CBCS SCHEME

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15MAT41

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1 a. Using Taylor's series method solve $\frac{dy}{dx} = x^2 + y^2$ with y(0) = 1 and hence find y(0.1) and consider upto 3rd degree. **(06 Marks)**

   b. Using modified Euler's method solve $\frac{dy}{dx} = 1 + \frac{y}{x}$ with y(1) = 2 then find y(1.2) in two steps. **(05 Marks)**

   c. Given $\frac{dy}{dx} = \frac{x+y}{2}$, give that y(0) = 2, y(0.5) = 2.636, y(1) = 3.595 and y(1.5) = 4.968 then find value of y at x = 2 using Milne's predictor and corrector formulae. **(05 Marks)**

OR

2 a. Using modified Euler's method solve $\frac{dy}{dx} = x + \sqrt{y}$, with y(0) = 1 then find y(0.2) with h = 0.2. **(06 Marks)**

   b. Solve $\frac{dy}{dx} = \frac{y-x}{y+x}$, with y(0) = 1 and hence find y(0.1) by taking one steps using Runge-Kutta method of fourth order. **(05 Marks)**

   c. Given $\frac{dy}{dx} = \frac{(1+x^2)y^2}{2}$, given that y(0) = 1, y(0.1) = 1.06. y(0.2) = 1.12 and y(0.3) = 1.21 then evaluate y(0.4) using Adam's – Bash forth method. **(05 Marks)**

Module-2

3 a. Given $\frac{d^2y}{dx^2} = \frac{2dy}{dx} - y$, y(0) = 1, y'(0) = 2, evaluate y(0.1) and y'(0.1) using Runge-Kutta method of fourth order. **(06 Marks)**

   b. Solve the Bessel's differential equation : $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + (x^2 - n^2)y = 0$ leading to $J_n(x)$. **(05 Marks)**

   c. Express $x^3 + 2x^2 - 4x + 5$ in terms of Legendre polynomials. **(05 Marks)**

OR

4 a. Using Milne's method. obtain an approximate solution at the point x = 0.8 of the problem $\dfrac{d^2y}{dx^2} = 1 - 2y\dfrac{dy}{dx}$ using the following data :

x	0	0.2	0.4	0.6
y	0	0.02	0.0795	0.1762
y′	0	0.1996	0.3937	0.5689

(06 Marks)

   b. If α and β are two distinct roots of $J_n(x) = 0$ then P-T $\displaystyle\int_0^1 x\, J_n(\alpha x)\, J_n(\beta x)\, dx = \{0 \ \text{if} \ \alpha \neq \beta$.

(05 Marks)

   c. With usual notation, prove that $J + \dfrac{1}{2}(x) = \sqrt{\dfrac{2}{\pi x}}\sin x$. **(05 Marks)**

Module-3

5 a. State and prove Cauchy-Riemann equation in Cartesian form. **(06 Marks)**
   b. Find analytic function f(z) whose imaginary part is $v = \left(r - \dfrac{1}{r}\right)\sin\theta$. **(05 Marks)**
   c. Discuss the transformation of $\omega = e^z$. **(05 Marks)**

OR

6 a. State and prove Cauchy's integral formula. **(06 Marks)**

   b. Emulate $\displaystyle\oint_c \dfrac{e^{2z}}{(z+1)(z-2)}\, dz$ where c is $|z| = 3$ using Cauchy's residue theorem. **(05 Marks)**

   c. Find the bilinear transformation which maps $z = -1, 0, 1$ into $\omega = 0, i, 3i$. **(05 Marks)**

Module-4

7 a. Derive mean and variance of the binomial distribution. **(06 Marks)**
   b. A random variable x has the following probability mass function.

x	0	1	2	3	4	5
P(x)	k	3k	5k	7k	9k	11k

i) find k   ii) find p(x < 3)   iii) find p(3 < x ≤ 5). **(05 Marks)**

   c. The joint distribution of two random variable x and y as follows :

x \ y	−4	2	7
1	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$
5	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$

Compute : i) E(x) and E(y)   ii) E(xy)   iii) cov(xy). **(05 Marks)**

OR

8   a.   2% of the fuses manufactured by a firm are found defective. Find the probability that a box
           containing 200 fuses contains. i) no defective fuses ii) 3 or more defective fuses.   **(06 Marks)**
     b.   In a test on 2000 electric bulbs. It was found that the life of a particular brand was
           distributed normally with an average life of 2040 hours and S.D 60 hours. Estimate the
           number of bulbs likely to burn (P(0 < z < 1.83) = 0.4664 P(1.33) = 0.4082, P(2) = 0.4772)
           i) more than 2150 ii) less than 1960 iii) more than 1920 but less than 2160 hours.   **(05 Marks)**
     c.   The joint probability distribution of two random variable X and Y given by the following
           table:

Y\X	1	3	9
2	$\frac{1}{8}$	$\frac{1}{24}$	$\frac{1}{12}$
4	$\frac{1}{4}$	$\frac{1}{4}$	0
6	$\frac{1}{8}$	$\frac{1}{24}$	$\frac{1}{12}$

Find marginal distribution of X and Y and evaluate cov(XY).

(05 Marks)

Module-5

9   a.   Define: i) Null hypothesis ii) significance level iii) Type–I and Type–II error.   **(06 Marks)**
     b.   Ten individual are chosen at random from a population and their height in inches are found
           to be 63, 63, 66, 67, 68, 69, 70, 70, 71, 71. Test the hypothesis that mean height of the
           universe is 66 inches. Given that ($t_{0.05}$ = 2.262 for 9d.f)   **(05 Marks)**
     c.   Find the unique fixed probability vector for the regular stochastic matrix :

$$A = \begin{bmatrix} \frac{1}{2} & \frac{1}{4} & \frac{1}{4} \\ \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 1 & 0 \end{bmatrix}.$$

(05 Marks)

OR

10   a.   A coin is tossed 1000 times and head turns up 540 times. Decide on the hypothesis that the
           coin is unbiased.   **(06 Marks)**
     b.   Four coins are tossed 100 times and following results were obtained :

No. of heads	0	1	2	3	4
Frequency	5	29	36	25	5

Fit a binomial distribution for the data and test the goodness of fit $\left(\chi^2_{0.05} = 9.49\right)$.   **(05 Marks)**

     c.   A student's study habit are as follows. If he studies one night, he is 70% sure not to study
           the next night. On the other hand if he does not study one night he is 60% sure not to study
           the next night. In the long run how often does he study?   **(05 Marks)**

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Fourth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Additional Mathematics – II

Time: 3 hrs.   Max. Marks: 80

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

Module-1

1 a. Find the rank of matrix $A = \begin{bmatrix} 2 & -1 & -3 & -1 \\ 1 & 2 & 3 & -1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & -1 \end{bmatrix}$ **(05 Marks)**

   b. Solve by Gauss elimination method:
      $2x + y + 4z = 12 \qquad 4x + 11y - z = 33 \qquad 8x - 3y + 2z = 20$ **(05 Marks)**

   c. Find all the eigen values of the matrix
      $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ **(06 Marks)**

OR

2 a. Find the values of K, such that the matrix A may have the rank equal to 3:
      $A = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 2 & 4 & K \\ 1 & 4 & 10 & K^2 \end{bmatrix}$ **(05 Marks)**

   b. Solve by Gauss elimination method
      $x_1 - 2x_2 + 3x_3 = 2 \qquad 3x_1 - x_2 + 4x_3 = 4 \qquad 2x_1 + x_2 - 2x_3 = 5$ **(05 Marks)**

   c. Find all the eigen values and corresponding eigen vectors of the matrix
      $A = \begin{bmatrix} -19 & 7 \\ -42 & 16 \end{bmatrix}$ **(06 Marks)**

Module-2

3 a. Find C.F of $(4D^4 - 8D^3 - 7D^2 + 11D + 6)y = 0$.   **(05 Marks)**

   b. Solve the initial value problem $\dfrac{d^2x}{dt^2} + 4\dfrac{dx}{dt} + 29x = 0$

      Subject to the conditions $x(0) = 0$, $\dfrac{dx}{dt}(0) = 15$.   **(05 Marks)**

   c. Using the method of undetermined coefficients, solve $(D^2 - 4D + 3)y = 20\cos x$ **(06 Marks)**

OR

4 a. Solve $(D^2 - 2D + 4)y = e^x \cos x$.   **(05 Marks)**

   b. Solve $(D^2 + 4)y = x^2 + 2^{-x}$.   **(05 Marks)**

   c. Using the method of variation of parameters, find the solution of $(D^2 - 2D + 1)y = e^x / x$.

                                                                               (06 Marks)

Module-3

5   a.   Find the Laplace transform of $\dfrac{\cos 3t - \cos 4t}{t}$.   **(05 Marks)**

b.   Find $L\{t\sin^2 t\}$ **(05 Marks)**

c.   Express the following function interms of Heaviside unit step function and hence find the Laplace transform where

$$f(t) = \begin{cases} t^2 & 0 < t \le 2 \\ 4t & t > 2 \end{cases}$$ **(06 Marks)**

OR

6   a.   Find $L\left[\dfrac{e^{-t}.\sin t}{t}\right]$.   **(05 Marks)**

b.   Using Laplace transform evaluate $\displaystyle\int_0^\infty e^{-t}t\sin^2 3t\,dt$.   **(05 Marks)**

c.   If $f(t) = \begin{cases} t & 0 \le t \le a \\ 2a - t & a \le t \le 2a \end{cases}$ $f(t+2a) = f(t)$, show that $L[f(t)] = \dfrac{1}{s^2}\tan h\left(\dfrac{as}{2}\right)$.   **(06 Marks)**

Module-4

7   a.   Find inverse Laplace transform of $\dfrac{s+5}{s^2 - 6s + 13}$.   **(05 Marks)**

b.   Find inverse Laplace transform of $\log\left[\dfrac{s^2 + 4}{s(s+4)(s-4)}\right]$.   **(05 Marks)**

c.   Solve by using Laplace transform method $y''(t) + 4y(t) = 0$, given that $y(0) = 2$, $y'(0) = 0$.   **(06 Marks)**

OR

8   a.   Find $L^{-1}\left[\dfrac{s^2}{(s^2+1)(s^2+4)}\right]$.   **(05 Marks)**

b.   Find $L^{-1}\left[\dfrac{(s+2)e^{-s}}{(s+1)^4}\right]$ **(05 Marks)**

c.   Solve by using Laplace transform method $y'' + 5y' + 6y = 5e^{2x}$, $y(0) = 2$, $y'(0) = 1$.   **(06 Marks)**

Module-5

9   a.   There are 10 students of which three are graduates. If a committee of five is to be formed, what is the probability that there are (i) only 2 graduates (ii) atleast 2 graduates?   **(05 Marks)**

b.   In a school 25% of the students failed in the first language, 15% of the students failed in second language and 10% of the students failed in both. If a student is selected at random find the probability that :
   i)   He failed in first language if he had failed in the second language.
   ii) He failed in second language if he had failed in the first language.   **(05 Marks)**

c.   In a bolt factory there are four machines A, B, C and D manufacturing respectively 20%, 15%, 25%, 40% of the total production. Out of these 5%, 4%, 3% and 2% are defective. If a bolt drawn at random was found defective what is the probability that it was manufactured by A or D.   **(06 Marks)**

OR

10 a. From 6 positive and 8 negative numbers, 4 numbers are chosen at random (without replacement) and multiplied. What is the probability that the product is a positive number?

(05 Marks)

   b. Three students A, B, C write an entrance examination. Their chances of passing are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ respectively. Find the probability that (i) atleast one of them passes (ii) all of them passes.

(05 Marks)

   c. Three major parties A, B, C are contending for power in the elections of a state and the chance of their winning the election is in the ratio 1:3:5. The parties A, B, C respectively have probability of banning the online lottery $\frac{2}{3}$, $\frac{1}{3}$, $\frac{3}{5}$. What is the probability that there will be a ban on the online lottery in the state? What is the probability that the ban is from the party 'C'?

(06 Marks)

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Fourth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Software Engineering

Time: 3 hrs.   Max. Marks: 80

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

Module-1

1   a. Explain briefly software engineering ethics.   (04 Marks)
    b. With a suitable block diagram, explain water fall model.   (06 Marks)
    c. Explain requirements engineering processes with suitable diagram.   (06 Marks)

OR

2   a. With the help of neat diagram, explain insulin pump control system.   (04 Marks)
    b. With a neat diagram, explain Boehm's spiral model.   (08 Marks)
    c. Explain Ethnography in detail.   (04 Marks)

Module-2

3   a. Draw a context model for Patient Management System. How the interactions are modeled?
                                                                             (06 Marks)
    b. With the help of a neat state diagram, illustrate the working of a microwave oven. (06 Marks)
    c. What is Model Driven Engineering? State the three types of abstract system models
        produced.   (04 Marks)

OR

4   a. Illustrate how design models are the bridge between system requirements and the
        implementation of a system. Draw a sequence diagram describing data collection of weather
        information system.   (05 Marks)
    b. What is design pattern? Explain four elements of design pattern.   (05 Marks)
    c. Discuss the implementation issues important in software engineering. (06 Marks)

Module-3

5   a. Explain development testing. Explain the three levels of granularity carried out in testing.
                                                                             (04 Marks)
    b. Discuss test driven development and state the benefits of test driven developments.
                                                                             (04 Marks)
    c. What is user testing? Explain six stages of acceptance testing process. (08 Marks)

OR

6   a. List and explain the 'Lehman's Law' concern to system change.   (06 Marks)
    b. Explain software reengineering process with suitable diagram. State the activities of
        reengineering process.   (06 Marks)
    c. Explain the four strategic options of legacy system management.   (04 Marks)

Module-4

7   a. List and explain the factors affecting software pricing.   (05 Marks)
    b. Explain in detail plan driven development approach to software engineering. (05 Marks)
    c. Explain the COCOMO – II estimation model.   (06 Marks)

OR

8 a. Explain different types of software standards and mention their importance. (05 Marks)
  b. Explain how reviews and inspections are used to check the quality of project delivery.
    (06 Marks)
  c. List and explain the key stages in software component analysis. (05 Marks)

Module-5

9 a. Explain the ways of coping with change and reduction of rework cost. (06 Marks)
  b. Explain the practices involved in the extreme programming. (10 Marks)

OR

10 a. State the principle of agile methods. (05 Marks)
   b. Explain plan drive and agile development approach for software development. (05 Marks)
   c. Write a note on pair programming. (06 Marks)

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15CS43

Fourth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Design and Analysis of Algorithms

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1 a. What is an algorithm? What are the properties of an algorithm? Explain with an example.
(04 Marks)

   b. Explain the general plan for analyzing the efficiency of a recursive algorithm. Suggest a recursive algorithm to find factorial of a number. Derive its efficiency. (08 Marks)

   c. If $t_1(n) \in O(g_1(n))$ and $t_2(n) \in O(g_2(n))$ prove that $t_1(n) + t_2(n) \in O(\max\{g_1(n), g_2(n)\})$.
(04 Marks)

OR

2 a. Explain the asymptotic notations with examples. (06 Marks)
   b. Distinguish between the two common ways to represent a graph. (04 Marks)
   c. Discuss about the important problem types and fundamental data structures. (06 Marks)

Module-2

3 a. Discuss how quick-sort works to sort an array and trace for the following data set. Draw the tree of recursive calls made.

65	70	75	80	85	60	55	50	45

   Derive the best case complexity of quick sort algorithm. (10 Marks)
   b. Briefly explain the Strassen's matrix multiplication. Obtain its time complexity. (06 Marks)

OR

4 a. Explain the concept of divide and conquer. Design an algorithm for merge sort and derive its time complexity. (10 Marks)

   b. What are the three major variations of decrease and conquer technique? Explain with an example for each. (06 Marks)

Module-3

5 a. Explain the concept of greedy technique for Prim's algorithm. Obtain a minimum cost spanning tree for the graph shown in Fig.Q5(a). **(08 Marks)**
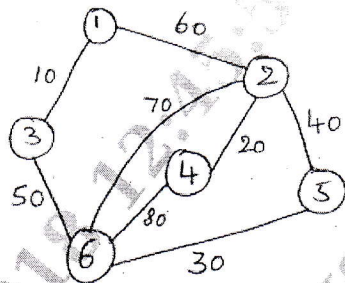

Fig.Q5(a)

b. Solve the below instance of the single source shortest path problem with vertex 6 as the source. With the help of a suitable algorithm. **(08 Marks)**
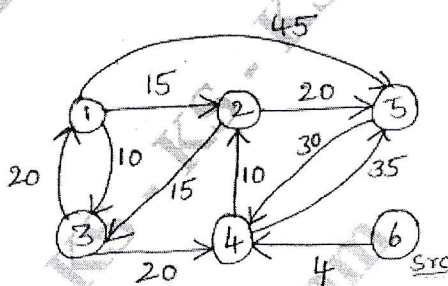

Fig.Q5(b)

OR

6 a. What are Huffman trees? Explain. Construct a Huffman code for the following data :

Character	A	B	C	D	E	–
Probability	0.5	0.35	0.5	0.1	0.4	0.2

Encode DAD_CBE using Huffman encoding. **(08 Marks)**

b. Explain transform and conquer technique. Sort the below list using Heap sort : 3, 2, 4, 1, 6, 5. **(08 Marks)**

Module-4

7 a. Define transitive closure of a graph. Write Warshall's algorithm to compute transitive closure of a directed graph. Apply the same on the graph defined by the following adjacency matrix :

$$R = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$

(08 Marks)

b. Using Dynamic programming, solve the below instance of knapsack problem. **(08 Marks)**

Item	Weight	Value
1	2	12
2	1	10
3	3	20
4	2	15

Capacity w = 5

OR

8   a.   Obtain a optimal binary search tree for the following four–key set.   (08 Marks)

Key	A	B	C	D
Probability	0.1	0.2	0.4	0.3

   b.   Solve the following travelling sales person problem represented as a graph shown in Fig.Q8(b), using dynamic programming.   (08 Marks)
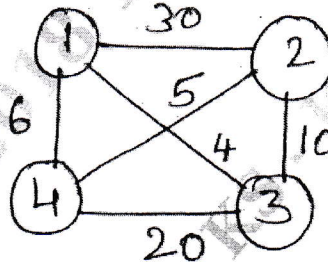

Fig.Q8(b)

Module-5

9   a.   What is the central principle of backtracking? Apply backtracking to solve the below instance of sum of subset problem
         $S = \{5, 10, 12, 13, 15, 18\}$ $d = 30$.   (08 Marks)
   b.   Solve the below instance of assignment problem using branch and bound algorithm.

$$C = \begin{array}{cccc} Job_1 & Job_2 & Job_3 & Job_4 \\ \begin{bmatrix} 9 & 2 & 7 & 8 \\ 6 & 4 & 3 & 7 \\ 5 & 8 & 1 & 8 \\ 7 & 6 & 9 & 4 \end{bmatrix} & & & \begin{array}{l} Person\ a \\ Person\ b \\ Person\ c \\ Person\ d \end{array} \end{array}$$

(08 Marks)

OR

10   a.   Draw the state-space tree to generate solutions to 4-Queen's problem.   (04 Marks)
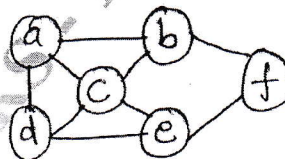   b.   Apply backtracking to the problem of finding a Hamiltonian circuit in the graph shown below :   (04 Marks)

Fig.Q10(a)

    c.   Define the following :
        i)   Class P
        ii)   Class NP
        iii)   NP complete problem
        iv)   NP hard problem.   (08 Marks)

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15CS44

Fourth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Microprocessors and Microcontrollers

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1 a. Explain with neat block diagram, the architecture of 8086 microprocessor. (08 Marks)
   b. What are Addressing Modes? Discuss its types with suitable examples. (08 Marks)

OR

2 a. Develop an assembly language program to calculate the sum of 5 bytes of data. (05 Marks)
   b. With a neat block diagram, explain the three steps to create executable assembly language program. (06 Marks)
   c. What are assembler directives? Discuss any three directives with examples. (05 Marks)

Module-2

3 a. Discuss shift and rotate instruction of 8086 microprocessor with examples. (08 Marks)
   b. Explain with suitable examples the logical instructions of 8086 microprocessor. (04 Marks)
   c. Discuss multiplication (MUL) and division (DIV) instructions of 8086 microprocessor. (04 Marks)

OR

4 a. What are interrupts? Discuss interrupt vector table with diagram for 8086 microprocessor. (06 Marks)
   b. Write an assembly language program for 8086 that :
      i) Clears the screen
      ii) Sets the cursor at the centre of screen. (05 Marks)
   c. Develop an assembly language program for 8086 to convert Binary Coded Decimal (BCD) to ASCII. (05 Marks)

Module-3

5 a. Explain the string instructions (MOVS, LODS, STOS, CMPS and SCAS) with suitable examples. (08 Marks)
   b. Discuss the sign extension of 8 bit and 16 bit operands [CBW and CWD] in 8086 with suitable examples. (08 Marks)

OR

6 a. Discuss 8086 input/output (IN and OUT) instructions with examples. (04 Marks)
   b. Explain 8255 and its control word format with diagrams. (08 Marks)
   c. Explain the features of 8255 PPI. (04 Marks)

Module-4

7 a. Discuss the processor modes of CPSR with respect to ARM processor. (06 Marks)
   b. Write the comparison between microprocessor and microcontrollers. (04 Marks)
   c. Explain with neat block diagram the ARM based embedded device microcontroller.

(06 Marks)

OR

8 a. Discuss the following with diagrams :
      i)   Von Neumann architecture with cache
      ii) Harvard architecture with TCM. (08 Marks)
   b. Explain the pipeline mechanism in (Advanced RISC Machine)ARM processor. (08 Marks)

Module-5

9 a. Discuss the comparison instructions with examples with respect to ARM processor.

(05 Marks)
   b. Explain the Barrel shifter operation in ARM processor with diagram. (06 Marks)
   c. Explain the arithmetic instructions with examples with respect to ARM process. (05 Marks)

OR

10 a. Explain briefly co-processor instructions of ARM processor. (04 Marks)
   b. Discuss the load store instructions with respect to :
      i)   Single Register Transfer
      ii) Multiple Register Transfer. (07 Marks)
   c. Write a short note on Swap instructions with examples with respect to ARM processor.

(05 Marks)

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15CS45

Fourth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Object Oriented Concepts

Time: 3 hrs.   Max. Marks: 80

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

Module-1

1 a. Write the differences between procedure oriented program and object oriented program.
(04 Marks)

   b. List and explain any four features of object oriented program. (05 Marks)

   c. What is function overloading? Write a C++ program to define three overloaded functions to find the sum of two integers, sum of two floating point numbers and sum of three integers.
(07 Marks)

OR

2 a. Define a Student class with following measures:
Data members: RollNo., Name, averagemarks
Member function: to read the data, to print the data, write a C++ program to read the data of 10 students and print the 10 students information. (05 Marks)

   b. Define a friend function. Illustrate with an example. (05 Marks)

   c. What is constructor? Mention its types. Explain parameterized constructor with an example.
(06 Marks)

Module-2

3 a. List and explain the java buzzwords. (08 Marks)

   b. ```
class Example {
 public static void main (String args[ ]) {
  int a;
  for (a = 0; a < 3; a++)
   { int b = –1;
     System.out.println (“   ” + b);
     b = 50;
     System.out.println (“   ” + b);
   }
  }
 }
```
What is the output of the above code? If you insert another 'int b' outside the for loop, what is the output. (04 Marks)

   c. With an example, explain in working of >> and >>> (unsigned right shift). (04 Marks)

## OR

4  a. Define bytecode. How does it help java program(s) achieve portability? (05 Marks)

   b. Write a java program to sum only the first five elements of the array {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} using "for each" version of the for loop. (06 Marks)

   c. Define type casting. Explain with an example. (05 Marks)

## Module-3

5    a.    Define inheritance. Explain multilevel hierarchy with an example program.    **(05 Marks)**

      b.    Describe the various levels of access protections available for packages and their implications.    **(07 Marks)**

      c.    Distinguish between method overloading and overriding in Java, with suitable example.

                                                                       **(04 Marks)**

### OR

6    a.    Define exception. Explain exception handling mechanism with an example.    **(08 Marks)**

      b.    Discuss the following terms with example: i) super    ii) final    **(08 Marks)**

## Module-4

7    a.    What is thread? Explain two ways of creating a thread in JAVA with example.    **(08 Marks)**

      b.    What is the need of synchronization? Explain with an example how synchronization is implemented in JAVA.    **(08 Marks)**

### OR

8    a.    Explain the delegation event model used to handle events in JAVA. What are events, event listener and event sources?    **(06 Marks)**

      b.    With the syntax, explain the use of isAlive( ) and join( ) methods.    **(04 Marks)**

      c.    Explain Adapter class and Inner classes with example.    **(06 Marks)**

## Module-5

9    a.    What is an Applet? Explain the skeleton of an Applet. Enlist applet tags.    **(08 Marks)**

      b.    Write a program using an Applet which will Print "key pressed" on the status window when you press the key, "key released" on the status window when you release the key and when you type the characters it should print "Hello" at coordinates (50, 50) on Applet.    **(08 Marks)**

### OR

10    a.    Describe the two key features of swings.    **(04 Marks)**

       b.    Explain the following with an example for each and syntax:

          i)    JLabel

          ii)    JTextfield

          iii)    JButton

          iv)    JComboBox    **(12 Marks)**

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# CBCS SCHEME

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## Fourth Semester B.E. Degree Examination, Dec.2018/Jan.2019
## Data Communication

Time: 3 hrs.                                                                 Max. Marks: 80

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

## Module-1

1   a.   Define Data Communication. Explain the Fundamental components of a data communication system. With the neat diagram, explain components of data communication.        **(06 Marks)**
    b.   List out the functionalities of physical layer, data link layer, network layer, explain in brief.        **(04 Marks)**
    c.   Define Transmission impairment. Explain different causes of transmission impairment during signal transmission.        **(06 Marks)**

### OR

2   a.   Explain digital signal transmission methods. Explain line coding.        **(06 Marks)**
    b.   Draw the line code for the sequence 01001110 using NRZ, NRZ – L, NRZ – I, RZ, AMI.        **(07 Marks)**
    c.   Define Through put. A network with a bandwidth of 10mbps can pass only an average of 12,000 frames per minute. With each frame carrying an average of 10,000 bits. What is the throughput of this network?        **(03 Marks)**

## Module-2

3   a.   Explain PCM and quantization process with steps.        **(08 Marks)**
    b.   What is Spread Spectrum? Explain FHSS with suitable diagram.        **(08 Marks)**

### OR

4   a.   What is Multiplexing? Define Synchronous TDM, with data rate management – strategies.        **(07 Marks)**
    b.   Compute the following, if the data rate for each input connection is 1Kbps. If 1 bit at a time is multiplexed, what is the duration of  i) Each input slot     ii) Each output slot
         iii) Each frame.        **(03 Marks)**
    c.   Explain how message can be sent from one system to another using datagram approach and calculate the total delay with appropriate diagram.        **(06 Marks)**

## Module-3

5   a.   Explain Error detection using block coding.        **(06 Marks)**
    b.   Identify the code word using CRC given data word 1001 and generator is 1011.        **(04 Marks)**
    c.   Explain different frame types in HDLC.        **(06 Marks)**

### OR

6   a.   What is Internet checksum? If a sender needs to send four data items 7, 11, 12, 0, 6 answer the following :        **(06 Marks)**
         i)   Find the checksum at the sender site.
         ii)  Find the checksum at the receiver site if there is no error.
    b.   Explain stop and wait protocol with appropriate diagram.        **(04 Marks)**
    c.   Explain the frame format and transition phases of point to point protocol.        **(06 Marks)**

## Module-4

**7** a. What is Channelization? List and explain the channelization protocols. **(06 Marks)**

b. A slotted ALOHA network transmit 200 bit frames using a shared channel with 200 K bits/sec bandwidth. Find the throughput if the system produces. **(06 Marks)**
   i) 1000 Frames per second     ii) 500 Frames per second     iii) 250 Frames per second.

c. Describe Gigabit Ethernet. **(04 Marks)**

## OR

**8** a. Describe Pure ALOHA and Slotted ALOHA. **(04 Marks)**

b. Explain briefly controlled access method. **(06 Marks)**

c. Define Bluetooth and its architecture. **(06 Marks)**

## Module-5

**9** a. Write a short note on Satellite networks. **(04 Marks)**

b. Explain the Operation of cellular telephony. **(06 Marks)**

c. Explain Transition from IPV4 to IPV6. **(06 Marks)**

## OR

**10** a. Explain the working of mobile $I_P$ with phases. **(08 Marks)**

b. Explain IP datagram header format, with neat diagram and give the description of each field. **(08 Marks)**

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