S.Y. B.Sc. (Semester – I)(Computer Science) Examination, 2011
ENGLISH (2008 Patern)

Time : 2 Hours   Max. Marks : 40

1. Answer the following **(any two)** :   **10**

   A) State the various types of communication with suitable examples.

   B) What is a thesaurus and how does it help in enriching the language ?

   C) Explain the significance of body language in the process of communication.

2. Answer the following :

   A) Use the following words in sentences to bring out their literal and figurative
      meanings. [Make two sentences using each word]. **[any two]**   **4**

      1) Draw   2) Open   3) Cold

   B) Differentiate between the following pair of words and make sentences
      (any two) :   **4**

      1) stationery, stationary

      2) birth, berth

      3) affect, effect

   C) Choose the correct spelling.   **2**

      1) vacum, vacuum, vacumm

      2) equipment, equiptment, equippment

3. Answer the following :

   A) Give antonyms of the following by adding a negative prefix.   **4**

      1) honest

      2) patient

      3) social

      4) wanted

B) Re-order the jumbled words with the help of hints given in the bracket.　　**4**

　　1) nturaresat (a place where eatables / food is served)

　　2) gsurneo (a doctor specialised in operations)

　　3) vetinelbai (something that cannot be avoided)

　　4) lnnaibca (one who eats human flesh)

C) Transcribe the following **(any two)** :　　**2**

　　1) thought

　　2) hear

　　3) bridge

4. Answer the following **(any two)** :　　**10**

　A) Write a brief talk on "Corruption free India".

　B) Your sister can not go on a trip with the family because she has to prepare for an important exam. Write a dialogue.

　C) Give acceptable combination for the following collocations.

　　1) A great standard -

　　2) It's a real fact -

　　3) do mistake -

　　4) Give an exam -

　　5) hot welcome -

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S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2011
GENERAL ENGLISH (2008 Pattern)

Time : 2 Hours   Max. Marks : 40

1. A) Manish, Subodh, Sameer and Yogiraj are asked to have a group discussion on 'Facebook – A Boon or Curse'. Write the transcript of the discussion in the form of a dialogue.   **5**

   B) You are attending an interview for the post of a Process Analyst in a Multinational Company. Write down five questions you could be asked by the interviewer along with their possible responses.   **5**

2. A) Write a paragraph on 'Mobile Security'.   **5**

   B) Write a telephonic conversation between you and your friend regarding the college picnic.   **5**

3. A) Punctuate the following sentences :   **5**

    i) what a pleasant surprise
    ii) rohan stood first in the class and he was awarded the medal
    iii) tina told anay to drive the car
    iv) may i leave the class early today
    v) please buy some apples bananas and guavas.

   B) Write a review of the film you have recently watched.   **5**

4. A) Write a summary note of the passage given below :   **5**

   This Sanskrit play, a solitary composition of its kind, comes very close to Greek Tragedy. The central idea of Greek Tragedy is that man learns through suffering, and it is through suffering that he becomes modest and humble. Man realises the futility of ambitions and accepts his own significance. But before he learns this lesson, he has to pay heavily for it; having done that he becomes a nobler and purer soul. That is what happens in Urubhanga. Duryodhana falls in the field, but the valorous Kuru prince of formerly unrelenting malice, experiences a metamorphosis and emerges a transfigured personality. He serenely accepts that fate as a punishment for his violations of the moral order of the world, before he dies. He does not regard his fate as evil but something just and proper that puts an end to all strife. (141 words)

   B) Write an e-mail to your brother advising him about his future career after passing High School Examination.   **5**

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S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2011
CS – 211 : DATA STRUCTURES USING 'C'
(Paper – I) (New) (2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : *1) Black figures to the **right** indicate **full** marks.*
*2) **All** questions carry **equal** marks.*
*3) **All** questions are **compulsory**.*

1. Attempt **all** of the following :   **(1×10=10)**

   a) Define space complexity.

   b) What term is used to describe an O(n) algorithm ?

   c) What is circular linked list ?

   d) Draw all possible non similar binary trees having 3 nodes.

   e) Define multiple stack.

   f) Define input restricted dequeue.

   g) What is minimal spanning tree ?

   h) Give structure of a node in AVL tree.

   i) Draw a graph corresponding to following adjacency.

$$\begin{array}{c c c c c} & a & b & c & d \\ a & \begin{bmatrix} 0 & 0 & 0 & 0 \\ b & 1 & 0 & 1 & 1 \\ c & 1 & 0 & 0 & 0 \\ d & 0 & 0 & 1 & 0 \end{bmatrix} \end{array}$$

   j) Choice of good data structure improves program efficiency. Comment.

2. Attempt **any two** of the following : **(2×5=10)**

   a) Write a 'C' function to add a number at the end of a double linked list ?

   b) Write a 'C' function to accept two trees and check first tree is mirror of other or not ?

   c) Write a 'C' functions push and pop for stack using singly linked list.

3. Attempt **any two** of the following : **(2×5=10)**

   a) Sort the following data by using Heap sort procedure

      12, 45, 21, 76, 83, 97, 82, 54.

   b) Convert following expression into postfix and then evaluate it using stack.

      A/B $ CD*E – A*C

      Assume $ for exponentiation and has highest priority, A = 4, B = 3, C= 2, D = 1, E = 2.

   c) Write a 'C' function to count the number of leaf nodes of a tree (Recursive).

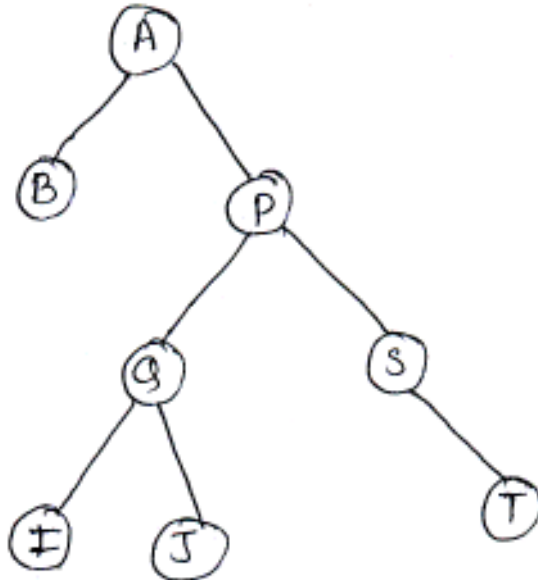4. Attempt **any one** of the following (**A** or **B**) : **(1×10=10)**

   A) a) What are the applications of stack ? **4**

      b) Show the contents of queue at each step of following program and find final output. **3**

       int x = 20, y = 30 ;

       initqueue ( ) ;

       addqueue (6) ;

       addqueue (x) ;

       y = delete queue ( ) ;

       y = deletequeue ( ) ;

        addqueue (y + 3) ;

        x = y + 30 ;

        addqueue (x) ;

        addqueue (x – 1) ;

        addqueue (x) ;

c) Traverse the given binary tree using three traversal techniques. **3**

OR

B) a) Write a short note on priority queue. **4**

b) Construct binary search tree for the following **3**

34   67   45   12   78   55   43   90   11

c) Sort the following data in ascending order using insertion sort method. **3**

Orange, Apple, Banana, Pineapple, Strawberry, Watermelon.

_____

S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2011
CS – 211 : DATA STRUCTURES USING 'C'
(Paper – I) (New) (2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : *1) Black figures to the* **right** *indicate* **full** *marks.*

                2) **All** *questions carry* **equal** *marks.*

                3) **All** *questions are* **compulsory**.

1. Attempt **all** of the following :   **(1×10=10)**

  a) Define space complexity.

  b) What term is used to describe an O(n) algorithm ?

  c) What is circular linked list ?

  d) Draw all possible non similar binary trees having 3 nodes.

  e) Define multiple stack.

  f) Define input restricted dequeue.

  g) What is minimal spanning tree ?

  h) Give structure of a node in AVL tree.

  i) Draw a graph corresponding to following adjacency.

$$
\begin{array}{c}
\quad a \quad b \quad c \quad d \\
\begin{array}{c} a \\ b \\ c \\ d \end{array}
\left[
\begin{array}{cccc}
0 & 0 & 0 & 0 \\
1 & 0 & 1 & 1 \\
1 & 0 & 0 & 0 \\
0 & 0 & 1 & 0
\end{array}
\right]
\end{array}
$$

  j) Choice of good data structure improves program efficiency. Comment.

P.T.O.

2. Attempt **any two** of the following : **(2×5=10)**

   a) Write a 'C' function to add a number at the end of a double linked list ?

   b) Write a 'C' function to accept two trees and check first tree is mirror of other or not ?

   c) Write a 'C' functions push and pop for stack using singly linked list.

3. Attempt **any two** of the following : **(2×5=10)**

   a) Sort the following data by using Heap sort procedure

     12, 45, 21, 76, 83, 97, 82, 54.

   b) Convert following expression into postfix and then evaluate it using stack.

     A/B $ CD*E – A*C

     Assume $ for exponentiation and has highest priority, $A = 4, B = 3, C = 2, D = 1, E = 2$.

   c) Write a 'C' function to count the number of leaf nodes of a tree (Recursive).

4. Attempt **any one** of the following (**A** or **B**) : **(1×10=10)**

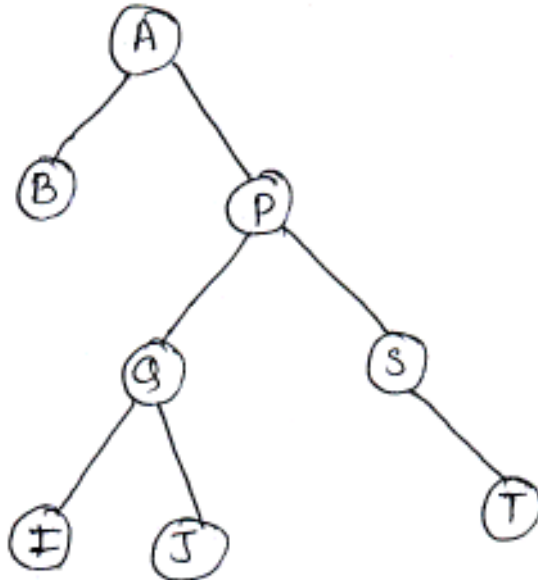   A) a) What are the applications of stack ? **4**

     b) Show the contents of queue at each step of following program and find final output. **3**

       int x = 20, y = 30 ;

       initqueue ( ) ;

       addqueue (6) ;

       addqueue (x) ;

       y = delete queue ( ) ;

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         addqueue (y + 3) ;

         x = y + 30 ;

         addqueue (x) ;

         addqueue (x – 1) ;

         addqueue (x) ;

c) Traverse the given binary tree using three traversal techniques. **3**

OR

B) a) Write a short note on priority queue. **4**

b) Construct binary search tree for the following **3**

34   67   45   12   78   55   43   90   11

c) Sort the following data in ascending order using insertion sort method. **3**

Orange, Apple, Banana, Pineapple, Strawberry, Watermelon.

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S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2011
(New 2008 Pattern) (Paper – II)
CS – 212 : RELATIONAL DATABASE MANAGEMENT SYSTEM
(RDBMS)

Time : 2 Hours   Max. Marks : 40

Instructions : *1)* *All questions carry **equal** marks.*
                        2) *All questions are **compulsory**.*
                        3) *Black figures to the **right** indicate **full** marks.*

1. Attempt **all** of the following :   **(1×10=10)**
   a) State the purpose of Iterate statement.
   b) What is Transaction ?
   c) Define Term-cascading rollback.
   d) What is filtering ?
   e) List any two advantages of 2 Tier Architecture.
   f) What is strict schedule ?
   g) What is authorization matrix ?
   h) What do you mean by log record ?
   i) Write any two responsibilities of server machines.
   j) What are different types of locks ?

2. Attempt **any two** of the following :   **(2×5=10)**
   a) Explain Thomos Writ Rule.
   b) Differentiate between Discretionary Access Control and Mandatory Access Control.
   c) Explain Failures classification in detail.

3. Attempt **any two** of the following :   **(2×5=10)**
   a) Following are the log entries at the time of system crash :
      [start − Transaction, T_1]
      [start − Transaction, T_3]
      [read − Item, T_1, B]
      [write − Item, T_2, C, 10, 5]
      [start − Transaction, T_3]

[commit ‗ Transaction, T$_2$]
[start ‗ Transaction, T$_4$]
[write ‗ Item, T$_1$, A, 13, 16]
[commit ‗ Transaction, T$_1$]
[write ‗ Item, T$_3$, D, 5, 7]
[read ‗ Item, T$_3$,E]
[write - Item, T$_4$, D, 70,100]
System crash.
If immediate update is used, what will be the recovery procedure ?

b) How client machine interact with server ? Explain with diagram.

c) The following is the list of events in an interleaved execution of a set of transaction T$_1$, T$_2$, T$_3$ with 2PL protocol

Time	Transaction	Code
t$_1$	T$_1$	LOCK (A, S)
t$_2$	T$_2$	LOCK (B, S)
t$_3$	T$_3$	LOCK (A, X)
t$_4$	T$_1$	LOCK (C, S)
t$_5$	T$_2$	LOCK (A, X)
t$_6$	T$_3$	LOCK (D, X)
t$_7$	T$_1$	LOCK (A – C)
t$_8$	T$_2$	LOCK (D, S)
t$_9$	T$_3$	LOCK (C, X)
t$_{10}$	T$_1$	Commit
t$_{11}$	T$_2$	LOCK (C, S)

Construct a wait for-a graph according to above request. Is there dead lock at any instance ? Justify.

4. Attempt the following : **(2×5=10)**

   a) Explain granting and revoking privileges.

   b) Consider following entities and relationships.

   > Cust (no, name, city)

   > Account (Ano, type, bal).

   Cust and Account are related with M-M with discriptive attributes W -Amt and W-date.

   Define a trigger that will take care of constraints cust-bal should be greater than 5000 When he withdraw the amount.

   > OR

   b) Consider the following table :

   Teacher (TId, Tname, Tdesi, DOJ; no-of-research - papers).

   Write a cursor to update designation (Tdesi) of 'Asst. Proff' to 'Asso. Proff' from above table depending upon total number of research paper are more than 10.

   _____

S.Y. B.Sc. (Comp. Sc.) (Semester – I) Examination, 2011
MATHEMATICS (Paper – I)
(2008 Pattern)
MTC – 211 : Linear Algebra (New)

Time : 2 Hours   Max. Marks : 40

*Instructions : 1) **All** questions are **compulsory**.*
                *2) **All** questions carry **equal** marks.*

1. Attempt **all** questions :   **10**

   i) For what values of k the system

      kx + y = 0

      – 5x + 4y = 0 has trivial solution.

   ii) If $A = \begin{bmatrix} 1 & 3 & 5 & 4 \\ 0 & 1/3 & 4 & 5 \\ 0 & 0 & 9 & 5 \\ 0 & 0 & 0 & 2 \end{bmatrix}$, find det A.

   iii) Determine whether the set $S = \left\{ \begin{bmatrix} a, & b \\ c & d \end{bmatrix} \middle| \ a = 1 \right\}$ is a subspace of $M_{2 \times 2}(R)$.

   iv) Give an example of matrix which is in row-echelon form.

   v) If 4, 3, 3 are the eigen values of a matrix A, then find the eigen values of 3A.

   vi) If $V = P_3$ is a vector space of polynomials of degree $\leq$ 3, then find the standard basis for P_3.

   vii) Let $T : R^2 \to R^2$ is defined as T (x, y) = (x + y + 1, x + y). Determine whether T is linear transformation ?

   viii) The equation 2x – 3y = 11 has infinitely many solutions ? Justify.

   ix) State true or false : If a square matrix A has all distinct eigen values then A is diagonalizable.

   x) Find nullity of a matrix A of order 4×5 and rank (A) = 3.

2. Attempt **any two** of the followings : **10**

   i) Let V be an n-dimensional vector space, then prove that any set of n linearly independent vectors in V is a basis for V.

   ii) The set $S = \{ (1, 1, 1), (1, 2, 3), (0, 1, 0)\}$ forms a basis for R^3. Express (2, 1, 3) as a linear combination of vectors in S.

   iii) Solve the system

$$2x_1 + x_2 + x_3 = 2$$
$$x_1 + 3x_2 + 2x_3 = 2$$
$$3x_1 + x_2 + 2x_3 = 2$$

   by using Gauss-Jordan elimination method.

3. Attempt **any two** of the followings : **10**

   i) Let $T : V \rightarrow W$ be a linear transformation then prove that the range of T is a subspace of W.

   ii) Verify Calay Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 \\ 1 & 1 \end{bmatrix}$, and use it to find A.

   iii) Find the standard matrix for the linear transformation $T : R^5 \rightarrow R^2$ defined by $T(x_1, x_2, x_3, x_4, x_5) = (3x_1 - x_2 + 4x_3, - 3x_2 + 4x_4 - 2x_5)$.

4. Attempt **any one** of the followings : **10**

   i) a) Find eigen values and corresponding eigen spaces to the matrix

$$\begin{bmatrix} 5 & 0 \\ -7 & 1 \end{bmatrix}$$

      b) Find the basis for the column space of the following matrix.

$$A = \begin{bmatrix} 1 & 1 & 0 & -1 \\ 1 & 2 & 3 & 0 \\ 2 & 3 & 3 & -1 \end{bmatrix}$$

ii) a) Find rank and nullity of matrix A and verify "Dimension theorem",

$$\text{where } A = \begin{bmatrix} 1 & 2 & 1 & 3 \\ 2 & 1 & -4 & -5 \\ 7 & 8 & -5 & -1 \\ 10 & 14 & -2 & 8 \end{bmatrix}$$

b) Find a matrix P, that diagonalize $A = \begin{bmatrix} 1 & 4 \\ 1 & -2 \end{bmatrix}$ and determine $P^{-1}AP$.

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S.Y. B.Sc. (Comp. Sc.) (Semester – I) Examination, 2011
MATHEMATICS (Paper – I)
(2008 Pattern)
MTC – 211 : Linear Algebra (New)

Time : 2 Hours   Max. Marks : 40

Instructions : *1)* **All** *questions are* **compulsory**.
                2) **All** *questions carry* **equal** *marks.*

1. Attempt **all** questions :   **10**

   i) For what values of k the system

      kx + y = 0

      – 5x + 4y = 0 has trivial solution.

   ii) If $A = \begin{bmatrix} 1 & 3 & 5 & 4 \\ 0 & \frac{1}{3} & 4 & 5 \\ 0 & 0 & 9 & 5 \\ 0 & 0 & 0 & 2 \end{bmatrix}$, find det A.

   iii) Determine whether the set $S = \left\{ \begin{bmatrix} a, & b \\ c & d \end{bmatrix} \middle| \, a = 1 \right\}$ is a subspace of $M_{2\times 2}(R)$.

   iv) Give an example of matrix which is in row-echelon form.

   v) If 4, 3, 3 are the eigen values of a matrix A, then find the eigen values of 3A.

   vi) If $V = P_3$ is a vector space of polynomials of degree ≤ 3, then find the standard basis for P_3.

   vii) Let $T : R^2 \to R^2$ is defined as T (x, y) = (x + y + 1, x + y). Determine whether T is linear transformation ?

   viii) The equation 2x – 3y = 11 has infinitely many solutions ? Justify.

   ix) State true or false : If a square matrix A has all distinct eigen values then A is diagonalizable.

   x) Find nullity of a matrix A of order 4×5 and rank (A) = 3.

                                                          P.T.O.

2. Attempt **any two** of the followings : **10**

   i) Let V be an n-dimensional vector space, then prove that any set of n linearly independent vectors in V is a basis for V.

   ii) The set $S = \{ (1, 1, 1), (1, 2, 3), (0, 1, 0)\}$ forms a basis for R^3. Express $(2, 1, 3)$ as a linear combination of vectors in S.

   iii) Solve the system

$$2x_1 + x_2 + x_3 = 2$$
$$x_1 + 3x_2 + 2x_3 = 2$$
$$3x_1 + x_2 + 2x_3 = 2$$

   by using Gauss-Jordan elimination method.

3. Attempt **any two** of the followings : **10**

   i) Let $T : V \rightarrow W$ be a linear transformation then prove that the range of T is a subspace of W.

   ii) Verify Calay Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 \\ 1 & 1 \end{bmatrix}$, and use it to find A.

   iii) Find the standard matrix for the linear transformation $T : R^5 \rightarrow R^2$ defined by $T(x_1, x_2, x_3, x_4, x_5) = (3x_1 - x_2 + 4x_3, -3x_2 + 4x_4 - 2x_5)$.

4. Attempt **any one** of the followings : **10**

   i) a) Find eigen values and corresponding eigen spaces to the matrix

$$\begin{bmatrix} 5 & 0 \\ -7 & 1 \end{bmatrix}$$

     b) Find the basis for the column space of the following matrix.

$$A = \begin{bmatrix} 1 & 1 & 0 & -1 \\ 1 & 2 & 3 & 0 \\ 2 & 3 & 3 & -1 \end{bmatrix}$$

ii) a) Find rank and nullity of matrix A and verify "Dimension theorem",

$$\text{where } A = \begin{bmatrix} 1 & 2 & 1 & 3 \\ 2 & 1 & -4 & -5 \\ 7 & 8 & -5 & -1 \\ 10 & 14 & -2 & 8 \end{bmatrix}$$

b) Find a matrix P, that diagonalize $A = \begin{bmatrix} 1 & 4 \\ 1 & -2 \end{bmatrix}$ and determine $P^{-1}AP$.

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S.Y.B.Sc. (Computer Science) (Semester – I) Examination, 2011
MATHEMATICS (Paper – II)
(2008 Pattern)
MTC – 212 : Numerical Analysis

Time : 2 Hours   Max. Marks : 40

Instructions : 1) *All* questions are *compulsory.*
                      2) Figures to the *right* indicate *full* marks.
                      3) *Use of single memory, non-programmable scientific calculator is **allowed**.*

1. Attempt **all** questions.   **10**

   i) Find the absolute error of the number 0.80039.

   ii) Find the number of imaginary roots of the equation $f(x)=x^9–x^5+x^4+x^2+1=0$
   (Use Descarte's rule).

   iii) If $y = \sec^2 x$ then find the error in x.

   iv) Prove that $\dfrac{\Delta}{\nabla} - \dfrac{\nabla}{\Delta} = E - E^{-1}$.

   v) State **true** or **false** :

   The order of convergence of Regula-Falsi method is 2. Justify.

   vi) Write the formula for $\dfrac{d^2 y}{dx^2}$ using Newton's forward difference formula for non-tabular values of x.

   vii) Evaluate : $\Delta\left[x^2 + \sin x\right]$.

   viii) If $f(1) = 10$, $f(2) = 50$, $f(3) = 70$, $f(4) = 80$ and $f(5) = 100$, find $\int\limits_{1}^{5} f(x)dx$ using Trapezoidal rule.

   ix) Given $\dfrac{dy}{dx} + 2y = 0$; $y(0) = 1$, find $y(0.1)$ using Euler's method.

   x) Write Runge-Kutta formula of third order for ordinary differential equation.

2. Attempt **any two** of the following :   **10**

  i) Find a real root of the equation x sinx + cosx = 0 correct to three decimal places using Newton-Raphson method.

  ii) The function y = f(x) is given at the points (7, 3), (8, 1) (9, 1) and (10, 9).

    Find f(9.5) using Lagrange's interpolation formula.

  iii) Solve the following system of equations by Gauss-Seidel iterative method.

$$3x_1 + 8x_2 + 29x_3 = 71$$
$$83x_1 + 11x_2 - 4x_3 = 95$$
$$7x_1 + 52x_2 + 13x_3 = 104$$

    [Perform 4 iterations]

3. Attempt **any two** of the following :   **10**

  i) State and prove Newton's backward interpolation formula for equally spaced points.

  ii) From the following table, find $\dfrac{dy}{dx}$ and $\dfrac{d^2y}{dx^2}$ at x = 1.5

x :	1.5	2.0	2.5	3.0	3.5	4
y :	3.375	7.000	13.625	24.000	38.875	59.000

  iii) Find the value of the area of the circle of diameter 82 from the following given data :

d (Diameter)	80	85	90	95	100
A (Area)	5026	5674	6362	7088	7854

[4018] – 104

4. Attempt **any one** of the following : **10**

   i) a) State and derive Simpson's $\left(\dfrac{3}{8}\right)^{th}$ rule for numerical integration.

   b) Evaluate the integral $I = \int_{3}^{5} \dfrac{4}{2+x^2}\, dx$, using Simpson's $\left(\dfrac{1}{3}\right)^{rd}$ rule. (Take h=0.25)

   ii) a) Determine the value of y(0.1) and y(0.2) upto 4 decimal places using Euler's modified method, where $\dfrac{dy}{dx} = 1 + xy;\ y(0) = 2$ [Take h = 0.1]

   b) Given that $\dfrac{dy}{dx} = \dfrac{x^2 + y^2}{10}$, with y (0) =1, find y (0.2) using Runge-Kutta method of fourth order. [Take h = 0.1].

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S.Y. B.Sc. (Comp. Sc.) (Semester – I) Examination, 2011
ELECTRONICS
ELC 211 : Microprocessor Architecture and Programming (Paper – I)
(New Course) (2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
                      2) Figures to the ***right*** *indicate* ***full*** *marks.*
                      3) ***Neat*** *diagram must be drawn* ***wherever*** *necessary.*

1. Answer the following questions in **one** or **two** sentences.   **(1×10=10)**

    a) Define memory space.

    b) List the components of CPU.

    c) In which type of communication system 'start' and 'stop' bits are used ?

    d) What is the size of Data cache memory (internal) of Pentium Microprocessor ?

    e) State any two flags of flag register of Pentium Microprocessor.

    f) Where does the quotient and remainder get stored after execution of unsigned byte wide DIV instruction ?

    g) Which interrupt has highest priority in Pentium ?

    h) Write an example of the following addressing modes.

      i) Direct addressing mode.

      ii) Register indirect addressing mode.

    i) What is the function of 'ORG' directive in assembly language program ?

    j) What will be the content of AL and BL registers after execution of the following instructions ?

    MOV BL, 08 H

    MOV AL, 02 H

    add AL, BL

2. Attempt **any two** of the following : **(5×2=10)**

   a) Explain 'I/O Interface Unit' with neat block diagram.

   b) Explain function of the following blocks of Pentium Processor.

      i) Instruction cache

      ii) Branch Target buffer

      iii) Bus Interface Unit

      iv) Floating Point Unit

      v) U and V pipe line.

   c) Explain working of the following instructions :

      i) MOVSX Destination, source

      ii) PUSHF

      iii) SBB AL, BL

      iv) SHR CL, 1

      v) JNC back.

3. Attempt **any two** of the following : **(5×2=10)**

   a) Explain interrupt processing sequence used in Pentium Processor.

   b) Draw flowchart and write an assembly language program to find largest number from an array of numbers.

   c) Draw flowchart and write an assembly language program to convert decimal number to Hexadecimal number.

4. Attempt **any one** of the following : **(10×1=10)**

   a) i) How does virtual address gets converted in to physical address by segmentation ?

      ii) Write an assembly language program to read two numbers from keyboard and display their multiplication.

b) i) Explain function of the following registers of Pentium Processor.

  I) CX

  II) Stack Pointer (SP)

  III) Code Segment (CS)

  IV) Source Index (SI)

  V) Base Pointer (BP)

ii) Explain following DOS int 21H (interrupt) functions.

  I) Function 01H

  II) Function 02H

  III) Function 08H

  IV) Function 09H

  V) Function 4CH

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S.Y. B.Sc. (Comp. Sci.) (Semester – I) Examination, 2011
ELECTRONICS (Paper – II)
ELC-212 : Communications Principles
(New Course) (2008 Pattern)

Time : 2 Hours   Max. Marks : 40

*Instructions : 1) **All** questions are **compulsory**.*
*2) **Neat** diagrams must be drawn **wherever** necessary.*

1. Answer the following in **one** or **two** sentences :   **(1×10=10)**

   a) State any two applications of LF band.

   b) Give any two examples of half duplex communication system.

   c) What is base band signal ?

   d) What is modulation ?

   e) In Spread Spectrum Communication FHMA stands for _____

   f) Define SDMA and give any one example of SDMA system.

   g) Define an antenna.

   h) Calculate the length of a half wave dipole antenna designed to operate at a frequency of 200 MHz.

   i) What is cluster in cellular system ?

   j) State the essential protocols in GSM.

2. Answer following questions (**any two**) :   **(5×2=10)**

   a) State any four types of the noise in communication system. Explain an industrial noise.

   b) Explain QPSK modulator with neat block diagram and phasor diagram.

   c) Differentiate between TDM and FDM.

3. Answer following questions (**any two**) :   **(5×2=10)**

   a) Distinguish between serial and parallel communication.

   b) Explain any three features of FDMA. A mobile operator is allotted 20 MHz band width for each simplex band. If it has B_{guard} of 5 kHz and B_c is 25 kHz, find number of channels in FDMA system.

   c) Explain GPRS general architecture with neat block diagram.

P.T.O.

4. Answer following questions (**any one**) :   **(10×1=10)**

    A) i) Explain an amplitude modulation with neat labeled waveforms.

           If the modulating signal amplitude is 3V and carrier signal amplitude is 5V, calculate the modulation index.

      ii) State different types of antenna arrays.

           Draw Yagi-Uda antenna.

           Write the advantages of using antenna array structures.

    B) i) Differentiate between Advoc and Infrastructure network.

      ii) Draw the block diagram of GSM system architecture. Explain the role of VLR and HLR.

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S.Y. B.Sc. (Comp. Sci.) (Semester – I) Examination, 2011
ELECTRONICS (Paper – II)
ELC-212 : Communications Principles
(New Course) (2008 Pattern)

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S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2011
ELC-212 : ELECTRONICS – II
Process Control Instrumentation (Old) (2004 Pattern)

Time : 2 Hours   Max. Marks : 40

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw **neat** diagram **whenever** necessary.*

1. Answer the following questions in **one-two** sentences :   **(1×10=10)**

    a) Define set point in process control system.

    b) Give any two analysis possible using PSPICE.

    c) What are the advantages of Open-loop control system.

    d) If the minimum temperature accepted by temperature transducer is 10°C to produce the output 1 mV and maximum temperature accepted is 200°C to produce the output 20 mV. What will be the input range and output span ?

    e) State the working principle of bimetal strip.

    f) Draw block diagram of single channel DAS.

    g) Define aperture time of sample and hold circuit.

    h) Write expression for output of PI control mode.

    i) What is mean by transient response ?

    j) Name the actuator used to position the R/W head in floppy drive.

2. Attempt **any two** questions :   **(5×2=10)**

    a) Develop a first order differential equation of mercury thermometer.

    b) The output of op-amp based proportional controller is –15V corresponding to 0% output and +15V for 100% output. Determine actual output for 80% controller output.

    c) Draw the circuit for instrumentation amplifier using 3 op-amp and derive expression for its voltage gain.

                                                                    P.T.O.

3. Attempt **any two** questions : **(5×2=10)**

   a) Draw the block diagram of close loop control system. Explain the role of each block in brief.

   b) Compare RTD, thermistor, thermocouple and solid state temperature sensor on the basis of linearity, accuracy, range and stability.

   c) With the help of neat circuit diagram explain the working of sample and hold circuit.

4. Attempt **any one** question : **(10×1=10)**

   a) i) Explain working principle of stepper motor. **5**

      ii) Describe derivative controller mode in detail. Hence explain its limitations. **5**

   b) i) Give any two differences between analog multiplexer and digital multiplexer. **2**

      ii) Explain signal conditioning technique used for calibration of non-linear transducers. **3**

      iii) Using optical emitter and receiver how position and speed of a distant object can be find out ? What is the advantage of this method ? **5**

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S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2011
CS – 221 : OBJECT ORIENTED CONCEPTS AND
PROGRAMMING IN C++
(2008 Pattern) (Paper – I)

Time : 2 Hours   Max. Marks : 40

Instructions : *1)* *Black figures to the* ***right*** *indicate* ***full*** *marks.*
                          2) ***All*** *questions carry* ***equal*** *marks.*

1. Attempt **all** of the following :   **(1×10=10)**

   a) Define following :
      i) Sequence containers   ii) Associative containers.

   b) Write syntax to create virtual base class.

   c) List file mode operation.

   d) What is friend class ? Give its syntax.

   e) Differentiate multiple and hierarchical inheritance.

   f) The destructor can have different name as the class – state **true/false**.

   g) Which are the types of polymorphism ?

   h) List the different cast operators in C++.

   i) The over loaded operator must have at least one user defined type operand.
      State **true/false**.

   j) What will be the out put of the following.
      cout < < setbase (16) < < 14;

2. Attempt **any two** of the following :   **(2×5=10)**

   a) Give the general format of class and state the significance of private, public
      & protected access specifiers.

   b) Explain the terms with example :
      i) Pass by reference   ii) Return by reference

   c) Write a program to read n numbers (where n is defined by user) and find the
      average of the non-negative integer numbers. Also find the deviation of the
      numbers using new & delete operators.

                                                                    P.T.O.

3. Attempt **any two** of the following : **(2×5=10)**

   a) Explain the usage of this pointer with example.

   b) Explain following functions with example
      i) tellg ()   ii) tellp ( )

   c) Write a program to prepare the marksheet of the college examination with the following items read from the keyboard.

      Name of the student, roll no, subject name, subject code, internal marks, external marks. Design the base class consisting of data members such as name of student, rollno, subject name. The derived class consist of the data members, viz, subject code, internal marks and external marks.

4. Attempt **any one** of the following (**A** or **B**) :   **10**

   A) 1) Explain exception handling mechanism.

      2) Write a C++ program using a class template to read any five parameterized data type such as float and integer and print the average.

                     OR

   B) 1) List the features of generic functions.   **4**

      2) Explain the output of the following programs   **3**
         code
         # include <iostream.h>
         # include <iomanip.h>
         ostream & currency (ostream & output)
         {
           output << "Rs";
           return output ;
         }
         Ostream & form (ostream and output)
         {

```
    output.setf (ios : : showpos) ;
    output.setf (ios : : show point) ;
    output.fill ('*') ;
    output. precision (2);
    output<< setiosflags (ios : : fixed) <<setw(10);
    return output ;
}
int main ( )
{
  cout << currency << form << 8539.5;
  return θ ;
}
```

3) Identify the error in the following Program :   **3**
```
# include <iostream.h>
class space
  {
     int mCount ;
     Public :
         Space ( )
         {
            mCount =  θ ;
         }
         Space operator ++ ( )
         {
            mCount ++ ;
            return space (mCount) ;
         }
     } ;
  void main ( )
  {
    space objectspace ;
    objectspace++;
  }
```

S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2011
CS-222 : SOFTWARE ENGINEERING
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions*: i) **All** questions are **compulsory**.*
*ii) **All** questions carry **equal** marks.*
*iii) Figures to the **right** indicate **full** marks.*

1. Attempt **al**l of the following :   **(1×10=10)**

   a) Define software engineering.

   b) Explain use of prototype.

   c) State any two characteristics of software.

   d) What does the radius of the spiral indicate in the spiral model ?

   e) What is Technical feasibility study ?

   f) What is requirement analysis ?

   g) What is inception ?

   h) Define validation.

   i) What are elements of analysis modeling ?

   j) What is meant by cardinality ?

2. Attempt **any two** of the following.   **(2×5=10)**

   a) What is software myths ? Explain types of software myths.

   b) Write a note on - " The Essence of Practice" .

   c) What is Elicitation ? Discuss the problems that are encountered as elicitation
      occurs.

3. Attempt **any two** of the following. (2×5=10)

   a) Explain framework activities of a process.

   b) Explain incremental model.

   c) Explain any five key human factors considered during Agile software development.

4. Attempt the following. (2×5=10)

   a) Explain software Testing.

                    OR

   a) Why it is difficult to gain clear understanding of what the customer want ?

   b) Draw context level DFD, first level DFD and E-R diagram for

      "Network based course registration system for university".

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S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2011
MATHEMATICS (Paper – I)
MTC – 221 : Computational Geometry
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

*Instructions: 1) **All** questions are **compulsory**.*
*   2) Figures to the **right** indicate **full** marks.*
*   3) **Use** of single memory non programmable scientific*
*   calculator is **allowed**.*

1. Attempt the following :   **10**

   i) If a line segment joining the points A[1 1] and B[1 3] is transformed to the line segment A*B* where A*[8 4] and B* [20 6], what is the 2×2 transformation matrix used ?

  ii) What is the significance of 'h' when a point in two dimensions is represented as [x y h] ?

 iii) Write the general 2×2 rotation matrix, about origin through an angle $\theta = 270°$.

  iv) Apply scaling in X-co-ordinate by factor 0.02 on the point p[–50 25].

   v) What is the effect of the 4×4 transformation matrix,

$$[T] = \begin{bmatrix} 1 & -1 & 2 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 3 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

     on any object in space ?

  vi) Find the value of $\delta\theta$ to generate 40 points on the circle

     $(X – 2)^2 + (Y – 4)^2 = 25$.

 vii) Write a matrix of orthographic projection on the plane X = 0.

viii) Define : Trimetric projection.

  ix) Write the transformation matrix for developing rear view of any object.

   x) Define the term : Convex hull.   **P.T.O.**

2. Attempt **any two** of the following :   **10**

   i) If a straight line with equation y = mx + k is transformed by using 2×2 transformation matrix $[T] = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, then obtain the equation of the transformed line.

  ii) Using the concatenated matrix, reflect the $\triangle ABC$, through the line y = 10, where A[1 3], B[2 4] and C[3 5].

 iii) Find the point of intersection at infinity, for the lines

    X + Y = 1 and

    X + Y = 0.

3. Attempt **any two** of the following :   **10**

   i) Determine the angles through which the plane X + 2Y + 2Z = 0 should be rotated about X-axis and then Y-axis so that it coincides with the Z = 0 plane.

  ii) Find the concatenated matrix required to make the plane X + Y + Z = 0 coincident with the Z = 0 plane.

 iii) Obtain an algorithm to generate uniformly spaced n points on the circle $(x - h)^2 + (y - k)^2 = r^2$.

4. Attempt **any one** of the following :   **10**

   a) With usual notations, derive the expression for

    θ - angle of rotation about X-axis,

    ϕ - angle of rotation about Y-axis

    for dimetric projection.

   b) i) Generate 5 points of the parabolic segment $y^2 = 16x$ in the first quadrant for $8 \leq y \leq 16$.

    ii) Find the parametric equation of the Be'zier curve with control points $B_0[-2 \ 1]$, $B_1[1 \ 3]$ and $B_2[6 \ -1]$. Further find the point corresponding to the parameter value t = 0.357.

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S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2011
MATHEMATICS (Paper – II)
MTC – 222 : Operations Research
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : *1) **All** questions are **compulsory.***
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of single memory, non-programmable scientific*
*   calculator is **allowed.***
*4) Graph papers will be supplied on **demand.***

1. Attempt **all** questions :   **10**

   i) Why we introduce artificial variables in the constraints ?

   ii) What is the condition for non-degenerate basic feasible solution in transportation problem ?

   iii) Write the dual of the following linear programming problem

   Maximize $(z) = x_1 + 2x_2 - x_3$

   Subject to $2x_1 - 3x_2 + 4x_3 \leq 5$

   $2x_1 - 2x_2 \qquad \leq 6$

   $3x_1 - x_3 \qquad \geq 4,$

   $x_1, x_2, x_3 \geq 0$

   iv) Which method is convenient for finding IBFS in transportation problem ? Why ?

   v) Solve the following assignment problem

   $$\begin{bmatrix} 10 & 10 \\ 15 & 15 \end{bmatrix}$$

   vi) Define : fair game.

vii) Find the saddle point of the following game

$$\begin{bmatrix} -5 & 2 & 0 & 7 \\ 5 & 6 & 4 & 8 \\ 4 & 0 & 2 & -3 \end{bmatrix}$$

viii) Solve the following transportation problem by North West Corner Rule.

	D_1	D_2	D_3	Capacity
A	2	7	4	19
B	3	3	1	8
C	1	6	2	7
Demand	7	9	18	

ix) Define optimal solution in LPP.

x) Draw the feasible region bounded by the lines for the following LPP.

Max $(z) = 3x_1 + 2x_2$
Subject to $x_1 - x_2 \le 1$
$\qquad\qquad x_1 + x_2 \ge 3$
$\qquad\qquad x_1, x_2 \ge 0.$

2. Attempt **any two** of the following : **10**

i) Solve the following linear programming problem by simplex method

Maximize $(z) = 40x_1 + 35x_2$

Subject to $2x_1 + 3x_2 \le 60$

$\qquad\qquad 4x_1 + 3x_2 \le 96$

$\qquad\qquad x_1, x_2 \ge 0.$

ii) Solve the following assignment problem to minimize the total cost.

$$
\begin{array}{c c c c c c}
 & a & b & c & d & e \\
\text{I} & 160 & 130 & 175 & 190 & 200 \\
\text{II} & 135 & 120 & 130 & 160 & 175 \\
\text{III} & 140 & 110 & 155 & 170 & 185 \\
\text{IV} & 50 & 50 & 80 & 80 & 110 \\
\text{V} & 55 & 35 & 70 & 80 & 105
\end{array}
$$

iii) A firm can produce three types of clothes say, A, B and C. The clothes are made of three colours of wools say, red, green and blue. One unit of cloth A needs 2 meters of red wool and 3 meters of blue wool ; one unit of cloth B requires 3 meters of red wool, 2 meters of green and 2 meters of blue wool and one unit of cloth C requires 5 meters of green wool and 4 meters of blue wool. The firm has only a stock of 800 meters of red wool, 1000 meters of green wool and 1500 meters of blue wool. Suppose that the profit per unit of clothes A, B and C is Rs. 3, Rs. 4 and Rs. 5 respectively, formulate LPP.

3. Attempt **any two** of the following : **10**

i) Find the IBFS of the following transportation problem by Matrix - Minima method.

From ↓ / To →	D_1	D_2	D_3	D_4	Capacity
S_1	19	30	50	10	7
S_2	70	30	40	60	9
S_3	40	8	70	20	18
Demand	5	8	7	14	

ii) Solve the following 2×4 game graphically

Player B

$$\text{Player A} \quad \begin{array}{c} A_1 \\ A_2 \end{array} \begin{array}{cccc} B_1 & B_2 & B_3 & B_4 \\ \left[\begin{array}{cccc} 2 & 1 & 0 & -2 \\ 1 & 0 & 3 & 2 \end{array} \right] \end{array}$$

iii) Explain Hungarian method for solving the assignment problem.

4. Attempt **any one** of the following : **10**

i) Find the IBFS by VAM method. Obtain its optimal solution by MODI method for the following transportation problem.

Destination / Origins	D_1	D_2	D_3	D_4	Capacity
O_1	15	10	17	18	2
O_2	16	13	12	13	6
O_3	12	17	20	11	7
Demand	3	3	4	5	

ii) a) Solve the following game by dominance principle

Player B

$$\text{Player A} \quad \begin{array}{c} A_1 \\ A_2 \\ A_3 \end{array} \begin{array}{ccc} I & II & III \\ \left[\begin{array}{ccc} 10 & -10 & 50 \\ -25 & 25 & -25 \\ 10 & -50 & 50 \end{array} \right] \end{array}$$

b) Solve the given linear programming problem by graphical method.

Maximize $(z) = 5x_1 + 7x_2$

Subject to $\quad x_1 + x_2 \le 4$

$3x_1 + 8x_2 \le 24$

$10x_1 + 7x_2 \le 35$

$x_1, x_2 \ge 0$

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**S.Y. B.Sc. (Semester – II) (Computer Science) Examination, 2011
ELC-221 : ELECTRONICS (Paper – I)
Micro Controller and Embedded Systems
(2008 Pattern)**

Time : 2 Hours   Max. Marks : 40

Instructions : *1)* ***All*** *questions are* ***compulsory.***

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

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

1. Answer the following in **one** or **two** sentences :   **(1×10=10)**

   a) How many register banks are available in 128 byte RAM of 8051 microcontroller ? How many registers are there in each bank ?

   b) List the ports of 8051 micro controller. Which port requires external pull-up registers ?

   c) Which ports of 8051 micro controller are used to communicate with 8K×8 external data memory ?

   d) Which register bits decide whether the external interrupt is level triggered or edge triggered ?

   e) When timer 0 and timer 1 overflows which bits of TCON register sets ?

   f) What is the vector address of $\overline{\text{INT1}}$?

   g) What is the step size in ADC 0804, if V_{in} = 0 to 5V.

   h) Define 'Embedded System'.

   i) What is loader ?

   j) What is the function of cross assembler ?

2. Attempt **any two** of the following :   **(2×5=10)**

   a) Explain with neat block diagram T CON register of 8051 microcontroller.

   b) Explain the alternate functions of port 3 pins.

   c) Write an assembly language program to generate square wave of 25% duty cycle on P2.4.

                                                                          P.T.O.

3. Attempt **any two** of the following : **(2×5=10)**

   a) Write an assembly language program in which g. bytes of data stored in RAM location starting from address 20H are transferred to serial port using interrupt.

   XTAL = 11.0592 MHz.

   b) Write an assembly language program to generate delay of one second using Timer-1, Mode-1 using XTAL = 12 MHz.

   c) If R = 5K and I_{ret} = 2 mA, calculate output voltage V_{out} for the following inputs (i) ED H (ii) CB H applied to the DAC 0808.

4. Attempt **any one** of the following : **(10×1=10)**

   a) Explain classification of embedded system. Explain operation of the following instructions.

     i) MOV A, R_0
     ii) XCH A, @ R_1
     iii) DAA
     iv) ORL 10 H, # 23H
     v) NOP.

   b) i) Explain interfacing of LCD (Liquid Crystal Display) with 8051 microcontroller.

     ii) If IP register is loaded with OC H, write down the sequence in which interrupts are serviced.

     iii) Write an assembly language program to send low to high (positive edge) pulse on port pin P1.6 when P2.7 pin changes to logic 1.

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S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2011
ELC-222 : ELECTRONICS (Paper – II)
Digital Signal Processing (2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*

1. Answer the following in **one** or **two** sentences :   **(1×10=10)**
   a) State the significance of ROC.
   b) What do you mean by a DT signal ?
   c) List the types of DSP processors.
   d) State the basic principle of RADAR.
   e) Represent the signal x(n), graphically. Where, $x(n) = \{1, -1, \underset{\uparrow}{0}, 2, -1, 2\}$.
   f) What is the role of circular buffers ?
   g) Define correlation in signal processing.
   h) State any two advantages of digital filters.
   i) In decoding technique used for a CD player <u>EFM</u> stands for _____.
   j) Why Laplace Transform is referred as a bilateral transform ?

2. Attempt **any two** of the following :   **(2×5=10)**
   a) Differentiate between Digital Signal Processors and Microprocessors.
   b) Determine Four point DFT of X(n) = {1, 2, 3, 4}.
   c) Current I(s) in any network is given by the equation $I(s) = \dfrac{3S + 4}{S^2 + 4.S}$.
      Find the current at any time t.

3. Attempt **any two** of the following :   **(2×5=10)**
   a) What is Seismography ? Explain function of DSP in Seismography.
   b) Draw the block diagram of Digital Signal Processing System and explain the function of each block.
   c) Give any five differences between impulse invariance and bi-linear transformation method.

P.T.O.

4. Attempt **any one** of the following : **(1×10=10)**
    a) i) Draw the block diagram showing the elements of TMS320C5X DSP. **5**
      ii) Describe SONAR system with a neat block diagram. **5**

        OR

    b) I) i) Determine the convolution function

          $Y(n)$ for $X(n)= \{1, -1, \underset{\uparrow}{0}, 1, 2\}$ and $h(n) = \{1, \underset{\uparrow}{2}, 3, 4\}$. **2**

        ii) List any three design considerations of DSP architecture. **3**

     II) i) Obtain Laplace transform of unit impulse signal. **2**
        ii) Explain how noise is reduced and echo is cancelled in telephone network. **3**

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