CBCS SCHEME

Fourth Semester B.E. Degree Examination, June/July 2019
Engineering Mathematics - IV

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1   a. If $y' + y + 2x = 0$, $y(0) = -1$ then find $y(0.1)$ by using Taylor's series method. Consider upto third order derivative term. **(06 Marks)**

   b. Find $y(0.2)$ by using modified Euler's method, given that $y' = x + y$, $y(0) = 1$.
      Take $h = 0.1$ and carry out two modifications at each step. **(07 Marks)**

   c. If $y' = \dfrac{1}{x + y}$, $y(0) = 2$, $y(0.2) = 2.0933$, $y(0.4) = 2.1755$, $y(0.6) = 2.2493$ then find
      $y(0.8)$ by Milne's method. **(07 Marks)**

OR

2   a. Use Taylor's series method to find $y(0.1)$ from $y' = 3x + y^2$, $y(0) = 1$. Consider upto fourth derivative term. **(06 Marks)**

   b. Use Runge – Kutta method to find $y(0.1)$ from $y' = x^2 + y$, $y(0) = -1$. **(07 Marks)**

   c. Use Adam – Bashforth method to find $y(0.4)$ from $y' = \dfrac{1}{2} xy$, $y(0) = 1$, $y(0.1) = 1.0025$,
      $y(0.2) = 1.0101$, $y(0.3) = 1.0228$. **(07 Marks)**

Module-2

3   a. Express $x^3 - 5x^2 + 6x + 1$ in terms of Legendre polynomials. **(06 Marks)**

   b. Find $y(0.1)$, by using Runge – Kutta method , given that $y'' + xy' + y = 0$, $y(0) = 1$, $y'(0) = 0$. **(07 Marks)**

   c. Solve Bessel's operation leading to $J_n(x)$. **(07 Marks)**

OR

4   a. Prove that $J_{\frac{1}{2}}(x) = \sqrt{\dfrac{2}{\pi x}} \sin x$. **(06 Marks)**

   b. Find $y(0.4)$ by using Milne's method, given that $y(0) = 1$, $y'(0) = 1$, $y(0.1) = 1.0998$,
      $y'(0.1) = 0.9946$, $y(0.2) = 1.1987$, $y'(0.2) = 0.9773$, $y(0.3) = 1.2955$, $y'(0.3) = 0.946$. **(07 Marks)**

   c. State and prove Rodrigue's formula. **(07 Marks)**

Module-3

5   a. Derive Cauchy – Riemann equations in Cartesian coordinates. **(06 Marks)**

   b. Find an analytic function $f(z) = u + iv$ in terms of z ,.given that $u = e^{2x}(x \cos 2y - y \sin 2y)$. **(07 Marks)**

   c. Evaluate $\displaystyle\int_c \dfrac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} \, dz$, c is $|z| = 3$ by residue theorem. **(07 Marks)**

OR

6 a. Prove that $\left(\dfrac{\partial^2}{\partial x^2} + \dfrac{\partial^2}{\partial y^2}\right)\,|f(z)|^2 = 4|f'(z)|^2$. **(06 Marks)**

   b. Discuss the transformation $W = Z^2$. **(07 Marks)**

   c. Find a bilinear transformation that maps the points ∞ , i , o in Z – plane into -1 , -i , 1 in W – plane respectively. **(07 Marks)**

Module-4

7 a. In a sampling a large number of parts manufactured by a machine, the mean number of defectives in a sample of 20 is 2, out of 1000 such samples , how many would be expected to contain atleast 3 defective parts? **(06 Marks)**

   b. If X is a normal variate with mean 30 and standard deviation 5, find the probabilities that
i) $26 \leq X \leq 40$ ii) $X > 45$ iii) $|X - 30| > 5$.
Given that $\phi(0.8) = 0.288$, $\phi(2.0) = 0.4772$, $\phi(3) = 0.4987$, $\phi(1) = 0.3413$. **(07 Marks)**

   c. The joint density function of two continuous random variables X and Y is given by
$$f(x, y) = \begin{cases} K\ xy, & 0 \leq x \leq 4, \quad 1 < y < 5 \\ 0, & \text{otherwise} \end{cases}$$
Find i) K   ii) E(x)   iii) E(2x + 3y). **(07 Marks)**

OR

8 a. Derive mean and standard deviation of the Poisson distribution. **(06 Marks)**

   b. The joint probability distribution for two random variables X and Y as follows :

X \ Y	-2	-1	4	5
1	0.1	0.2	0	0.3
2	0.2	0.1	0.3	0

Find i) Expectations of X, Y , XY   ii) SD of X and Y   iii) Covariance of X, Y
iv) Correlation of X and Y. **(07 Marks)**

   c. In a certain town the duration of shower has mean 5 minutes. What is the probability that shower will last for i) 10 minutes or more   ii) Less than 10 minutes   iii) Between 10 and 12 minutes. **(07 Marks)**

Module-5

9 a. A group of boys and girls were given in Intelligence test. The mean score , SD score and numbers in each group are as follows : **(06 Marks)**

	Boys	Girls
Mean	74	70
SD	8	10
X	12	10

Is the difference between the means of the two groups significant at 5% level of significance? Given that $t_{0.05} = 2.086$ for 20 d.f.

   b. The following table gives the number of accidents that take place in an industry during various days of the week. Test if accidents are uniformly distributed over the week.

Day	Mon	Tue	Wed	Thu	Fri	Sat
No. of accidents	14	18	12	11	15	14

Given that $X^2 = 11.09$ at 5% level for 5 d.f. **(07 Marks)**

c. Find the unique fixed probability vector for the regular stochastic matrix.

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 1/6 & 1/2 & 1/3 \\ 0 & 2/3 & 1/3 \end{bmatrix}$$

(07 Marks)

OR

10 a. Define the following terms :
   i) Type I error and type II error.
   ii) Transient state.
   iii) Absorbing state. (06 Marks)

b. A certain stimulus administered to each of the 12 patients resulted in the following increases of blood pressure : 5, 2, 8, -1, 3, 0, -2, 1, 5, 0, 4, 6. Can it be concluded that the stimulus will be general be accompanied by an increase in blood pressure. Given that $t_{0.05} = 2.2$ for 11 d.f. (07 Marks)

c. If $P = \begin{bmatrix} 0 & 2/3 & 1/3 \\ 1/2 & 0 & 1/2 \\ 1/2 & 1/2 & 0 \end{bmatrix}$. Find the corresponding stationary probability vector. (07 Marks)

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17MATDIP41

Fourth Semester B.E. Degree Examination, June/July 2019
Additional Mathematics – II

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Find the rank of the matrix $\begin{bmatrix} 2 & 3 & 4 \\ -1 & 2 & 3 \\ 1 & 5 & 7 \end{bmatrix}$ by elementary row operations. **(08 Marks)**

   b. Test for consistency and solve $x + y + z = 6$, $x - y + 2z = 5$, $3x + y + z = 8$. **(06 Marks)**

   c. Solve the system of equations by Gauss elimination method :
   $x + y + z = 9$ $\quad$ $x - 2y + 3z = 8$ $\quad$ $2x + y - z = 3$ **(06 Marks)**

OR

2 a. Find all the eigen values and the corresponding eigen vectors of the matrix

   $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ **(08 Marks)**

   b. Solve by Gauss elimination method $x_1 - 2x_2 + 3x_3 = 2$, $\quad 3x_1 - x_2 + 4x_3 = 4$,
   $2x_1 + x_2 - 2x_3 = 5$. **(06 Marks)**

   c. If $A = \begin{bmatrix} 2 & -3 \\ 3 & 4 \end{bmatrix}$ find A^{-1} by Cayley Hamilton theorem. **(06 Marks)**

Module-2

3 a. Solve $\dfrac{d^3y}{dx^2} - 2\dfrac{d^2y}{dx^2} + 4\dfrac{dy}{dx} - 8y = 0$. **(08 Marks)**

   b. Solve $6\dfrac{d^2y}{dx^2} + 17\dfrac{dy}{dx} + 12y = e^{-x}$. **(06 Marks)**

   c. Solve $y'' - 4y' + 13y = \cos 2x$. **(06 Marks)**

OR

4 a. Solve $\dfrac{d^3y}{dx^3} + 6\dfrac{d^2y}{dx^2} + 11\dfrac{dy}{dx} + 6y = 0$. **(08 Marks)**

   b. Solve $y'' + 2y + y = \dfrac{e^{\frac{x}{2}} + e^{-\frac{x}{2}}}{2}$. **(06 Marks)**

   c. Solve $y'' + 2y' + y = 2x + x^2$. **(06 Marks)**

Module-3

5 a. Find $L[\cosh at]$. **(08 Marks)**

   b. Find $L[e^{-2t} \sinh 4t]$ **(06 Marks)**

   c. Find $R\{t \sin 2t\}$. **(06 Marks)**

OR

6 a. Show that $\int\limits_{0}^{\infty} t^3 e^{-st} \sin t\, dt = 0$. **(08 Marks)**

   b. If $f(t) = t^2$, $0 < t < 2$ and $f(t + 2) = f(t)$ for $t > 2$, find $L[f(t)]$. **(06 Marks)**

   c. Express $f(t) = \begin{cases} t, & 0 < t < 4 \\ 5, & t > 4 \end{cases}$ in terms of unit step function and hence find their Laplace Transforms. **(06 Marks)**

Module-4

7 a. Find the inverse Laplace Transform of $\dfrac{3}{s^2} + \dfrac{2e^{-s}}{s^3} - \dfrac{3e^{-2s}}{s}$. **(08 Marks)**

   b. Find $L^{-1}\left[\dfrac{s^3 + 6s^2 + 12s + 8}{s^6}\right]$. **(06 Marks)**

   c. Find the inverse Laplace Transform of $\dfrac{s+5}{s^2 - 6s + 13}$. **(06 Marks)**

OR

8 a. Solve by using Laplace Transform $\dfrac{d^2 y}{dt^2} + k^2 y = 0$, given that $y(0) = 2$, $y'(0) = 0$. **(08 Marks)**

   b. Find inverse Laplace Transform of $\dfrac{1}{(s+1)(s+2)(s+3)}$. **(06 Marks)**

   c. Find $L^{-1}\left[\dfrac{s+1}{s^2 + 6s + 9}\right]$. **(06 Marks)**

Module-5

9 a. Find the probability that a leap year selected at random will contain 53 Sundays. **(08 Marks)**

   b. A six faced die on which the numbers 1 to 6 are marked is thrown. Find the probability of (i) 3 (ii) an odd number coming up. **(06 Marks)**

   c. State and prove Bayee's theorem. **(06 Marks)**

OR

10 a. A problem is given to three students A, B, C whose chances of solving it are $\dfrac{1}{2}, \dfrac{1}{4}, \dfrac{1}{5}$ respectively. Find the probability that the problem is solved. **(08 Marks)**

   b. For any three events A, B, C, prove that $P\{(A \cup B)/C\} = P(A/C) + P(B/C) - P\{(A \cap B)/C\}$. **(06 Marks)**

   c. Three machines A, B and C produce respectively 60%, 30% and 10% of the total number of items of a factory. The percentages of defective output of these machines are respectively 2%, 3% and 4%. An item is selected at random and is found defective. Find the probability that the item was produced by machine C. **(06 Marks)**

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17CS42

Fourth Semester B.E. Degree Examination, June/July 2019
Object Oriented Concepts

Time: 3 hrs.   Max. Marks: 100

*Note: Answer any FIVE full questions, choosing
ONE full question from each module.*

Module-1

1 a. Explain the various features of OOC.   (08 Marks)
   b. What is a constructor? Mention its types. Explain the parameterized constructor with a suitable code.   (08 Marks)
   c. Give the difference between procedure oriented programming and object oriented programming.   (04 Marks)

OR

2 a. What is an inline function? Write a C++ function to find the maximum of 2 numbers using inline.   (08 Marks)
   b. Why friend function is required? Write a program to add two numbers using friend function.   (08 Marks)
   c. Write short note son function overloading.   (04 Marks)

Module-2

3 a. List and explain the Java Buzzwords.   (08 Marks)
   b. Describe the concept of bytecode.   (04 Marks)
   c. Develop the program to calculate the average among the elements {4, 8, 10, 12} using foreach in java. How foreach is different from for?   (08 Marks)

OR

4 a. List the different types of operators. Explain any three.   (08 Marks)
   b. What is an array? List the types and explain any one with a suitable code.   (06 Marks)
   c. Explain switch case with an example.   (06 Marks)

Module-3

5 a. Explain the packages in Java with an example.   (08 Marks)
   b. Explain the interfaces in java using suitable code.   (08 Marks)
   c. Write short notes on "this" keyword with an example.   (04 Marks)

OR

6 a. Explain exception handling with a suitable code.   (08 Marks)
   b. Explain the java garbage collector.   (08 Marks)
   c. Write short notes on "super" keyword, with an example.   (04 Marks)

Module-4

7 a. Explain the concepts of multithreading in Java. Explain the two ways of making class threadable with examples.   (10 Marks)
   b. With a syntax, explain isAlive( ) and join( ) with suitable program.   (10 Marks)

OR

8 a. Write short notes on Event Listener interface and explain any two interfaces with syntax.
   (08 Marks)
   b. Write short notes on Event class and explain any two with syntax. **(08 Marks)**
   c. How inner classes are used in Java? Explain. **(04 Marks)**

Module-5

9 a. What is an applet? Explain the life cycle of an applet. **(10 Marks)**
   b. Explain passing parameters in Applets. **(10 Marks)**

OR

10 Explain the following with a suitable code:
   i)   JLabel
   ii)   JTextField
   iii) JList
   iv)   JTable. **(20 Marks)**

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17CS43

Fourth Semester B.E. Degree Examination, June/July 2019
Design and Analysis of Algorithms

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Design an algorithm to search an element in a array using sequential search. Discuss the worst case, best case and average case efficiency of this algorithm. **(08 Marks)**

   b. Discuss adjacency matrix and adjacency list representation of a graph with suitable example. **(06 Marks)**

   c. Give the recursive algorithm to solve towers of Hanoi problem. Show that the efficiency of this algorithm is exponential. **(06 Marks)**

OR

2 a. Give the general plan for analyzing time efficiency of non recursive algorithms. Derive the worst case analysis for the algorithm to check whether all the elements in a given array are distinct. **(08 Marks)**

   b. List and define any three asymptotic notations. What are the various basic asymptotic efficiency classes? **(06 Marks)**

   c. Explain the following types of problems:
   (i) Combinatorial problems   (ii) Graph problems. **(06 Marks)**

Module-2

3 a. Write an algorithm to sort 'n' numbers using Quick sort. Trace the algorithm to sort the following list in ascending order.

   80   60   70   40   10   30   50   20 **(08 Marks)**

   b. Discuss general divide and conquer technique with control abstraction and recurrence relation. **(06 Marks)**

   c. Apply DFS based algorithm and source removal method to find the topological sequence for the graph shown in Fig.Q3(c). **(06 Marks)**

Fig.Q3(c)

OR

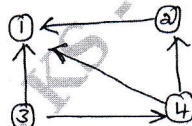4 a. Apply Strassen's matrix multiplication to multiply following matrices. Discuss how this method is better than direct matrix multiplication method.

$$\begin{bmatrix} 4 & 3 \\ 2 & 1 \end{bmatrix} \times \begin{bmatrix} 2 & 5 \\ 1 & 6 \end{bmatrix}$$
   (08 Marks)

   b. Write recursive algorithm to find maximum and minimum element in an array. **(06 Marks)**

   c. Write an algorithm to sort 'n' number using merge sort. **(06 Marks)**

Module-3

5 a. Write an algorithm to solve knapsack problem using Greedy technique. Find the optimal solution to the knapsack instance n = 7, m = 15
$(P_1, P_2\ldots\ldots P_7) = (10, 5, 15, 7, 6, 18, 3)$
$(W_1, W_2\ldots\ldots W_7) = (2, 3, 5, 7, 1, 4, 1)$ **(10 Marks)**

b. Apply Prim's algorithm and Kruskal's method to find the minimum cost spanning tree to the graph shown in Fig.Q5(b). **(10 Marks)**
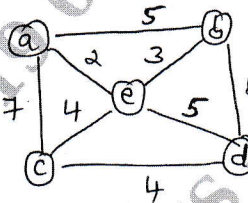

Fig.Q5(b)

OR

6 a. Write an algorithm to solve single source shortest path problem. Apply the algorithm to the graph shown in Fig.Q6(a) by considering 'a' as source. **(10 Marks)**
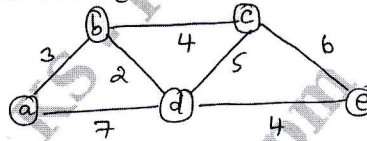

Fig.Q6(a)

b. Define heap. Write bottom-up heap construction algorithm. Construct heap for the list 1, 8, 6, 5, 3, 7, 4 using bottom-up algorithm and successive key insertion method. **(10 Marks)**

Module-4

7 a. Define transitive closure of a directed graph. Find the transitive closure matrix for the graph whose adjacency matrix is given.

$$\begin{bmatrix} 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 \end{bmatrix}$$

(10 Marks)

b. Find the optimal tour for salesperson using dynamic programming technique. The directed graph is shown in Fig.Q7(b). **(10 Marks)**

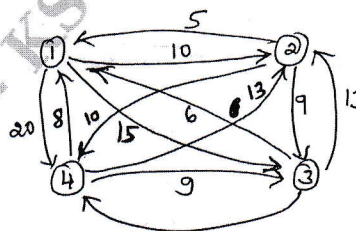Fig.Q7(b)

OR

8 a. Write an algorithm to construct optimal binary search tree for the following data:

Key	A	B	C	D
Probability	0.1	0.2	0.4	0.3

(10 Marks)

   b. Apply the bottom-up dynamic programming algorithm to the following instance of the knapsack problem. Knapsack capacity W = 10.

Item	Weight	Value
1	7	42
2	3	12
3	4	40
4	5	25

(10 Marks)

Module-5

9 a. Construct state-space tree for solving four queens problem using backtracking. **(06 Marks)**
   b. Discuss graph coloring problem. Find different solutions for 4 nodes and all possible 3 coloring problem. **(06 Marks)**
   c. Write a note on: (i) Non deterministic algorithms. (ii) LC branch and bound solution to solve O/I knapsack problem. **(08 Marks)**

OR

10 a. What are the two additional items required by Branch and Bound technique, compared with backtracking. Solve the following assignment problem using branch and bound technique, whose cost matrix for assigning four jobs to four persons are given

$$\begin{bmatrix} 9 & 2 & 7 & 8 \\ 6 & 4 & 3 & 7 \\ 5 & 8 & 1 & 8 \\ 7 & 6 & 9 & 4 \end{bmatrix}$$

(10 Marks)

   b. Discuss the following :
   (i) Subset sum problem
   (ii) NP hard and NP complete classes. **(10 Marks)**

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17CS44

Fourth Semester B.E. Degree Examination, June/July 2019
Microprocessors and Microcontrollers

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. With a neat block diagram explain internal architecture of 8086 microprocessor. **(08 Marks)**
   b. Explain the following with respect to 8086 microprocessor:
      (i) Memory segmentation (ii) Flag Register **(06 Marks)**
   c. Calculate the physical address in following instructions if CS = 4000H, DS = 2000H, SS = 1000H, ES = 3000H, BX = 0022H, BP = 1234H
      (i) MOV AL, [BX]   (ii) MOV CL, [BP]   (iii) MOV ES : AX, [BX + 05] **(06 Marks)**

OR

2 a. What is an addressing mode? With example explain different addressing modes of 8086. **(08 Marks)**
   b. What is stack? Explain the working of PUSH and POP instructions. **(06 Marks)**
   c. What is an assembler directive? With example explain following assembler directives:
      (i) assume   (ii) org   (iii) db   (iv) equ **(06 Marks)**

Module-2

3 a. Differentiate between procedure and macro. Write a program using macros that clears the screen, sets the cursor at the centre of screen and display the message "Journey Towards Excellence". **(08 Marks)**
   b. Explain shift and rotate instructions of 8086. **(06 Marks)**
   c. Write a program to count number of zeros and ones in a given byte. **(06 Marks)**

OR

4 a. What is an interrupt vector table? Explain the steps a 8086 will take when it responds to an interrupt. **(08 Marks)**
   b. With example explain the following instructions of 8086.
      (i) MUL   (ii) DAA   (iii) CWD   (iv) STD **(06 Marks)**
   c. Write a program to find the value of $x^2 + 2x + 5$, where x is 8 bit input hex number. **(06 Marks)**

Module-3

5 a. What is data integrity? Explain the methods used for data integrity in Ram and ROM. Also find the checksum byte for 34H, 54H, 7FH, 11H, E6H and 99H. **(08 Marks)**
   b. Explain how signed numbers are represented in 8086. Also explain the significance of overflow flag. **(06 Marks)**
   c. Explain IN and OUT instructions. Show the design of an output port with an I/O address of 99H using 74LS373. **(06 Marks)**

OR

6 a. Differentiate between memory mapped I/O and I/O mapped I/O. Explain the control word format of 8255. **(08 Marks)**
   b. With example explain any five string manipulation instructions of 8086. **(06 Marks)**
   c. Write a program to find average of n different temperatures. **(06 Marks)**

Module-4

7 a. Differentiate between RISC and CISC. **(06 Marks)**
   b. With a neat block diagram explain ARM core data flow model. **(06 Marks)**
   c. Explain the different operating modes of Arm. Also explain the complete ARM register set. **(08 Marks)**

OR

8 a. With a block diagram explain typical ARM based embedded system. **(06 Marks)**
   b. With the help of bit layout diagram explain current program status register of ARM. **(06 Marks)**
   c. Explain the concepts of core Extensions and Pipeline in ARM processor. **(08 Marks)**

Module-5

9 a. With example explain MOV and MVN instructions of ARM. **(06 Marks)**
   b. Explain the different barrel shifter operations. **(06 Marks)**
   c. Explain the arithmetic instructions of ARM. **(08 Marks)**

OR

10 a. Explain multiply, branch and load store instructions of ARM. **(10 Marks)**
   b. With example explain SWAP instruction of ARM. **(04 Marks)**
   c. Write ARM assembly language program to add two 32 bit numbers. **(06 Marks)**

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Fourth Semester B.E. Degree Examination, June/July 2019
Software Engineering

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a.   Define software. Explain essential attributes of good software.   (08 Marks)
    b.   Explain different types of application software's.   (06 Marks)
    c.   Explain Bohem's spiral model.   (06 Marks

OR

2   a.   Explain a general model of the design process with block diagram.   (06 Marks)
    b.   Explain the structure of requirement document.   (08 Marks)
    c.   Explain requirement elicitation and analysis process.   (06 Marks)

Module-2

3   a.   Explain context models with an example.   (08 Marks)
    b.   Explain : i) Generalization ii) Aggregation.   (06 Marks)
    c.   Draw state diagram for working of microwave oven.   (06 Marks)

OR

4   a.   Explain Rational Unified Process (RUP).   (08 Marks)
    b.   Draw UML state diagram for weather station system.   (08 Marks)
    c.   Discuss in short about open source licensing.   (04 Marks

Module-3

5   a.   Define testing. Explain interface testing.   (08 Marks)
    b.   Discuss TDD(Test Driven Development)   (06 Marks)
    c.   Explain user testing.   (06 Marks)

OR

6   a.   Define software evolution. Explain software evolution process with block diagram.
                                                                                        (08 Marks)
    b.   Discuss Lehman's laws of program evolution dynamics.   (06 Marks)
    c.   Discuss four strategic options for legacy system management.   (06 Marks

Module-4

7   a.   Discuss factors affecting software pricing.   (10 Marks)
    b.   Explain project scheduling process.   (10 Marks)

OR

8   a.   Discuss software quality attributes.   (08 Marks)
    b.   Discuss the various inspection checks in program inspection.   (06 Marks)
    c.   Discuss the relationships between internal and external quality attributes.   (06 Marks

Module-5

9   a.   Explain two ways of coping with change and changing requirements.   (10 Marks)
    b.   Explain extreme programming practices.   (10 Marks)

OR

10 a.   Explain the extreme programming release cycle.   (08 Marks)
    b.   Write short note on pair programming.   (06 Marks)
    c.   Explain SCRUM process.   (06 Marks)

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CBCS SCHEME

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Fourth Semester B.E. Degree Examination, June/July 2019
Data Communications

Time: 3 hrs.   Max. Marks: 100

**Note: Answer any FIVE full questions, choosing
ONE full question from each module.**

Module-1

1 a. Explain OSI model with neat diagram.   (08 Marks)
   b. With neat diagram, explain the four basic topologies.   (08 Marks)
   c. Write in brief the FIVE components of a data communication.   (04 Marks

OR

2 a. What is data communication? Explain different forms of data representation. (08 Marks)
   b. Describe simplex, half duplex and full duplex with respect to data communication. (07 Marks)
   c. What are the factors that determine whether a communication is LAN or WAN? (05 Marks

Module-2

3 a. Name 3 types of transmission impairment.   (08 Marks)
   b. List the characteristics of virtual circuit networks.   (04 Marks)
   c. Explain : i) Bandwidth   ii) Thoughput   iii) Latency.   (08 Marks

OR

4 a. Explain digital to digital conversion.   (07 Marks)
   b. What do you mean by amplitude shift keying , Frequency shift keying and phase shift
      keying?   (06 Marks)
   c. Write short notes on :
      i) Shannon capacity and
      ii) Nyquist theorem is communication.   (07 Marks)

Module-3

5 a. How does a single bit error differ from burst error?   (04 Marks)
   b. Describe channelizing protocol.   (07 Marks)
   c. Explain why collision is an issue in Random Access Protocol but not in Controlled Access
      Protocol?   (09 Marks

OR

6 a. Explain 10 Gigabit Ethernet implementation.   (08 Marks)
   b. What are the advantages of dividing Ethernet LAN with bridge?   (06 Marks)
   c. Define spread spectrum technique used by bluetooth.   (06 Marks)

Module-4

7 a. Explain the advantages of IPV6 compared to IPV4.   (06 Marks)
   b. Describe 3 security issues that are applicable to IP protocol.   (08 Marks)
   c. Which protocol is the carrier of the agent advertisement and solicitations messages?
                                                                               (06 Marks)

OR

8 a. What are the different types of extension headers in IPV4? Explain. (06 Marks)
  b. Explain the benefits of renumbering and auto configuration. (07 Marks)
  c. Distinguish between compatible and mapped address and explain their applications.
  (07 Marks)

Module-5

9 a. Explain various components of cellular system with neat diagram. (06 Marks)
  b. What is mobile IP? Explain three phases for communication in Mobile IP. (08 Marks)
  c. Explain various ICMPV6 messages. (06 Marks)

OR

10 a. Describe three ways to make transition from IPV4 to IPV6. (06 Marks)
   b. What is cellular telephony? Explain third generation of 3G of cellular telephony. (06 Marks)
   c. Explain the three categories of satellites. (08 Marks)

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