

- (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. What quantifiers are available in predicate calculus to representing knowledge, Distinguish between them with suitable example? 6
- b. Write a short note on: 6
- i. Indexing
- ii. Frame notation.
2. a. Define a function addprop where addprop will work similar to the function of putprop 6
- b. Explain working of first and rest functions with suitable examples. 6
3. a. Elaborate on multilayered architecture of GA proposed by Weinberg. 6
- b. Describe components of classifier system in detail. 6
4. a. What is FAM? Describe FAM in detail. 6
- b. Explain in brief- "Neural and fuzzy systems as function estimators." 6
5. a. Elaborate on following sentence: "A self-learning computer can generate programs itself, enabling it to carry out new tasks." 6
- b. Describe KDD process in details. 6

**[TURN OVER**

## Section II

- |    |    |  |   |
|----|----|--|---|
| 6  | a. | Write note on: i) FFT ii) Discrete cosine transform.   | 6 |
|    | b. | Explain the process of sampling and quantization.  | 7 |
| 7  | a. | Define and explain the following frequency filters : i) Gaussian low pass ii) High boost                       | 6 |
|    | b. | What is Image averaging? Explain any one application for the same.   | 7 |
| 8  | a. | Briefly explain the scaling function.  | 6 |
|    | b. | Define Ideal and Ramp edge. Hence discuss the derivative operators for the same.                               | 7 |
| 9  | a. | Define Skeleton. Write and explain the steps to find skeleton of an object.                                    | 6 |
|    | b. | With an example explain the LZW coding technique in image compression.   | 7 |
| 10 | a. | Write note on: i) Shape number ii) Moments   | 6 |
|    | b. | Explain the use of thresholding in image segmentation. List down the steps to find the global threshold value. | 7 |
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**M.Sc. (Computer Science) Part – II**  
**Distributed Computing**  
**& Embedded Systems**  
**April: - 2016**

**QP Code : 18732**

(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.
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Section I

- |   |    |  |   |
|---|----|--|---|
| 1 | a. | Why encoding the network address of the server's machine into an object reference is not recommended?                                | 6 |
|   | b. | What is a stateful or stateless connection? What are their advantages?   | 6 |
| 2 | a. | How Java RMI rely on code migration?   | 6 |
|   | b. | What is data stream? Which transmission modes are used in distributed systems to capture the exchange of time-dependent information? | 6 |
| 3 | a. | Give an example where client-centric consistency can easily lead to write-write conflicts.   | 6 |
|   | b. | How processes in distributed systems synchronize for communication between processes to occur?                                       | 6 |
| 4 | a. | What are dependable systems? How dependable systems are used to controlling faults?  | 6 |
|   | b. | Consider causally-consistent lazy replication. When exactly can an operation be removed from a write queue?                          | 6 |
| 5 | a. | What is the main issue in backward recovery? How it is achieved? What is forward recovery?   | 6 |
|   | b. | Should the client and server-side CORBA objects for asynchronous method invocation be persistent? Explain.                           | 6 |

**WT-Con. 1955-16.**

**[TURN OVER**

## Section II

- 6 a. "The Time-to-Market design constraint has become especially demanding in recent years." Explain. 6
- b. Using suitable block diagram explain the build and load process for embedded application programs. 7
- 7 a. What is an event? What are various features of an event? How events are processed by microcontroller? 6
- b. Discuss two strategies used for limiting the duration of an unbounded priority inversion in real-time embedded operating system. 7
- 8 a. Differentiate between C and Assembly language. Why we need to mix C and Assembly language while developing embedded system applications? 6
- b. Discuss the need for memory optimization in an embedded system. 7
- 9 a. Describe Data Acquisition System (DAS)? What are its uses? 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, applied to the external interrupt pin. 6
- b. Explain the configuration of Timer\_0 to generate delay of 800 msec. 7

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**WT-Con. 1955-16.**

(1) Attempt any three questions from each section.

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**Section I**

- Q.1(a) Find out the **CLASS** of addressing, **net\_id**, **host\_id**, **network address** and **subnetwork address** for following IP Addresses. 6  
i) 126.39.24.7    ii) 221.224.115.251    iii) 167.254.221.121
- (b) Compare layer 2 and layer 3 switching devices. 6
- Q.2(a) Write a note on FDDI network. 6  
(b) List and discuss the different DSL technologies and their advantages. 6
- Q.3(a) Using suitable diagram, explain the implementation of spanning tree algorithm to avoid looping problem encountered in layer2 devices. 6  
(b) Write a note on interior and exterior routing protocols in networking 6
- Q.4(a) Explain ISDN in detail? and its advantages. 6  
(b) Explain the components and functions of Network Interface Card (NIC). 6
- Q.5(a) List & explain the technical challenges and requirements in planning the Enterprise Network. 6  
(b) Define routing table? How it gets updated? And hence state the Dijkstra's algorithm used in routing. 6

**[TURN OVER**

## Section II

- Q.6(a) State Kepler's laws of planetary motion, and hence illustrate in each case their relevance to artificial satellite motion around the earth. 7
- (b) Explain any TWO advantages offered by satellite communication over other communication systems. 6
- Q.7(a) Explain the term sidereal time and orbital plane, using suitable diagram. 7
- (b) Define the following term: 6
- i) Limits of visibility
  - ii) Polar Mount antenna
- Q.8(a) State Reciprocity Theorem for antenna and illustrate it with neat labeled diagram. What are the two important consequences that emerge due to Reciprocity Theorem. 7
- (b) What is meant by cross polarization discrimination? Describe the factors which work in favor of good cross-polarization discrimination. 6
- Q.9(a) Explain the term "up-link" and "down-link" of a satellite circuit? Derive an expression for saturation flux density in terms of EIRP. 7
- (b) Explain in detail an intermodulation noise. 6
- Q.10(a) What do you mean by a spread spectrum technology, and how this is useful to minimize interference in CDMA systems. 7
- (b) What are non-geo-stationary orbits? State different design considerations on non-geostationary orbit satellite systems. 6

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**M.Sc. (Computer Science) Part – II**  
**Elective - II**  
**Optimization Techniques**  
**& Customer Resources Management**  
**April: - 2016**

**QP Code : 18999**

[Total marks: 75]

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

- 1 a. A calculator company produces a scientific calculator and a graphing calculator. Long-term projections indicate an expected demand of at least 100 scientific and 80 graphing calculators each day. Because of limitations on production capacity, no more than 200 scientific and 170 graphing calculators can be made daily. To satisfy a shipping contract, a total of at least 200 calculators must be shipped each day. 6

If each scientific calculator sold results in a 140 INR loss, but each graphing calculator produces a 350 INR profit, how many of each type should be made daily to maximize net profits?

Draw the feasibility region graphs and solve the problem graphically.

- b. Explain applications of Optimization techniques. 6
- 2 a. How LP problem is solved using Simplex method? Give steps. 6
- b. Solve the following L.P.P. by Simplex method: 6

$$\begin{aligned} \text{Min } Z &= 5X_1 - 2X_2 + 3X_3 \\ \text{Subject to } 2X_1 + 2X_2 - X_3 &\geq 2 \\ 3X_1 - 4X_2 &\leq 3 \\ X_2 + 3X_3 &\leq 5 \\ \text{where } X_1, X_2, X_3 &\geq 0 \end{aligned}$$

- 3 a. Write down the dual of the following primal L.P.P. Solve this primal by Big M method, and hence determine solution of dual problem from the optimal simplex table of primal. 6

$$\begin{aligned} \text{Min } Z &= 300X_1 + 110X_2 \\ \text{Subject to } 30X_1 + 5X_2 &\geq 6 \\ 20X_1 + 10X_2 &\geq 8 \\ X_1, X_2 &\geq 0 \end{aligned}$$

- b. Discuss the transportation problem model as maximization problem. 6
- 4 a. Explain algorithm for obtaining an initial basic feasible solution to a transportation problem using North West Corner method. Find the initial solution for the following transportation problem using North West Corner method. 6

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	
S <sub>1</sub>					7
S <sub>2</sub>					9
S <sub>3</sub>					18
	5	8	7	14	34

**[TURN OVER**

- b. Solve the following Travelling Salesman's problem. 6

	A	B	C	D
A	$\infty$	4	7	3
B	4	$\infty$	6	3
C	7	6	$\infty$	7
D	3	3	7	$\infty$

- 5 a. Discuss briefly Monte-Carlo simulation technique. Find the approximate area under the following curve, using Monte-Carlo simulation technique. 6

$$f(x) = 3x^2 + 2x + 1 \quad 0 \leq x \leq 1$$

- b. Solve the following Integer Programming problem: 6

$$\text{Min } Z = 3X_1 + 2.5X_2$$

$$\text{Subject to } X_1 + 2X_2 \geq 20$$

$$3X_1 + 2X_2 \geq 50$$

$$X_1, X_2 \geq 0 \text{ and integers}$$

### Section II

- 6 a. Explain features and applications of eCRM. 6
- b. Explain various technologies required for using CRM. 7
- 7 a. What are uses of reporting tools for successful Sales Force Automation (SFA)? 6
- b. Define customer. Explain customer life cycle. 7
- 8 a. What is application service provider (ASP)? Explain their role in implementing CRM. 6
- b. What is Enterprise marketing automation (EMA)? Explain EMA components. 7
- 9 a. Why call centers are required in business? How they enhance business? 6
- b. Explain marketing campaign and campaign management. 7
- 10 a. Why power user beta test is required? What will happen if this test is skipped? 7
- b. What is application service provider (ASP)? What are the disadvantages of implementing ASP? Discuss these disadvantages with reference to:
- (i) Small scale industries
  - (ii) Large scale industries