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17MAT41

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
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. From Taylor's series method, find y(0.1), considering upto fourth degree term if y(x) satisfying the equation $\frac{dy}{dx} = x - y^2$, $y(0) = 1$. **(06 Marks)**

b. Using Runge-Kutta method of fourth order $\frac{dy}{dx} + y = 2x$ at $x = 1.1$ given that $y = 3$ at $x = 1$ initially. **(07 Marks)**

c. If $\frac{dy}{dx} = 2e^x - y$, $y(0) = 2$, $y(0.1) = 2.010$, $y(0.2) = 2.040$ and $y(0.3) = 2.090$, find $y(0.4)$ correct upto four decimal places by using Milne's predictor-corrector formula. **(07 Marks)**

OR

2 a. Using modified Euler's method find y at $x = 0.2$ given $\frac{dy}{dx} = 3x + \frac{1}{2}y$ with $y(0) = 1$ taking $h = 0.1$. **(06 Marks)**

b. Given $\frac{dy}{dx} + y + zy^2 = 0$ and $y(0) = 1$, $y(0.1) = 0.9008$, $y(0.2) = 0.8066$, $y(0.3) = 0.722$. Evaluate $y(0.4)$ by Adams-Bashforth method. **(07 Marks)**

c. Using Runge-Kutta method of fourth order, find $y(0.2)$ for the equation $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0) = 1$ taking $h = 0.2$. **(07 Marks)**

Module-2

3 a. Apply Milne's method to compute $y(0.8)$ given that $\frac{d^2y}{dx^2} = 1 - 2y\frac{dy}{dx}$ and the following table of initial values.

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. Express $f(x) = x^4 + 3x^3 - x^2 + 5x - 2$ in terms of Legendre polynomials. **(07 Marks)**

c. Obtain the series solution of Bessel's differential equation $x^2y'' + xy' + (x^2 + n^2)y = 0$ leading to $J_n(x)$. **(07 Marks)**

OR

4 a. Given $y'' - xy' - y = 0$ with the initial conditions $y(0) = 1$, $y'(0) = 0$, compute $y(0.2)$ and $y'(0.2)$ using fourth order Runge-Kutta method. **(06 Marks)**

b. Prove $J_{-1/2}(k) = \sqrt{\frac{2}{\pi x}}\cos x$. **(07 Marks)**

c. Prove the Rodfigues formula $P_n(x) = \frac{1}{2^n n!}\frac{d^n y}{dx^n}(x^2-1)^n$ **(07 Marks)**

Module-3

5 a. Derive Cauchy-Riemann equations in Cartesian form. **(06 Marks)**

b. Discuss the transformation $w = z^2$. **(07 Marks)**

c. By using Cauchy's residue theorem, evaluate $\int_C \frac{e^{2z}}{(z+1)(z+2)}dz$ if C is the circle $|z| = 3$. **(07 Marks)**

OR

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

b. State and prove Cauchy's integral formula. **(07 Marks)**

c. Find the bilinear transformation which maps $z = \infty$, i, 0 into $w = -1$, $-i$, 1. **(07 Marks)**

Module-4

7 a. Find the mean and standard of Poisson distribution. **(06 Marks)**

b. In an examination 7% of students score less than 35 marks and 89% of the students score less than 60 marks. Find the mean and standard deviation if the marks are normally distributed given A(1.2263) = 0.39 and A(1.4757) = 0.43 **(07 Marks)**

c. The joint probability distribution table for two random variables X and Y is as follows:

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

Determine:

i) Marginal distribution of X and Y

ii) Covariance of X and Y

iii) Correlation of X and Y **(07 Marks)**

OR

8 a. A random variable X has the following probability function:

x	0	1	2	3	4	5	6	7
P(x)	0	K	2k	2k	3k	K^2	$2k^2$	$7k^2+k$

Find K and evaluate $P(x \geq 6)$, $P(3 < x \leq 6)$. **(06 Marks)**

b. The probability that a pen manufactured by a factory be defective is 1/10. If 12 such pens are manufactured, what is the probability that

i) Exactly 2 are defective

ii) Atleast two are defective

iii) None of them are defective. **(07 Marks)**

c. The length of telephone conversation in a booth has been exponential distribution and found on an average to be 5 minutes. Find the probability that a random call made

i) Ends in less than 5 minutes

ii) Between 5 and 10 minutes. **(07 Marks)**

Module-5

9 a. A die is thrown 9000 times and a throw of 3 or 4 was observed 3240 times. Show that the dia cannot be regarded as an unbiased die. **(06 Marks)**

b. A group of 10 boys fed on diet A and another group of 8 boys fed on a different disk B for a period of 6 months recorded the following increase in weight (lbs):

Diet A:	5	6	8	1	12	4	3	9	6	10
Diet B:	2	3	6	8	10	1	2	8		

Test whether diets A and B differ significantly t.05 = 2.12 at 16df. **(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 terms:

i) Null hypothesis

ii) Type-I and Type-II error

iii) Confidence limits **(06 Marks)**

b. The t.p.m. of a Markov chain is given by $P = \begin{bmatrix} 1/2 & 0 & 1/2 \\ 1 & 0 & 0 \\ 1/4 & 1/2 & 1/4 \end{bmatrix}$. Find the fined probabilities vector. **(07 Marks)**

c. Two boys B_1 and B_2 and two girls G_1 and G_2 are throwing ball from one to another. Each boy throws the ball to the other boy with probability 1/2 and to each girl with probability 1/4. On the other hand each girl throws the ball to each boy with probability 1/2 and never to the other girl. In the long run how often does each receive the ball? **(07 Marks)**

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17MATDIP41

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
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:

$$A = \begin{bmatrix} 2 & 3 & 5 & 4 \\ 0 & 2 & 3 & 4 \\ 4 & 8 & 13 & 12 \end{bmatrix}$$ by elementary row transformations. **(08 Marks)**

b. Solve by Gauss elimination method

$2x + y + 4z = 12$
$4x + 11y - z = 33$
$8x - 3y + 2z = 20$ **(06 Marks)**

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

OR

2 a. Reduce the matrix

$$\begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 5 & 1 \\ 1 & 3 & 4 & 5 \end{bmatrix}$$ into its echelon form and hence find its rank. **(06 Marks)**

b. Applying Gauss elimination method, solve the system of equations

$2x + 5y + 7z = 52$
$2x + y - z = 0$
$x + y + z = 9$ **(06 Marks)**

c. Find all the eigen values for the matrix $A = \begin{bmatrix} 7 & -2 & 0 \\ -2 & 6 & -2 \\ 0 & -2 & 5 \end{bmatrix}$ **(08 Marks)**

Module-2

3 a. Solve $\frac{d^4y}{dx^4} - \frac{2d^3y}{dx^3} + \frac{d^2y}{dx^2} = 0$ **(06 Marks)**

b. Solve $\frac{d^2y}{dx^2} - \frac{6dy}{dx} + 9y = 5e^{-2x}$ **(06 Marks)**

c. Solve $\frac{d^2y}{dx^2} + y = \sec x$ by the method of variation of parameters. **(08 Marks)**

OR

4 a. Solve $\frac{d^3y}{dx^3} + y = 0$ **(06 Marks)**

b. Solve $y'' + 3y' + 2y = 12x^2$ **(06 Marks)**

c. Solve by the method of undetermined coefficients :
$y'' - 4y' + 4y = e^x$ **(08 Marks)**

Module-3

5 a. Find the Laplace transforms of $\sin 5t \cos 2t$ **(06 Marks)**

b. Find the Laplace transforms of $(3t + 4)^3$ **(06 Marks)**

c. Express $f(t) = \begin{cases} \sin 2t & 0 < t < \pi \\ 0 & t > \pi \end{cases}$,
in terms of unit step function and hence find L[f(t)]. **(08 Marks)**

OR

6 a. Find the Laplace transforms of $\frac{\sin^2 t}{t}$ **(06 Marks)**

b. Find the Laplace transform of $2^t + t \sin t$ **(06 Marks)**

c. If $f(t) = t^2$, $0 < t < 2$ and $f(t + 2) = f(t)$, for $t > 2$, find L[f(t)]. **(08 Marks)**

Module-4

7 a. Find the Laplace Inverse of
$\frac{1}{(s+1)(s-1)(s+2)}$ **(08 Marks)**

b. Find the inverse Laplace transform of $\frac{3s+7}{s^2-2s-3}$. **(06 Marks)**

c. Solve $y'' + 2y' - 3y = \sin t$, $y(0) = 0$, $y'(0) = 0$. **(06 Marks)**

OR

8 a. Find the inverse Laplace transform of
$\log\left(\frac{s+a}{s+b}\right)$ **(06 Marks)**

b. Find the inverse Laplace transform of $\frac{4s-1}{s^2+25}$ **(06 Marks)**

c. Find the inverse Laplace of $y'' - 5y' + 6y = e^t$ with $y(0) = y'(0) = 0$. **(08 Marks)**

Module-5

9 a. State and prove Addition theorem on probability. **(05 Marks)**

b. A student A can solve 75% of the problems given in the book and a student B can solve 70%. What is the probability that A or B can solve a problem chosen at random. **(06 Marks)**

c. Three machines A, B, C produce 50%, 30% and 20% of the items in a factory. The percentage of defective outputs of these machines are 3, 4 and 5 respectively. If an item is selected at random, what is the probability that it is defective? If a selected item is defective, what is the probability that it is from machine A? **(09 Marks)**

OR

10 a. Find the probability that the birth days of 5 persons chosen at random will fall in 12 different calendar months. **(05 Marks)**

b. A box A contains 2 white balls and 4 black balls. Another box B contains 5 white balls and 7 black balls. A ball is transferred from box A to box B. Then a ball is drawn from box B. Find the probability that it is white. **(06 Marks)**

c. State and prove Baye's theorem. **(09 Marks)**

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17CS42

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Object Oriented Concepts

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Explain how C++ allows member functions in structures. Give example. **(06 Marks)**
b. What is data abstraction? How is it implemented in C++? **(06 Marks)**
c. What is function overloading? Write a C++ program to define three overloaded functions area ( ) to find area of circle, triangle and rectangle. **(08 Marks)**

OR

2 a. How we can make some specific member functions of one class friendly to another class? **(06 Marks)**
b. What is constructor? List the different types of constructors and explain default constructor with example. **(08 Marks)**
c. What is static member of a class? Write a C++ program to count the number of objects created. **(06 Marks)**

Module-2

3 a. List and explain the java buzzwords. **(08 Marks)**
b. Explain the concepts of arrays in java with examples. **(07 Marks)**
c. Explain type conversion in java with an example. **(05 Marks)**

OR

4 a. Write a java program to initialize and display different types of integer and floating point variables. **(05 Marks)**
b. List and explain different jump statements used in java with examples. **(07 Marks)**
c. List and explain different iteration statements used in java with examples. **(08 Marks)**

Module-3

5 a. Write a program in java to implement a stack operations that can hold 10 integers. **(07 Marks)**
b. Compare and contrast method overloading and method overriding with examples. **(08 Marks)**
c. Describe the significance of super in java. Give example. **(05 Marks)**

OR

6 a. Define package. What are the steps involved in creating user defined package with an example. **(08 Marks)**
b. What is an exception? How java supports exception handling mechanism. Give example. **(07 Marks)**
c. Explain how variables in interfaces are used. Give example. **(05 Marks)**

Module-4

7 a. What is thread? Explain two ways of creation of threads. **(07 Marks)**
b. Describe thread priority. How to assign and get the thread priority. **(07 Marks)**
c. Explain the following with syntax and example,
(i) wait ( ) (ii) notify ( ) (iii) notifyAll ( ). **(06 Marks)**

OR

8 a. What is meant by deadlock? How to avoid deadlock? Give example. **(10 Marks)**

b. Briefly explain the role of inner class and anonymous inner class in java. **(05 Marks)**

c. What is an event class? List and explain different event classes available in java. **(05 Marks)**

Module-5

9 a. Explain the five methods of Applet. **(05 Marks)**

b. Explain the HTML Applet tag with syntax and example. **(07 Marks)**

c. Write a swing program for displaying any one of the options : C, C++, Java, PHP through the selection of combo box by clicking the show button. **(08 Marks)**

OR

10 a. Explain with syntax:
(i) JLabel (ii) JTextField (iii) JButton (iv) JCheckBox (v) JComboBox. **(10 Marks)**

b. Write a program to create a table with column headings such as Fname, Lname, Address, Age and insert at least 5 records in the table and display. **(10 Marks)**

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17CS43

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
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. Explain Asymptotic notations in detail with example. **(12 Marks)**

b. Outline an algorithm to find maximum of n elements and obtain its time complexity. **(08 Marks)**

OR

2 a. Design algorithm for tower of Hanoi problem and obtain time complexity. **(10 Marks)**

b. Prove the theorem
if $f_1(n) \in 0(g, (n))$ and $f_2(n) \in 0(g_2(n))$ Then $f_1(n) + f_2(n) \in 0(\max\{g_1(n), g_2(n)\})$. **(10 Marks)**

Module-2

3 a. Design a recursive algorithm for binary search and calculate time complexity. **(10 Marks)**

b. Write the algorithm for merge sort and Trace 60, 50, 25, 10, 35, 25, 75, 30. **(10 Marks)**

OR

4 a. Develop an algorithm for Quick sort and derive its time complexity. **(10 Marks)**

b. What is topological sorting? Apply DFS for below graph to solve topological sorting. **(10 Marks)**

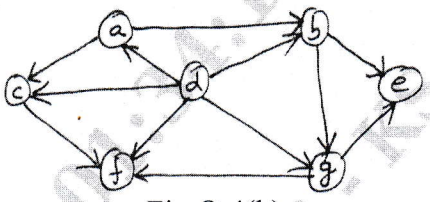


Fig.Q.4(b)

Module-3

5 a. Find the optimal solution to the knap sack instant n = 7, m = 15 using greedy method.

Object	1	2	3	4	5	6	7
Weight	02	03	05	07	01	04	01
Profit	10	05	15	07	06	18	03

(10 Marks)

b. Find the minimum spanning tree using Kruskal's algorithm.

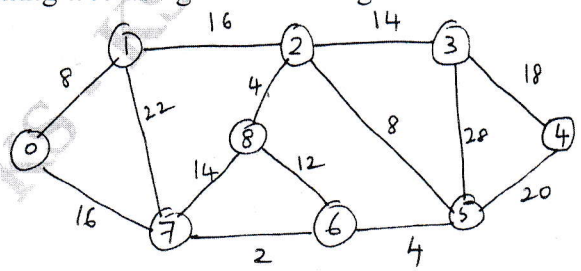


Fig.Q.5(b)

(10 Marks)

OR

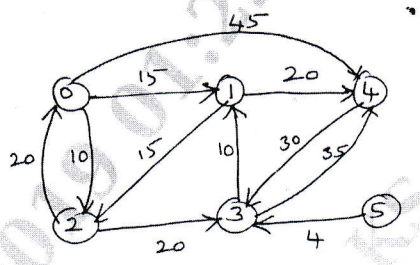
6 a. Construct a Huffman code for the following data:

Characters	A	B	C	D	-
Probability	0.4	0.1	0.2	0.15	0.15

Encode the text ABACABAD and decode 100010111001010 **(10 Marks)**

b. Calculate the shortest distance and shortest path from vertex 5 to vertex 0 using Dijkstra's. **(10 Marks)**

Fig.Q.6(b)



Module-4

7 a. Explain the general procedure to solve a multistage graph problem using backward approach with an example. **(10 Marks)**

b. Construct an optimal binary search tree for the following:

Items :	A	B	C	D
Probabilities :	0.1	0.2	0.4	0.3

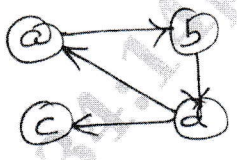
(10 Marks)

OR

8 a. Design Floyd's algorithm to find shortest distances from all nodes to all other nodes. **(10 Marks)**

b. Apply Warshall's algorithm to compute transitive closure for the graph below. **(10 Marks)**

Fig.Q.8(b)



Module-5

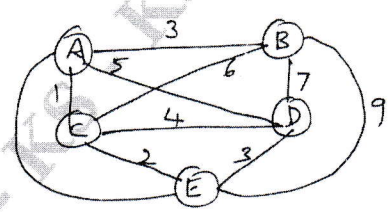
9 a. What is Hamiltonian circuit problem? What is the procedure to find Hamiltonian circuit of a graph? **(10 Marks)**

b. Explain the classes of NP-Hard and NP-complete. **(10 Marks)**

OR

10 a. Apply the branch and bound algorithm to solve the travelling salesman problem for the graph below.

Fig.Q.10(a)



(10 Marks)

b. Obtain the optimal solution assignment problem given:

	J_1	J_2	J_3	J_4
a	9	2	7	8
b	6	4	3	7
c	5	8	1	8
d	7	6	9	4

(10 Marks)

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17CS44

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Microprocessor and Microcontrollers

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume missing data suitably.

Module-1

1 a. Explain Execution Unit (EU) and Bus Interface Unit (BIU) of 8086 with a neat diagram. **(08 Marks)**

b. With an example distinguish between physical address, logical address and offset address. If CS = 2000h, DS = 3000h, SS = 4000h, ES = 5000h, BX = 0030h, BP = 0020h, find the physical address for i) MOV AL, [BP] ii) MOV CX, [BX] iii) Add AX, 20[BX]. **(06 Marks)**

c. Explain the following addressing modes of 8086:
i) Register Indirect
ii) Based Index
iii) Relative Based Index
iv) Direct Memory. **(06 Marks)**

OR

2 a. Explain all bits of flag register of 8086 μ_p with a neat diagram. Show the setting and resetting of flag bits with a suitable example. **(06 Marks)**

b. What are Assembler directives? Explain the following assembler directives with an example: i) PUBLIC ii) ORG iii) ASSUME iv) PTR. **(08 Marks)**

c. Develop an 8086 Assembly Language Program (ALP) to sort a given set of 'n' 16-bit numbers in descending order. Using Bubble sort algorithm to sort given elements. **(06 Marks)**

Module-2

3 a. Explain the following instructions with an example: i) DAA ii) AAM iii) SHR iv) TEST v) LEA vi) PUSH vii) LDS viii) CBW. **(08 Marks)**

b. What is an interrupt? Explain various types with an interrupt vector table. **(06 Marks)**

c. Assume that there is a class of five people with following grades: 69, 87, 96, 45, 75. Develop an ALP to find the highest grade. **(06 Marks)**

OR

4 a. Develop an ALP that adds the following two multiword numbers and saves the result:
Data 1 = 548FB9963CE7H
Data 2 = 3FCD4FA23B8DH. **(08 Marks)**

b. Develop an ALP to perform the following:
i) Clear the screen.
ii) Set the cursor at row 8 and column 5 of the screen.
iii) Prompt "There is a message for you from VTU, to read it enter Y. If the user enter 'Y' or 'y' then the message "Hello! All the best for you exams" will appear on the screen. If the user enters any other key, then the prompt. "No more messages for you" should appear on the next line. **(08 Marks)**

c. Develop an ALP to count the number of ones and zeros in a given 8 bit data using rotate instructions. **(04 Marks)**

Module-3

5 a. Explain handling of overflow problem that arises in addition of signed numbers with a suitable example. **(06 Marks)**

b. Develop an ALP using string instructions to accept a string from keyboard and check for palindrome and display appropriate messages on the screen. **(06 Marks)**

c. Design a memory system for 8086 with one 64KB RAM and one 64KB Rom at address 30000H to F0000H show the complete design along with memory mapping and draw the final diagram with address decoder. **(08 Marks)**

OR

6 a. Briefly explain the control word format of 8255 in I/O mode and BSR mode. Find the control word if PA = out, PB = in, $PC_0 - PC_3$ = in and $PC_4 - PC_7$ = out. Use post addresses of 300H-303H for the 8255 chip. Then get data from port B and send it to port A. **(08 Marks)**

b. Assume that we have 4 byte of hexadecimal data: 25H, 62H, 3FH and 52H

i) Find the checksum byte

ii) Perform the checksum operation to ensure data integrity.

iii) If the second byte 62H had been changed to 22H. Show how checksum detects the error. **(08 Marks)**

c. Explain XLAT instruction with example. **(04 Marks)**

Module-4

7 a. Differentiate between RISC and CISC processors. **(06 Marks)**

b. Explain ARM core data flow model with a neat diagram. **(06 Marks)**

c. With diagram explain the various blocks in a 3 stage pipeline of ARM processor organization. **(08 Marks)**

OR

8 a. Explain the various fields in the current program status register. **(08 Marks)**

b. Explain the architecture of a typical embedded device based in ARM core with a neat diagram. **(08 Marks)**

c. Describe the various modes of operation of ARM processor. **(04 Marks)**

Module-5

9 a. Write/develop an ALP to copy a block of data (Block 1) to another block (block 2) using ARM instructions. **(08 Marks)**

b. Explain the following instructions of ARM processor with suitable examples:
i) MLA ii) QADD iii) SMULL iv) LSL. **(08 Marks)**

c. If $r_5 = 5$, $r_7 = 8$ using the following instructions, write values of r_5, r_7 after execution of MOV r_7, r_5, LSL #2. **(04 Marks)**

OR

10 a. Write short notes on:

i) Memory access

ii) Branch instruction of ARM controller. **(08 Marks)**

b. Explain various types of SWAP instructions with syntax and example. **(06 Marks)**

c. Develop an ALP to find factorial of given number using LOOKUP table and ARM instruction set. **(06 Marks)**

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17CS45

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
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. What is software engineering? Briefly discuss the need for software engineering. **(08 Marks)**

b. With a neat diagram, explain the activity model of the insulin pump control system. **(08 Marks)**

c. List and explain any four software engineering code of ethics. **(04 Marks)**

OR

2 a. With a neat diagram, explain the water-fall model of software development process. List the drawbacks of waterfall model. **(08 Marks)**

b. Briefly discuss the important activities of requirements engineering process with a neat diagram. **(06 Marks)**

c. What is requirements validation? List and explain any four different checks to be carried out during requirements validation process? **(06 Marks)**

Module-2

3 a. Draw and explain state diagram of a microwave oven. **(08 Marks)**

b. Explain the terms class diagram, generalization and aggregation. **(08 Marks)**

c. Draw the sequence diagram for Patient Information System. **(04 Marks)**

OR

4 a. With a neat diagram, explain the Rational Unified Process. **(08 Marks)**

b. What is design pattern? Explain four elements of design pattern. **(06 Marks)**

c. What is software reuse? State the general models of open source licenses. **(06 Marks)**

Module-3

5 a. What is component testing? List and explain the different types of interface errors. **(06 Marks)**

b. Explain performance testing in detail. **(08 Marks)**

c. Explain the six stages of acceptance testing process. **(06 Marks)**

OR

6 a. With a neat diagram briefly discuss the software reengineering process. **(08 Marks)**

b. What is software maintenance? Explain the three different types of software maintenance. **(04 Marks)**

c. Explain software evolution process. **(08 Marks)**

Module-4

7 a. List and explain factors affecting software pricing. **(06 Marks)**

b. Explain briefly COCOMOIT model. **(08 Marks)**

c. Explain briefly the software review process. **(06 Marks)**

OR

8 a. Explain the various inspection checks for software inspection process. **(10 Marks)**

b. Discuss in detail the different stages in component measurement process with diagram. **(10 Marks)**

Module-5

9 a. Explain the practices involved in extreme programming. **(10 Marks)**

b. With a neat diagram explain the process of prototype development. What are the benefits of a prototype? **(10 Marks)**

OR

10 Write short notes on the following :

a. Agile methods

b. Testing in XP

c. Pair programming

d. Incremental delivery. **(20 Marks)**

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17CS46

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
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. Describe data communication and its components. **(05 Marks)**

b. Analyze the principle behind protocol layering. Enumerate the functions of different layers of OSI model. **(10 Marks)**

c. Differentiate Defacto standard and Dejure standard. **(05 Marks)**

OR

2 a. Analyze the causes of transmission impairments. **(05 Marks)**

b. Define line coding. Enumerates the challenges in line coding. Draw the line code of the sequence 010011110 using polar NRZ – L and NRZ – I schemes. **(10 Marks)**

c. In a digital transmission, the receiver clock is 0.3 percent faster than the sender clock. How many extra bits per second does the receiver receive if the data rate is 1Mbps. **(05 Marks)**

Module-2

3 a. Explain the three step procedure of pulse code modulation for analog to digital conversion with example. **(10 Marks)**

b. Briefly explain with neat diagrams. Amplitude shift keying and frequency shift keying modulation techniques. Specify bandwidth requirements. **(05 Marks)**

c. An analog signal has a bit rate of 8000 bps, and a baud rate of 1000 baud. How many data element are carried by each signal elements? How many signal elements do we need? **(05 Marks)**

OR

4 a. Describe about Frequency Division Multiplexing in brief with neat diagram. **(05 Marks)**

b. What is circuit switching? Enumerate the characteristics of circuit, switching. Analyze the three stages of circuit switching. **(10 Marks)**

c. Analyze how message can be transmitted from one system to another using datagram network and calculate the total delay in the network. **(05 Marks)**

Module-3

5 a. Describe three types of errors. **(05 Marks)**

b. Explain the encoder and decoder logic of Cyclic Redundancy Check (CRC) coding with neat diagram. **(10 Marks)**

c. Given message = 1011011, k = 7 and generator polynomial $P(X) = X^3 + X^2 + X^0$, n = 3. Find the codeword and design the checker in the receiver using Cyclic Redundancy Codes (CRC). **(05 Marks)**

OR

6 a. Explain the working of stop-and-wait protocol for Noiseless channels. **(05 Marks)**

b. Explain selective repeat ARQ protocol for noisy channels. **(05 Marks)**

c. Explain the frame format of HDLC protocol. **(05 Marks)**

d. Describe the transition phases of PPP protocol with Finite State Machines. **(05 Marks)**

Module-4

7 a. Analyze the need for access control protocols. Explain the working of CSMA/CD with suitable diagrams. **(10 Marks)**

b. Describe pure ALOHA and slotted ALOHA protocols. **(05 Marks)**

c. Discuss 802.3 MAC frame format. **(05 Marks)**

OR

8 a. Analyze Gigabit Ethernet. **(05 Marks)**

b. Brief on Bluetooth and explain the architecture of Bluetooth. **(05 Marks)**

c. Analyze channelization. Explain Code Division Multiple Access (CDMA) with an example. **(10 Marks)**

Module-5

9 a. Explain the operation of cellular telephony. **(05 Marks)**

b. Explain the working of mobile IP. **(05 Marks)**

c. Analyze satellite networks and its different categories. **(10 Marks)**

OR

10 a. Explain IP datagram header format with neat diagram and given the description of each field. **(10 Marks)**

b. Explain the transition from IPV4 to IPV6. **(05 Marks)**

c. Write a short note on fixed WiMax. **(05 Marks)**

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