(3 hours)   [Total marks: 75]

N. B.: (1)   Attempt any **three** questions from **each section.**
        (2)   Answers to the two sections must be written in **same answer sheet.**
        (3)   Figures to the right indicate full marks.
        (4)   Assume additional data if necessary but state the same clearly.
        (5)   Symbols have their usual meanings and tables have their usual standard design unless
               stated otherwise.
        (6)   Use of simple calculators and statistical tables is allowed.

Section I

1   a.   Distinguish between the following LISP commands: 6

         (i) SETF and SETQ   (ii) EQ and EQL   (iii) CAR and CDR

    b.   Write a short note on slot and assertion notations.   6

2   a.   Explain fuzzy control of a simple pendulum using Fuzzy Associative Memory (FAM)   6
         rules.

    b.   Classify and state different neural network models.   6

3   a.   State and explain Schema Theorem of Genetic Algorithm.   6

    b.   A population contains the four strings as 10001, 11100, 00011 and 01110 with fitness   6
         10, 15, 20 and 5 respectively. The probability of mutation is 0.01 and the probability of
         crossover is 1.0. Calculate the expected number of schemata of the form 1**** in
         generation one.

4   a.   Describe briefly De Jong function optimization.   6

    b.   Describe classifier system as a genetic based machine learning system.   6

5   a.   Discuss the data mining technique k- nearest neighborhood.   6

    b.   Elaborate that information is a production factor.   6

XD-Con. : 1045-15.   [TURN OVER

Section II

6	a.	Discuss some of the applications of digital image processing .	6
	b.	Define Discrete Fourier transform. List down its properties and application.	7
7	a.	What is High boost filtering in frequency domain? Explain in detail.	6
	b.	Explain the output and application of Image subtraction.	7
8	a.	Define and Compare the following sharpening filters : i) Butterworth	6
		ii) Gaussian	
	b.	Describe any one image multiresolution analysis technique.	7
9	a.	Explain any one gray scale morphology method.	6
	b.	What are redundancies? Explain any one technique to reduce them.	7
10	a.	Describe texture of image.Hence explain any one approach of this.	6
	b.	With an example describe graph theoretic technique.	7

XD-Con. : 1045-15.

(3 hours)   [Total marks: 75]

N.B.:   (1)   Attempt any **three** questions from **each section.**

(2)   Answers to the two sections must be written in **separate answer sheet.**

(3)   Figures to the right indicate full marks.

(4)   Assume additional data if necessary but state the same clearly.

(5)   Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.

(6)   Use of simple calculator and statistical tables are allowed.

Section I

1   a.   Explain with help of neat figures different forms of communications that can be possible between client and server.   6

b.   Why encoding the network address of the server's machine into an object reference is not recommended?   6

2   a   How Java RMI rely on code migration?   6

b.   Explain in detail different approaches for locating a mobile entity.   6

3   a.   Explain working of two-phase locking.   6

b.   Give an example where client-centric consistency can easily lead to write-write conflicts.   6

4   a.   What are dependable systems? How dependable systems are used to controlling faults?   6

b.   Devise a simple authentication protocol using signatures in a public-key cryptosystem.   6

5   a.   Discuss different security threats that can occur in mobile code. How these threats can be prevented?   6

b.   What is the main issue in backward recovery? How it is achieved? What is forward recovery?   6

[TURN OVER

Section II

6   a.   Explain hardware/software co-design in detail.   6

    b.   Using suitable block diagram explain the build and load process for embedded   7
         application programs.

7   a   Compare and contrast the non-preemptive vs. preemptive kernel, with reference to   6
         RTOS.

    b   Discuss two strategies used for limiting the duration of an unbounded priority inversion 7
         in real-time embedded operating system.

8   a.   Write a short note on preprocessor directives used in embedded C.   6

    b.   Discuss the need for memory optimization in an embedded system.   7

9   a.   Explain different types of display units.   6

    b.   List and define different DMA cycles.   7

10 a.   Write C language code to initialize External_Interrupt_0 to activate on a rising edge,   6
         applied to the external interrupt pin.

    b.   With suitable diagram explain what watchdog timer is and why it is used?   7

XD-Con. : 1256-15.

M. Sc. (Computer Science) Part- II
Paper - III
Enterprise Networking and Satellite Communications.
April: 2015

Q.P. Code : **19116**

(3 Hours)   [Total Marks : 75

N.B. : (1) Attempt any three questions from each section
     (2) Answers to the two sections must be written in separate answer sheet.
     (3) Figures to the right indicate full marks.
     (4) Assume additional data if necessary but state the same clearly.
     (5) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.
     (6) use of simple calcualtors and statistical tables are allowed.

SECTION I

1.   (a) Discuss the technical requirements in planning the Enterprise Network.   06
     (b) Use the ping command on a web site to measure to the round-trip-time. How   06
        does packet size affect round-trip time?

2.   (a) Explain in detail the SONET technology.   06
     (b) What is a router? Give its working, advantages and disadvantages.   06

3.   (a) Elaborate on RS-232 uses -15V to represent a bit?   03
     (b) With reference to multicasting, explain multicast addressing.   05
     (c) Elaborate on the ADSL technology.   05

4.   (a) Elaborate on digital telephony.   06
     (b) How data overrun occurs? How can it be prevented?   07

5.   (a) Draw and explain the FDDI network.   06
     (b) Elaborate on error detecting technique of checksum. Illustrate an example   06
        where checksum fails to detect transmission error.

SECTION II

6. (a) Briefly comment on the services provided by satellites.   06
   (b) State the Kepler's third law; calculate semimajor axis when mean motion   06
   (NN)=14.22296917 $\cdot$ day^{-1}, μ = 3.986005 $\cdot$ 10^{14} $\cdot$ m^3 $\cdot$ sec^{-2}.

7. (a) What is rain rate? Derive an equation to calculate the rain attenuation.   06
   (b) Explain how a satellite is launched into a high earth orbit.   07

8. (a) What are Horn antennas? Discuss its 3 types.   06
   (b) Discuss how ionospheric depolarization is achieved.   06

9. (a) Define and explain orbital debris.   02
   (b) Discuss combined Uplink and Downlink C/N ration with an appropriate   05
   diagram.
   (c) Elaborate on the telemetry, tracking and command systems used to support   06
   the function of spacecraft management.

10. (a) List various aspects involved in designing a communication satellite.   06
    (b) Compare and contrast TDMA and FDMA based networks?   06

XD-Con. 1447-15.

M. Sc. (Computer Science) Part- II
Paper - IV
Optimization Techniques and Customer Relations Management
April: 2015

QP Code : 19253

(3 hours)

NB.
1) Attempt any three questions from each section.
2) Answers to the two sections must be written in separate answer sheet.
3) Figures to the right indicate full marks.
4) Assume additional data necessary but state the same clearly.
5) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.
6) Use of simple calculators and statistical tables is allowed.

SECTION I

Q1   a)   Explain the main characteristics of Optimization problems?   (05)

       b)   An animal feed company must produce 200 kg of a mixture consisting of ingredients X and Y. The ingredient X costs Rs. 3 per kg and the ingredient Y costs Rs. 5 per kg. Not more than 80 kg of X and at least 60 kg of ingredient Y must be used. Formulate and solve the LPP graphically.   (07)

Q2   a)   Explain the difference between Unbounded solution and Infeasible solution w.r.t a LPP.   (06)

       b)   Solve the following Linear Programming Problem by Simplex method.   (07)
Maximize $Z = 2x + 3y$

$$\text{s.t.} \quad x + 4y \leq 8$$
$$3x + 2y \leq 14$$
$$x, y \geq 0$$

Q3   a)   What is Degeneracy in Transportation problem? And explain briefly how to resolve degeneracy.   (06)

       b)   Solve the following transportation problem to minimize cost.   (07)

DESTINATION→ ORIGIN ↓	D1	D2	D3	SUPPLY
F1	16	19	12	140
F2	22	13	19	160
F3	14	28	8	120
DEMAND	100	150	170	320

[TURN OVER

Q4   a)   Explain the Hungarian method of solving the assignment problem.   (06)

     b)   Find an Optimum Assignment to maximize profit.   (07)

OPERATORS	MACHINES				
	A	B	C	D	E
1	30	37	40	28	40
2	40	24	27	21	36
3	40	32	33	30	35
4	25	38	40	36	36
5	29	62	41	34	39

Q5   a)   Explain cutting plane algorithm to solve an integer programming problem.   (05)

     b)   Explain the Travelling Salesman problem   (04)

     c)   Explain sensitivity analysis of resource availability (i.e R.H.S OR bi)   (04)

[TURN OVER

XD-Con. 6572-15.

Section II

6   a.   The customer is king – Justify the statement with an example.   6

    b.   Discuss the CRM G-SPOT activity for any business with the help of a diagram.   7

7   a.   Explain any three similarities and differences between CRM and ECRM.   6

    b.   Explain the functionality of SFA.   7

8   a.   Explain the five step process involved in Permission Marketing.   6

    b.   Explain EMA components.   7

9   a.   State and explain various background processes involved in call centre implementation.   6

    b.   Why most ASP's advertise 24/7/365 uptime for their customers?   7

10 a.   Explain the process of customization during implementation of CRM.   6

    b.   What is "Beta testing"? What are the advantages from designer's point of view?   7

XD-Con. 6572-15.