DATABASE MANAGEMENT SYSTEM
(2003 Course)

Time : 3 Hours TE - Computer 2008 (May-June) 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) Black figures to the **right** indicate **full** marks.*
*4) Assume suitable data, **if necessary**.*

SECTION – I

1. a) Explain various components of DBMS. **8**

   b) Compare DBMS and File processing system with following points :
   (i) Redundancy (ii) Access control. **4**

   c) Specify CODD's norms to be satisfied by RDBMS. **6**

   OR

2. a) Design a generalization – specialization hierarchy for a motor vehicle sales company. The company sells motor cycles, passenger cars, vans and buses. Justify your placement of attributes at each level of the hierarchy. Explain why they should not be placed at a higher or lower level. **6**

   b) Give significance of following design constraints. **8**
   i) User-defined
   ii) Condition-defined
   iii) Overlapping
   iv) Dis-joint

   c) Explain functions of DBA. **4**

3. a) Consider the following relation : **6**
   Customer (cid, cname, caddress, city, state)
   Order (oid, odate, oamount)
   customer and order are related with one to many relationship. Solve the following queries.
   i) List the names of customers who belongs to Maharashtra state, sorted on city.
   ii) What are the names of all customers who placed the orders between 01/01/2007 to 31/03/2008 ?
   iii) Define constraint on order amount such that it should be always greater than zero.

b) Explain with example the concept of referential integrity. Also discuss the situations when referential integrity constraint is getting violated by insert, delete and update operations on the relation. 6

c) Specify the need for embedded SQL. List and explain various embedded commands. 4

OR

4. a) Given the following schema
employee (eno, address, dno, salary)
dept (dno, dname, loc, manager)
using SQL, generate a view to display department information such as dno, total number of employees, total salary and average salary. 4

b) For the relation schema r (R) where R = (A, B, C) find the tuple and domain relational calculus equivalent of (i) π_A (r) (ii) $\sigma_{B=10}$ (r). 4

c) State and prove Armstrong's axioms for functional dependency. 8

5. a) Compute closure of the following set F of functional dependencies for relation schema R = (A, B, C, D, E)
F : (A $\rightarrow$ BC, CD $\rightarrow$ E, B $\rightarrow$ D, E $\rightarrow$ A)
List candidate keys of R. 6

b) What is need for
i) Prototyping
ii) Testing
iii) User Interface design. 6

c) Write short note on normalization. 4

OR

6. a) Which are different fact finding techniques ? State advantages and disadvantages of each. 6

b) Show that, if a relation schema is in BCNF, then it is also in 3NF. 6

c) Use the axioms for functional and multivalued dependencies to show that each of the following rules is sound :
i) The intersection rule
ii) The difference rule. 4

SECTION – II

7. a) Give an example of a database application in which the reserved-space method of representing variable-length records is preferable to the Pointer method. Explain your answer. 8

   b) What are the advantages and disadvantages of hash indices relative to B^+- tree indices ? How might the type of index available influence the choice of a query-processing strategy ? 8

OR

8. a) List two advantages and two disadvantages of each of the following strategies for storing a relational database : 8

      i) Store each relation in one file.

      ii) Store multiple relations in one file.

   b) What is ordered indices ? Explain the types of ordered indices with suitable example. 8

9. a) Explain testing strategy for conflict serializability and view serializability with suitable example. 8

   b) Show by example that there are schedules possible under the tree protocol that are not possible under the two-phase locking protocol, and vice versa. 8

OR

10. a) State ACID properties of transaction. Explain implementation of any two of them. 8

   b) Explain the purpose of the check point mechanism. How does the frequency of check points affect. 8

      i) System performance when no failure occurs.

      ii) The time it takes to recover from a system crash.

      iii) The time it takes to recover from a disk crash.

11. a) What is the difference between persistence programming language and traditional programming language ? 6

b) Explain : object identity and pointers. 6

c) Specify advantages and disadvantages of distributed system. 6

OR

12. a) What is multiple inheritance ? Explain why ambiguity potentions exists with multiple inheritance. Give suitable example. 6

b) State which database system architectures you will prefer for following applications. Support your answer with brief explanation. 6

i) Banking system

ii) Airline-reservation system.

c) Explain different pointer swizzling techniques. 6

MICROPROCESSORS AND MICROCONTROLLERS
(2003 Course)

Time: 3 Hours TE : Computer 2008(May June) Max. Marks: 100

Instructions: *1) Answers 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) How Pentium supports or implements RISC features ? **6**

   b) What are $D/\overline{C}$, $M/\overline{IO}$, $W/\overline{R}$ pins ? What is their significance ? **6**

   c) How Pentium does address translation in real mode ? **6**

   OR

2. a) Explain the function of the following pins of Pentium : **8**
      i) $\overline{IERR}$
      ii) $\overline{FERR}$
      iii) IU
      iv) IV

   b) What are the different caches found in Pentium ? What are their sizes ? With the help of neat block diagram, explain cache organization in Pentium. **10**

3. a) What are the different operands for an instruction in Pentium ? Give details. **6**

   b) What are the contents of following registers on reset ? **6**

      EAX, EDX, CS, DS, IDTR, EIP

   c) Explain I/O organization in Pentium. **4**

   OR

4. a) On reset, what are the different steps followed by Pentium ? 6

   b) With the help of a neat diagram, explain non-pipelined write bus cycle of Pentium. 6

   c) Explain LSL instruction. 4

5. a) Differentiate between linear and physical address in protected mode. 6

   b) What are conforming code segments ? How they can be useful ? 6

   c) What are the different page sizes supported by Pentium ? How system programmer can select one of them ? 4

OR

6. a) Differentiate between system and non system descriptors ? Give two examples for each type. 8

   b) Name and explain the flags/registers of paging unit used to provide page level protection. 8

SECTION – II

7. a) Explain task switch when Pentium is operating in protected mode. 8

   b) Differentiate between interrupt handling in real mode and protected mode of Pentium. Give details. 10

OR

8. a) What is TSS descriptor ? How it is different than task gate descriptor ? Explain. 8

   b) What is NT flag ? Where it is located ? What is its use ? 6

   c) What are the sources of exceptions ? Give details. 4

9. a) Draw memory map of 8051 microcontroller, clearly showing bit addressable internal RAM area. How many SFRs are bit addressable ? Name them. **8**

   b) How many timers are available with 8051 ? Explain the SFRs involved in timer programming. **4**

   c) Explain the different flags available in PSW of 8051. **4**

OR

10. a) Explain memory map of 8051, clearly showing internal and external memory along with addresses. **4**

    b) What is the application of bit addressable area of 8051 ? **4**

    c) How do you program baud rate for the programmable modes of serial port ? What hex value will you load in THI register for the baud rate of 1200 ? **8**

11. a) Name all the SFRs found in PIC 16C61/71. **8**

    b) What is the effect of sleep instruction on $\overline{PD}$ bit of STATUS register found in PIC 16C61/71. **4**

    c) Explain INTCON register found in PIC 16C61/71. **4**

OR

12. a) With the help of neat diagram, explain PC and Stack of PIC 16C61/71. **8**

    b) Write the instructions of PIC 16C61/71 to add the numbers 50h had 20h and write the sum to PORTA. **6**

    c) What is $\overline{TO}$ bit of STATUS register found in PIC 16C61/71 ? Give details. **2**

DIGITAL SIGNAL PROCESSING
(2003 Course)

Time : 3 Hours TE : Computer 2008 (May-June) 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) Define a DT system. How it is described by means of difference equation ? What do you mean by its solution ? **6**

B) Describe linearity and time Invariant properties of a DT system. **6**

C) A 50 Hz signal is sampled at a rate of 900 samples/s. Find

i) No. of samples /cycle (N)

ii) Digital/Discrete frequencies f and ω

iii) Minimum sampling rate to avoid aliasing. **6**

OR

2. A) By means of convolution operation prove that

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

B) Obtain a linear convolution of two standard signals $\delta(n)$ and u (n) using graphical method. **6**

C) Define

i) Sampling

ii) Even signal

iii) Natural Response

iv) Aliasing **6**

P.T.O.

3. A) Obtain ZT of u (n). Hence obtain it for u (–n). Specify the ROC. 8

B) Given a ZT of DT signal x (n), how to obtain its FT ? Explain how to obtain and plot the magnitude and phase spectrum. 8

OR

4. A) Obtain IZT using Residue method

$$X(z) = \frac{z^2}{(z-a)^2} \text{ ROC : } |z| > |a|.$$ 8

B) State and prove time shifting property of FT. Apply it for x (n) = u (n – 2). 8

5. A) Explain the simple Geometric construction method to obtain the phase and frequency response of the system. 8

B) A system is described by means of its impulse response h (n) = 4^{-n} u (n). Obtain its difference equation, system function H (z) and frequency spectrum H (ω). 8

OR

6. A) Draw a pole zero plot for a system having

y (n) = 0.2 y (n – 1) + 0.15 y (n – 2) + x (n) – x (n – 1)

What do you mean by multiple order poles/zeros ? 8

B) How to determine the causality and stability from H (z) ? Illustrate with one example and obtain the impulse response for the same. 8

SECTION – II

7. A) Explain how N-point DFT and IDFT can be obtained by means of linear transformation matrix. Illustrate it for 4-pt DFT. 12

B) Compare N-point circular convolution with linear convolution. 6

OR

8. A) How DFT is obtained from FT ? Discuss the periodicity and convolution property of DFT. 8

B) Draw a signal flow graph for 8-pt DFT using DIF (decimation in frequency) FFT algorithm. Obtain its computational complexity. 10

9. A) Explain the mapping of s-plane onto z-plane in detail, w.r.t. IIR filter design. **8**

B) Discuss the design steps of IIR filter using BLT method. How the frequency response is obtained ? **8**

OR

10. A) What is Gibbs phenomenon ? What are the desirable features of windows used in windowing method ? **8**

B) Explain the algorithm steps to design an FIR filter using Hamming window. **8**

11. A) Obtain the system function H (z) and difference equation for

$h(n) = \{1, -2, -2, 3\}$ ($\uparrow$ at 1).

Draw direct form FIR filter structure. **8**

B) Explain with example linear phase FIR filter structure. Compare it with Direct Form Structure. **8**

OR

12. A) Explain in brief the features of ADSP 21XX architecture. List the various memory pointer registers. **8**

B) Obtain Direct Form – II IIR filter structure for a system $H(z) = \dfrac{z^2 + \frac{1}{3}z}{z^2 - \frac{3}{4}z + \frac{1}{8}}$.

What are its advantages over Direct Firm – I structure ? **8**

PRINCIPLES OF PROGRAMMING LANGUAGES
(2003 Course)

Time : 3 Hours TE : Computer 2008 (May-June) Max. Marks : 100

Instructions : *i) Answer **any three** questions from **each** Section.*
*ii) Answers to these sections should be written in **separate** books.*
iii) Neat diagram must be drawn whenever necessary.
*iv) Figures to the **right** indicate **full** marks.*
v) Assume suitable data if necessary.

SECTION – 1

1. a) Briefly discuss role of Programming Languages for following areas of applications with the help of Common Data Structure and Control Structure Supported, special features/characteristics needed, suitable high level language **8**

   i) Scientific Applications ii) Business Applications

   b) Explain specifications, implementations and operations performed with respect to following Data types **8**

   i) Set ii) Floating Point Data Type.

OR

2. a) Explain significance of readability of a programming language. What is the impact of user defined operator overloading on the readability of a program ? **6**

   b) Define Binding and Binding Times. List different Binding Times. **6**

   c) What do you mean by Persistent Data Type ? Which of the following Data Types are persistent /non persistent ? **4**

   i) Structure ii) Class
   iii) File iv) Enum.

3. a) Define the following terms : **4**

   i) Lifetime ii) Scope
   iii) Static scope iv) Dynamic scope.

   b) Why are the return address, dynamic link, and parameters placed in the bottom of the Activation Record ? **6**

c) Consider the following Code. 8

```
Void main ( ) {
int value = 2, list [5] = {1, 3, 5, 7, 9};
swap (value, list [0]) ;
swap (list [0], list [1]) ;
swap (value, list [value]) ;
}
Void swap (int a, int b) {
int temp ;
temp = a;
a = b ;
b = temp;
}
```

For each of the following parameter-passing Methods, what are the values of the variables named 'value' and array 'list' after each of the three calls to swap

a. Passed by Value

b. Passed by Reference

c. Passed by Value-Result

OR

4. a) What is difference between recursive call and ordinary call of a program ? How recursive subprogram call acts as an important sequence control structure in Programming ? 8

b) Justify "Static Scope does not Support Recursion". 4

c) Define exception, exception handler, raising an exception. What are design issues for exception handling ? 6

5. a) Describe Runtime organization for dynamically scoped Block Structured language. Justify your answer with suitable example. 8

b) From program development point of view, explain significance of Co-routine, Sub-routine, and Macros. 6

c) Does the statement *P + + increment P, or value pointed by P ? Justify. 2

OR

6. a) What is dangling reference and garbage ? How they are created ? Why these are known as problems ? 8

b) What do you mean by side-effects ? Suppose one wants to write a function which concatenates two strings and it calls the storage allocation to get space for new string. Should this be considered as a side effect ? Justify your answer. 4

c) What is the output of the statement strcat (string, '!'); 2

d) What does "segmentation violation" mean ? 2

SECTION – 2

7. a) Compare abstract base class and interface in JAVA. **4**

   b) Explain the typical phases associated with Applet Life Cycle. **6**

   c) What is Package ? What is importance of following JAVA packages ? **6**

   i) java.lang

   ii) java.awt

   iii) java.util

   iv) java.io

   v) java.net

OR

8. a) With the help of neat diagram, explain major phases associated with .NET framework development process. **6**

   b) How C# is better than C+ + and Java. **6**

   c) What is event handler ? How it is designed ? **4**

9. a) Consider the following PROLOG Database

   Symptom (cold, mild_body_ache)

   Symptom (flu, severe_body_ache)

   Symptom (cold, runny_nose)

   Symptom (flu, runny_nose)

   Symptom (flu, chills)

   What is the result in each of the following GOALS ? **8**

   i) Symptom (X, runny_nose) and Symptom (X, mild_body_ache)

   ii) Symptom (X, runny_nose) and Symptom (Y, mild_body_ache)

   iii) Symptom (X, runny_nose) and Symptom (X, Y)

   iv) Symptom (cold, X) and Symptom (flu, X)

   b) State and explain applications of PROLOG with respect to **6**

   i) Expert System

   ii) Natural Language Processing.

   c) What is use of cut operator with PROLOG ? **4**

OR

10. a) Consider the following PROLOG Database of cities and respective states
Location (Banglore, Karnataka)
Location (Mumbai, Maharashtra)
Location (Pune, Maharashtra)
Location(Surat, Gujrat)
Location (Hydrabad, AP)
Answer following Queries **6**
i) Specify GOAL to list all cities
ii) Specify GOAL to find the state of Pune City.

b) Explain the significance of following concepts with respect to PROLOG **4**
i) Anonymous Variable
ii) Compound goals.

c) What is Unification and Resolution ? Why these are important in LOGIC Programming ? **8**

11. a) Explain the working of following LISP functions, assume L is comma separated list of 5 characters. **6**

i) (car L)	ii) (caar L)
iii) (cdr L)	iv) (cddr L)
v) (cons L)	vi) (cons (car L) (cdr L))

b) Write a LISP Program to check whether given number is prime or not. **6**

c) Write short note on Binding in LISP. **4**

OR

12. a) Explain following expression evaluation techniques with proper examples **6**
i) Innermost ii) Outermost.

b) Write LISP program to find the length of following list at all levels. **6**
(a (b (c d) e) f (g h) i).

c) Write short note on "Lambda Calculus". **4**

COMPUTER NETWORKS
(2003 Course)

Time : 3 Hours TE : Computer 2008 (May-June) Max. Marks : 100

Instructions : *1) Answer **three** questions from Section **I** and **three** 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) Explain in detail the different design issues for the layers in layered architecture. **8**

   B) Explain connection oriented service in details. What are the principal differences between connectionless communication and connection oriented communication ? **8**

OR

2. A) What are the reasons for using the layered protocols ? **4**

   B) Why does ATM use small fixed length cells ? **4**

   C) What is OSI model ? Explain the functions of different layers in OSI model. **8**

3. A) Explain stop and wait protocol for noisy channel. Give the reason for moving from stop and wait ARQ protocol to GO BACK N ARQ protocol. **8**

   B) Define Piggy backing and its usefulness. **4**

   C) Compare and contrast flow control and error control. **4**

OR

4. A) What is the significance of window size in ARQ protocols ? Using 5 bit sequence numbers, What is the maximum size of the send and receive windows for each of following protocols
   1) Stop – and – Wait ARQ
   2) Go – Back – N ARQ
   3) Selective – Repeat ARQ. **8**

   B) What are different connecting devices used at different layers ? Explain working of any two devices in details. **8**

P.T.O.

5. A) Explain Adaptive Tree Walk Protocol. Illustrate with example. **8**

B) Explain wireless LAN protocol in detail. **10**

OR

6. A) Explain the CSMA protocols and show channel utilization graph. **8**

B) Explain Ethernet Frame format. Give the significance of pad field. **10**

SECTION – II

7. A) Explain the distance vector routing algorithm. **9**

B) Illustrate ARP in detail with example. **9**

OR

8. A) What is Leaky bucket algorithm ? What are the drawbacks of this algorithm ? **8**

B) An ISP is granted a block of addresses starting with 190.100.0.0/16 (65536 addresses) ISP needs to distribute these addresses to three groups of customers as follows :

a) The first group has 64 customers. Each need 256 addresses.

b) The second group has 128 customers. Each needs 128 addresses.

c) The third group has 128 customers. Each needs 64 addresses. **10**

Design the subblocks and find out how many addresses are still available after these allocations.

9. A) What is Berkeley Sockets ? Explain the primitives in it. **8**

B) Describe the connection establishment procedure in transport layer. **8**

OR

10. A) Explain flow control and Buffering in transport layer. 8

B) Explain UDP header. Explain RPC in detail. 8

11. A) What is DNS ? Explain in detail. 6

B) Explain Architecture of WWW. 6

C) What is Wireless Application Protocol ? 6

OR

12. Write a short notes on **any three** : 18

1) SNMP

2) Telnet

3) POP3

4) Structure of I-mode.

MANAGEMENT INFORMATION SYSTEMS
(2003 Course)

Time : 3 Hours TE : Computer 2008 (May-June) 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) Classify information systems. Discuss major differences among them. **9**

   B) What are different levels of management ? How does manager deal with these levels ? **8**

   OR

2. A) Differentiate between open and closed system. Explain importance of feedback system in an organization. **9**

   B) What are different models of organization structure ? Explain their suitability with business world. **8**

3. A) Explain different business processes in manufacturing sector with suitable example. **9**

   B) Why is production management considered as an important element in manufacturing sector ? **8**

   OR

4. A) Explain different business processes in service sector with suitable example. **9**

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

5. A) Discuss the architecture of ERP systems. Enlist the major features of ERP. 8

   B) Explain the benefits of implementing ERP systems. 8

OR

6. A) What is BPO ? Which are major business processes outsourced by different industries ? Explain in detail. 8

   B) What are the major challenges and issues in BPO sector in India ? 8

SECTION – II

7. A) What is CRM ? How does study of CRM help in different business applications ? 9

   B) Explain B2B e-commerce along with its architecture. 8

OR

8. A) What are the objectives and outcomes of supply-chain management ? 9

   B) Explain the functions and outcomes of integrated e-commerce business. 8

9. A) What is DSS ? Explain main features and types of DSS. 9

   B) Describe tools and models used in implementation of DSS. 8

OR

10. A) Explain expert system with a block diagram and a proper example. 9

    B) Discuss major challenges and issues in implementation of expert systems. 8

11. A) What are the ethical issues involved in strategic decision making ? Explain it with suitable examples. 8

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

OR

12. A) Discuss about various cyber crimes. 8

    B) Enlist and describe different tools used in security management. 8

SYSTEMS PROGRAMMING
(2003 Course)

Time : 3 Hours TE - Computer 2008 (May-June) Max. Marks : 100

Instructions : *1) Answer **any 3** questions from **each** Section.*
*2) Answers to the **two** Sections should be written in **separate** 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) The process of fixing up a few forward references should involve less overhead than making a complete second pass of the source program. Why don't all assemblers use the one-pass technique for efficiency ? **4**

   b) Define the following terms :
   i) Assembler ii) Macro
   iii) Pseudo-opcode iv) Reentrant code **4**

   c) Which macro features required to have a stack and the need for recursion ? Explain in brief. **4**

   d) Can one pass macro-processor successfully handle a macro containing conditional macro pseudo-ops ? If no what modifications are necessary to enable it to handle such situations ? If yes, how does it handle ? **6**

OR

2. a) Consider the following code, show the content of Macro Name Table and Macro Definition Table.

   Assume : AR, SR, BALR are of 2 bytes and L, DC are of 4 bytes long instructions.

```
START  100
SR     2,2
USING  *,15
MACRO
```

```
        XYZ     &A
        A       1,&A
        AR      2,2
        MEND
        L       1, D1
        MACRO
        ABC     &Z
        SR      3,3
        MACRO
        DISPLAY
        XYZ     B
        MEND
        L       1,&Z
        MEND
        XYZ     B1
        SR      4,4
        ABC     B1
D1      DC      F '4'
B1      DC      F '5'
        END
```

10

b) With the help of suitable example explain the use of intermediate code in two pass assembler. 8

3. a) State whether the following statements are TRUE OR FALSE and justify your answer.

i) Relocation is performed by linker.

ii) Transfer vector is used by direct linking loader.

iii) In absolute loader linking is done by programmer.

iv) In compile and go loader linking is performed by loader. 8

b) In case of direct linking loader what information must be provided by the assembler the loader with each procedure or data segment ? 4

c) What is global external symbol table ? Explain in brief. 4

OR

4. a) What is an overlay structure ? What is its use ? 4

b) Give the comparison between Absolute Loader and Compile And-Go loader. 4

c) Explain the design of Relocating Loader. 8

5. a) Enlist the bottlenecks in top-down passing. Briefly describe them. 8

b) Write an algorithm for lexical analysis. 8

OR

6. a) Discuss top-down parsing scheme. Give example to illustrate your approach. 8

b) Briefly explain recursive descent parsers. 8

SECTION – II

7. a) State whether the following statements are TRUE OR FALSE :

i) UNIX is the multiprogramming O.S.

ii) Short term scheduler is responsible for ready to running state transition.

iii) Process is the passive entity.

iv) Phasing concept is used by batch O.S. 4

b) What is an Operating System ? Explain various functions performed by operating system. 6

c) Write a pseudo "C" code for first come first serve job scheduling algorithm. 8

OR

8. a) Define the following terms :

i) Job

ii) Step

iii) Process

iv) Privileged instruction

v) Multiprogramming

vi) Realtime operating system. 6

b) Describe the difference between short-term, medium term and long term scheduling. 8

c) Comment on the statement : "The weighted turn arounds in First Come First Serve scheduling are arbitrarily distributed while those in Shortest Job First scheduling increase monotonically". 4

```
        XYZ     &A
        A       1,&A
        AR      2,2
        MEND
        L       1, D1
        MACRO
        ABC     &Z
        SR      3,3
        MACRO
        DISPLAY
        XYZ     B
        MEND
        L       1,&Z
        MEND
        XYZ     B1
        SR      4,4
        ABC     B1
D1      DC      F '4'
B1      DC      F '5'
        END
```

10

b) With the help of suitable example explain the use of intermediate code in two pass assembler. **8**

3. a) State whether the following statements are TRUE OR FALSE and justify your answer.

i) Relocation is performed by linker.

ii) Transfer vector is used by direct linking loader.

iii) In absolute loader linking is done by programmer.

iv) In compile and go loader linking is performed by loader. **8**

b) In case of direct linking loader what information must be provided by the assembler the loader with each procedure or data segment ? **4**

c) What is global external symbol table ? Explain in brief. **4**

OR

4. a) What is an overlay structure ? What is its use ? 4

b) Give the comparison between Absolute Loader and Compile And-Go loader. 4

c) Explain the design of Relocating Loader. 8

5. a) Enlist the bottlenecks in top-down passing. Briefly describe them. 8

b) Write an algorithm for lexical analysis. 8

OR

6. a) Discuss top-down parsing scheme. Give example to illustrate your approach. 8

b) Briefly explain recursive descent parsers. 8

SECTION – II

7. a) State whether the following statements are TRUE OR FALSE :

i) UNIX is the multiprogramming O.S.

ii) Short term scheduler is responsible for ready to running state transition.

iii) Process is the passive entity.

iv) Phasing concept is used by batch O.S. 4

b) What is an Operating System ? Explain various functions performed by operating system. 6

c) Write a pseudo "C" code for first come first serve job scheduling algorithm. 8

OR

8. a) Define the following terms :

i) Job

ii) Step

iii) Process

iv) Privileged instruction

v) Multiprogramming

vi) Realtime operating system. 6

b) Describe the difference between short-term, medium term and long term scheduling. 8

c) Comment on the statement : "The weighted turn arounds in First Come First Serve scheduling are arbitrarily distributed while those in Shortest Job First scheduling increase monotonically". 4

9. a) State whether the following statements are TRUE OR FALSE
   i) FIFO page replacement suffers from Belady's Anomaly.
   ii) Multiple partition memory management scheme supports multiprogramming.
   iii) CPU is responsible for generating logical address of memory.
   iv) Fixed memory partitioning causes internal fragmentation. **4**

   b) Explain the difference between logical address and physical address. **4**

   c) Explain the best-fit algorithm used for memory allocation. What are the advantages and disadvantages of this algorithm ? **8**

OR

10. a) Differentiate between :
   i) Paging and segmentation
   ii) Contiguous and non-contiguous memory allocation. **8**

   b) What is variable memory partitioning scheme ? Differentiate between external and internal fragmentation. **8**

11. a) Explain Elevator algorithm with the help of an example. **6**

   b) What is an I/O buffer ? What is its use ? **4**

   c) Enlist and briefly explain various free space management scheme. **6**

OR

12. a) A disk drive has 640 cylinders, numbered 0 – 639. The drive is currently serving the request at cylinder 68. The queue of pending requests in FIFO order is : 84, 153, 32, 128, 10, 133, 61, 69.

   Starting from the current head position what is the total distance that disk arm moves to satisfy all the pending requests for the following disk scheduling algorithms :

   1) C-SCAN 2) SCAN 3) SSTF **8**

   b) With the help of a neat diagram describe the three methods used Record Blocking. **8**

SOFTWARE ENGINEERING
(2003 Course)

Time : 3 Hours TE - Computer 2008 (May-June) Max. Marks : 100

Instructions *: 1) Answers to the **two** Sections should be written in **separate** book.*
*2) Black 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.*

SECTION – I

1. A) What is meant by engineering the software ? What is meant by software evolution ? Explain the merits and demerits of incremental process model. **8**

   B) What are the reasons to have a Software Process ? What are the issues addressed by Umbrella Activities in Layered Model of software engineering ? What are the levels of CMMI ? **9**

   OR

2. A) List and explain management and customer myths. Why a late project can not be placed back on schedule by merely adding people to the project teams ? What is the impact of scope change on project deliverables ? **8**

   B) What is the objective of Personal Software Process (PSP) ? What are the activities of PSP model ? What are the goals of Team Software Process (TSP) model ? What are the conditions in which Rapid Application Development Model is preferred ? **9**

3. A) In what sense practice is important to Managers and Software Engineers ? What are the steps carried out in problem understanding and solution planning ? What are the ways to examine the result ? **8**

B) What is importance of Planning ? List and explain planning practices. What are the elements of Hatley-Pirbhai Modeling ? 9

OR

4. A) What is meant by "Principle" ? List and explain Seven Core Principles of Software Engineering. 8

B) What are the principles of 'Deployment" ? What is the role of feedback in deployment ? What are the elements of System Engineering Hierarchy ? 9

5. A) What is the difference between needs and requirements ? What are the problems in requirement elicitation ? Why requirements needs to be validated ? 8

B) List and explain analysis rules. How domain analysis is carried out ? How analysis classes are identified ? What are the essential characteristics of a class ? 8

OR

6. A) How stakeholder identification is performed ? What are the advantages of recognizing multiple viewpoints ? What is collaborative requirements gathering ? 8

B) What is meant by Scenario ? How scenario modeling is performed ? Develop an activity diagram for enrolment of students to a course. 8

SECTION – II

7. A) What is the relationship between analysis and design ? Which quality attributes design must satisfy ? What is the relationship between modularity and functional dependence ? 8

B) How architecture can be mapped to components ? What is meant by instantiation of the system ? What is the relationship between architecture and design ? 9

OR

8. A) What is meant by design class ? What are the types of design class ? A cohesive design should have high cohesive and low coupling. Justify. 8

   B) What are the categories of users ? What is the relationship between user model and design model ? The analysis and design process for user interfaces is iterative. Justify. 9

9. A) What is the relationship between software life cycle phases – requirement engineering, analysis, design, implementation and testing ? Testing follows an "Outward" approach, starting at component level and moves towards component integration. Justify. 8

   B) What philosophy is followed for test case design while performing white-box testing ? For the following program block, show how independent program paths are identified and cyclomatic complexity is calculated using flow graph notations. 9

```
begin
    int x, y, power ;
    float z ;
    input (x, y) ;
    if (y < 0)
        power = –y ;
    else
        power = y;
    z = 1;
    while (power ! = 0) {
        z = z* x ;
        power = power – 1;
    }
    if (y < 0)
    z = 1/z ;
    output (z);
    end
```

OR

10. A) What is the difference between verification and validation ? How Top-down and Bottom-up integration is achieved ? What is a stub and a cluster ? 8

B) What is the importance of test data in case of black-box testing ? What is test oracle ? With suitable example illustrate in which situations you will prefer boundary value analysis over equivalence partitioning. 9

11. A) What are the important factors in product revision ? How product revision is dependent on problem scope ? What are the challenges in deriving product metrics ? 8

B) Explain in detail metrics for testing. 8

OR

12. A) What are the attributes of software metrics ? Explain in detail coupling metrics. 8

B) Write short notes on : 8

a) Operation oriented metrics

b) User interface metrics.
