Explain the following variations of the turing machine : **8**
   1) Single infinite tape Turing machine
   2) Multitape or Multitrack Turing Machine
   3) Multitape or Multi track Turing Machine.

OR

10. a) Design the post machine which accepts the strings of a and b having odd length and the element at the centre is 'a'. **8**

    b) Design and write out in Full a Turing machine that scans to the right until it finds two consecutive a's and then halts over the language of {a, b}*. **8**

11. a) Let G be a CFG and r be a regular expression. Show that the problem **10**
    1) L (G) = L (r)
    2) L (r) $\in$ L (G) are undecidable.

    b) Show that the set of languages L over {0, 1} so that neither L nor L' is recursively enumerable is uncountable. **6**

OR

12. a) Show that both P and NP are closed under the operation union, intersection, concatenation and kleen closure (*). **8**

    b) Prove that "The set of real numbers, R, is not countable". **4**

    c) Define recursive and recursive enumerable language. **4**

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T.E. (Computer) (Sem. – I) Examination, 2009
DIGITAL SIGNAL PROCESSING
(2003 Course)

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Answers to the* ***two*** *sections should be written in* ***separate books.***

2) Neat diagrams must be drawn ***wherever*** *necessary.*

3) ***Use*** *of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is* ***allowed.***

4) Assume suitable data, ***if necessary.***

5) Attempt Q. ***1*** *or Q.* ***2****, Q.* ***3*** *or Q.* ***4****, Q.* ***5*** *or Q.* ***6*** *from Section* ***I*** *and Q.* ***7*** *or Q.* ***8****, Q.* ***9*** *or Q.* ***10****, Q.* ***11*** *or Q.* ***12*** *from Section* ***II****.*

SECTION – I

1. A) Define $\delta(n)$ and u (n). Show that

$$u(n)=\sum_{K=0}^{\infty}\delta(n-K)$$ **6**

B) Test the following system for linearity and time invariance :

$y(n) = 2x(n) + x(n-1)$ **6**

C) Define : i) CT signal ii) DT signal

iii) Quantization iv) Sampling period **6**

OR

2. A) Obtain the linear convolution of two DT signals. **8**

$x(n) = u(n) - u(n-4)$

$h(n) = 2[\delta(n) + \delta(n-1)]$

P.T.O.

B) Define step response and impulse response of a system. How stability and causality can be described in terms of impulse response ? Test it for the system

$y(n) = 2\,x(n) + x(n-1)$ **10**

3. A) Define Fourier Transform (FT). Obtain it for

$x(n) = (a)^n\,u(n), \; |a| < 1.$

State the necessary conditions for the existence of FT. **8**

B) Derive the relationship between Fourier Transform (FT) and Z - Transform (ZT). What is ROC ? **8**

OR

4. A) State and prove the convolution property of FT. **8**

B) Using power - series method obtain Inverse ZT (IZT) for

$$X(Z)=\frac{Z(Z+1)}{Z^3-3Z^2+3Z-1},\ |Z|>1$$ **8**

5. A) Define i) Rational ZT and ii) Pole zero plot. Explain in detail how a behaviour of a causal signal can be described by means of pole zero plot. **10**

B) Obtain system function H (z) and draw a pole zero plot

$$y(n)=\frac{1}{2}y(n-1)+x(n)+x(n-1).$$ **6**

OR

6. A) With example, explain the method of simple geometric interpretation (construction) to obtain the frequency response of DT system. **10**

   B) Determine the system function H (z) and impulse response h (n) for a system.

   $y(n) = 2x(n) + \frac{1}{2}y(n-1)$ with $y(-1) = 0$. **6**

SECTION – II

7. Derive 1st stage of Radix-2 Decimation In Time (DIT) FFT algorithm. Draw a signal flow graph for N = 8. Explain the basic butterfly structure and obtain the computational complexity of FFT algorithm. **18**

OR

8. State the convolution property of DFT. How circular convolution is different than linear convolution ? Using graphical method find out N - point circular convolution of

   $x_1(n) = \{1, -1, -2, 3, -1\}$

   $x_2(n) = \{1, 2, 3\}$ **18**

9. A) Explain Gibbs phenomenon observed in FIR filter design. State the desirable features of window functions. **8**

   B) Explain the design steps of FIR filter using windowing method. **8**

OR

10. A) Compare between :

i) FIR and IIR Filter

ii) Impulse invariance and BLT method. **10**

B) Discuss frequency warping effect observed in BLT method. **6**

11. A) Explain the cascade and parallel form of IIR Filter structure. **10**

B) Draw Direct Form-I IIR Filter structure for :

$$H(z)=3+\frac{4z}{z-0.5}-\frac{2}{z-0.25} \quad .$$ **6**

OR

12. A) With example, explain the realization of linear phase FIR filter structure. **8**

B) How DSP processor architecture is different than conventional micro-processor architecture ? Explain in brief the features of DSP processor. **8**

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T.E. (Computer) (Sem. – I) Examination, 2009
(2003 Course)
MICROPROCESSORS AND MICROCONTROLLERS

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Answer to the* ***two*** *Sections should be written in* ***separate*** *answer books.*

*2) In Section – **I** attempt Q. No. **1** or Q. No. **2**, Q. No. **3** or Q. No. **4**, Q. No. **5** or Q. No. **6**.*
*In Section – **II** attempt Q. No. **7** or Q. No.**8**, Q. No. **9** or Q. No. **10**, Q. No. **11** or Q. No. **12**.*

3) Neat diagrams must be drawn ***wherever*** *necessary.*

4) Figures to the ***right*** *indicate* ***full*** *marks.*

5) Assume suitable data if ***necessary***.

SECTION – I

1. a) Which features make the Pentium, a superscalar processor ? Explain in detail. **6**

   b) Describe the pipelining stages in floating point unit of Pentium briefly. **6**

   c) What is the function of each of the following pins ?

      i) $\overline{BE7}-\overline{BE0}$

      ii) $\overline{KEN}$

      iii) $\overline{FERR}$. **6**

OR

2. a) With the help of neat block diagram, explain the architecture of Pentium processor. **8**

   b) What is the use of INIT pin ? How is it different than RESET pin functionally ? **4**

   c) What is the use of branch prediction logic in Pentium ? Explain with diagram. **6**

P.T.O.

3. a) With the help of neat block diagram, explain how 32 bit memory is addressed by Pentium. **6**

   b) Draw and explain timing diagram of non-pipelined write cycle with one wait state. **6**

   c) Explain 32 bit addressing mode in Pentium. Give one example. **4**

OR

4. a) Draw and explain Burst read cycle in Pentium. **6**

   b) Describe any two instructions that can be executed in protected mode only. **6**

   c) Explain different data types supported by Pentium processor. **4**

5. a) Explain the process of linear to physical address translation for 4 MB pages. Also name and draw the formats of descriptors and registers used for this translation. **12**

   b) Differentiate between IVT and IDT. **4**

OR

6. a) What is TLB ? Describe its use in Pentium in detail. **8**

   b) What are the rules of accessing following segments other than its own for any program :
      i) Data segment
      ii) Conforming code segment
      iii) Non-conforming code segment without using call gates
      iv) Non-conforming code segment with call gate. **8**

SECTION – II

7. a) What is a task ? Which steps are followed by Pentium to switch to a new task ? **6**

   b) Differentiate between real address mode and virtual 8086 mode. **6**

   c) Which are different classes of exceptions ? **4**

OR

8. a) How software interrupts are handled in virtual 8086 mode ? What is the significance of interrupt redirection bit map ? **8**

   b) Describe the formats of task register, TSS descriptor and Task Gate descriptor. What is the significance of each ? Where are they located in protected mode environment ? **8**

9. a) What are different addressing modes in 8051 ? Give one example each. **6**

   b) Write 8051 ALP to initialise timer 1 in mode 1 to generate an interrupt after a delay of 2 ms. Assume clock = 4.8 MHz. Show the required SFR format and calculations. **6**

   c) How many I/O ports are there in 8051 microcontroller ? Draw the diagram of 1 bit of port 1. Which ports are used in external memory interfacing ? **6**

OR

10. a) Describe the internal and external memory organisation for program and data memory in 8051. **6**

    b) Describe power saving modes supported in MCS 51 family. **6**

    c) Describe the serial port in 8051 along with different modes. Specify baud rate in each mode. **6**

11. a) Describe the interrupt structure in PIC 16C7X family. Elaborate on every interrupt in the controller. **8**

    b) Describe CCP module in PIC microcontrollers. Explain capture, compare and PWM modes briefly. **8**

OR

12. a) What are the steps required in ADC programming in PIC 16C71 ? **6**

    b) Explain Power On Reset and Brown Out Reset in PIC microcontrollers. **5**

    c) Describe the features of PIC 16F8XX family. **5**

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T.E. (Computer Engg.) (Semester – I) Examination, 2009
DATA COMMUNICATIONS
(2003 Course)

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Attempt Q.**1** or Q.**2**, Q.**3** or Q.**4**, Q.**5** or Q.**6** from Section – **I** and Q.**7** or Q.**8**, Q.**9** or Q.**10**, Q.**11** or Q.**12** from Section – **II***

*2) Answers to the **two** Sections should be written in **separate** books.*

*3) **Neat** diagrams must be drawn **wherever** necessary.*

*4) Black figures to the **right** indicate **full** marks.*

*5) **Assume** suitable data, **if necessary**.*

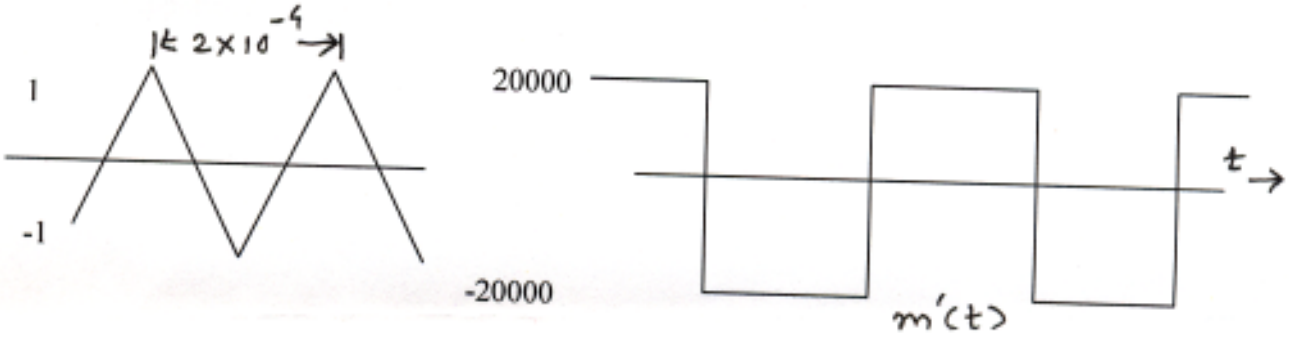
SECTION – I

1. a) What is DSB-SC modulator ? Explain the working of a switching modulator. **8**

   b) Explain the working of super heterodyne AM receiver with a neat block diagram . **8**

   OR

2. a) Estimate the bandwidth of FM and PM for the modulating signal m (t) as shown below. Kf = $2\pi * 10^5$ and Kp = 5π **8**



   b) Compare ASK, PSK, FSK techniques. **6**

   c) Explain in Short the Nyquist Sampling Theorem. **2**

P.T.O.

3. a) Explain in detail the practical difficulty in reconstructing a signal from its samples. What is the solution to overcome it ? **8**

   b) Explain the terms PAM, PPM, PWM. **6**

   c) 6 message signals each of bandwidth 5 KHz are time division multiplexed and transmitted. Calculate the signaling rate and minimum channel BW of PAM/TDM Channel. **2**

OR

4. a) Differentiate between Ideal sampling and Natural (chopper) sampling techniques . **6**

   b) Describe in short PAM/TDM system with neat diagram. **6**

   c) Describe the terms Crosstalk and Guard Time. **4**

5. a) What is meant by quantization noise ? Discuss the factor on which it depends upon and techniques used for reducing its effect. **10**

   b) A signal m (t) of bandwidth B = 4 KHz is transmitted using a binary companded PCM with $\mu = 100$. Compare the case of L = 64 with L = 256 from the point of view of Transmission bandwidth and the output SNR. **8**

OR

6. a) Explain in detail Differential Pulse Code Modulation system. Draw diagrams for DPCM transmitter and receiver. What is its advantage over PCM ? **10**

   b) Draw and explain the schematic diagram of T1 Carrier system. What is the data rate supported ? **8**

SECTION – II

7. a) State and explain Shannon's theorem on channel capacity. **6**

   b) Describe the following terms : **6**

      1) Hamming weight of a code word

      2) Code Efficiency

      3) Hamming Distance.

   c) Describe in short CRC technique with suitable example. **6**

OR

8. a) Using Shannon's theorem compute the maximum bit rate of a channel having Bandwidth 3100 Hz and signal to noise ratio 20 dB. **6**

   b) How error correction and detection capabilities of block codes are related to minimum distance dmin ? **6**

   c) What is ARQ ? Explain in short go-back-n and selective repeat methods. **6**

9. a) How many number of equivalent voice channels are supported by following digital transmission formats ? Also give the data rate supported by each DS1, DS2, DS3, DS4. **8**

   b) Draw and explain the STS _ 1 (SONET) Frame structure. **8**

   OR

10. a) Draw and explain ATM protocol stack. Comment on the significance of AAL Layer with suitable example. **8**

    b) Find out the similarities and differences between Frame Relay and ATM . **8**

11. a) Describe in detail ISDN transmission structure. **8**

    b) What is Ethernet ? Explain how collision handling is done in it. **8**

    OR

12. a) Draw and explain the TCP/IP Model. How it is different than OSI Model ? **8**

    b) Comment on various network topologies. Which is the most preferred today and why ? **8**

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T.E. (Computer/IT) Sem. I Examination, 2009
DATABASE MANAGEMENT SYSTEMS
(2003 Course)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **3** questions from Section – **I** and **3** questions from Section – **II**.*
*2) Answers to the **two** Sections should be written in **separate** books.*
*3) **Neat** diagrams must be drawn **wherever** necessary.*
*4) Black figures to the **right** indicate **full** marks.*
*5) **Assume** suitable data, **if necessary**.*

SECTION – I

1. A) With the help of neat diagram, explain database system structure and describe its various components. **10**

   B) Explain in detail : **8**

   i) Specialization-Generalization in an E-R model.

   ii) Different levels of data abstraction.

   OR

2. A) What is meant by mapping cardinality ? For a binary relationship set what are the possible mapping cardinalities ? Explain with diagrams. **6**

   B) Consider the following database : **4**

   Employee (emp_name, street, city)

   Works (emp_name, company_name, salary)

   Company (company_name, city)

   Manager (emp_name, manager_name)

   Draw an E-R diagram for above database.

P.T.O.

C) Explain the distinction between following : **4**

a) Condition defined and user defined design constraints.

b) Disjoint and overlapping design constraints.

D) Specify CODDs norms to be satisfied by RDBMS. **4**

3. A) What is a view in SQL, and how it is defined ? Discuss the problems that may arise when one attempts to update a view. How are views typically implemented, explain with example. **8**

B) Describe the concept of cursor and how it is used in embedded SQL. Explain in detail. **8**

OR

4. A) Explain general syntax of SQL query ? Let the following relation schemas be given : **8**

R = (A, B, C)

S = (D, E, F)

Let relations r(R) and s(S) be given. Give an expression in SQL that is equivalent to each of the following queries :

i) $\prod_A(r)$

ii) $\sigma_B = 17(r)$

iii) $r \times s$

iv) $\prod_{A,F}(\sigma_{C=D}(r \times s))$

B) Explain the concept of Embedded SQL and Dynamic SQL. Describe the circumstances in which you would choose to use embedded SQL rather than SQL alone or only a general-purpose programming language. **8**

5. A) Specify Armstrong's axioms. Use Armstrong's axioms to prove the soundness of the pseudotransitivity rule. **8**

   B) What is decomposition ? Suppose that we decompose the schema R = (A, B, C, D, E) into (A, B, C) and (A, D, E), show that this decomposition is a lossless decomposition if the following set F of functional dependencies holds :

   $A \rightarrow BC \;\; CD \rightarrow E \;\; B \rightarrow D \;\; E \rightarrow A$ **8**

   OR

6. A) For relation schema R = (A, B, C, D, E), compute the closure F+ and canonical cover Fc of the following set F of functional dependencies

   $(A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A).$ **8**

   B) Consider the relation schema R(A B C) with FDs $AB \rightarrow C$ and $C \rightarrow A$ show that the schema R is in 3NF but not in BCNF. Also determine the minimal keys for R. **8**

SECTION – II

7. A) With neat sketch explain RAID levels. **8**

   B) Explain Hash Join Algorithm. **8**

   OR

8. A) Explain Insertion Operation on B+ trees with suitable example. **8**

   B) Differentiate between static and dynamic hashing. **8**

9. A) When do deadlocks happen, how to prevent them, and how to recover if deadlock takes place ? **10**

   B) Explain Thomas write rule with an example. **8**

   OR

10. A) Explain recoverable and cascadeless schedules. **10**

    B) Write an algorithm to find a cycle in the precedence graph. **8**

11. A) Explain how objects are stored in the relational databases. **8**

    B) Specify advantages and disadvantages of distributed system. **8**

OR

12. A) Explain in detail ODMG language constructs for object definition and object manipulation. **8**

    B) Explain the various issues that decide the time cost of communication between client and server. **8**

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T.E. (Computer Engineering) (Semester – II) Examination, 2009
MICROPROCESSOR BASED SYSTEMS (Old)
(1997 Course)

Time : 3 Hours Max. Marks : 100

Instructions : *i) Answer **any three** questions from **each** Section.*
*ii) Answers to the **two** Sections should be written in **separate** answer books.*
*iii) **Neat** diagrams must be drawn **wherever** necessary.*
*iv) Figures to the **right** indicate **full** marks.*
*v) Assume **suitable** data, if **necessary**.*

SECTION – I

1. Answer the following :

   a) Write the instruction to OR two bits in bit-addressable area of 8051. **2**

   b) What is the significance of DPL, CPL and RPL ? **6**

   c) What is the maximum physical memory supported by 80386DX in real mode ? **4**

   d) With the help of neat diagram, explain the signals ERROR, BUSY and PEREQ of 80386DX and their usefulness during co-processor communication. **6**

2. a) What are the different addressing modes of 8051 ? **4**

   b) Name the bit addressable SFRs in 8051. **6**

   c) What are the different on-chip memories available in 8051 ? Draw neat diagram to show the same. **6**

3. a) Why Privilege Level (P.L.) checks are required by 80386DX ? What are the P.L. checks performed by 80386DX microprocessor when the a program accesses the following :
      i) Other data segment
      ii) Other stack segment
      iii) Other code segment. **8**

   b) What are the checks performed by 80386DX microprocessor while loading a selector ? Also mention exceptions generated when specific checks fail. **8**

P.T.O.

4. a) Compare Virtual 8086 mode and Real mode of 80386DX microprocessor ? **6**

   b) What are the different segments, descriptors and registers used for logical to linear address translation in 80386DX. Explain in detail. **10**

5. a) What is I/O permission bit map ? **4**

   b) Interface 4KB of SRAM to 8051 micro controller. Also draw memory map. **8**

   c) What is GDT and LDT ? **4**

SECTION – II

6. a) What are bus cycle definition signals of 80386DX ? **6**

   b) What does it mean by "aligned and misaligned data transfer in 80386DX ? Draw and explain. **6**

   c) What is the significance of BS16 pin in 80386DX ? **4**

7. a) List the features of serial port of 8051. What are the different modes of operation of 8051 serial port ? Explain. **10**

   b) With the help of neat diagram, explain the linear to physical address translation in 80386DX. **8**

8. a) Name different ports of 8051. Also mention the functions of each port in detail. **8**

   b) What are the privileged instructions and IOPL sensitive instructions in 80386DX processor ? Give details. **8**

9. a) What is Interrupt Descriptor Table ? What does it contain ? Explain its use. **8**

   b) What is TSS (Task State Segment) ? Explain in brief how TSS is helpful in multitasking. **8**

10. a) What do you mean by segment level protection ? **6**

    b) Name the different timer modes of 8051. **4**

    c) What are system descriptors in 80386DX ? Name few. **6**

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