

**(3 Hours)**

**[Total Marks: 80]**

N.B.: (1) Question No.1 is compulsory.

(2) Attempt any three questions from the remaining five questions.

(3) Make suitable assumptions wherever necessary but justify your assumptions

1. a) Explain SONA framework for flexible network design. **10**  
b) Compare the Top-Down vs Bottom-Up Network Design Approach **10**
  
2. a) State and Explain in brief different external threats hampering the integrity of the enterprise network. **10**  
b) Explain different phases in PPDIIO Network Lifecycle. **10**
  
3. a) Explain the role SNMP in network management. **10**  
b) Explain the hierarchical network model of network design. **10**
  
4. a) Explain VPN and its implementation techniques. **10**  
b) Explain EIGRP in detail and highlight its characteristics which make it suitable for Enterprise Networks. **10**
  
5. a) State and Explain IPv4 to IPv6 Transition strategies. **10**  
b) State and explain suitable routing protocols for Enterprise architecture. **10**
  
6. Write a note on (any two) **20**
  - a. SDN Architecture
  - b. MPLS
  - c. Enterprise WAN architecture technologies

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[Time: 03 Hours]

[Marks: 80]

- Note: 1. Question number 1 is compulsory.  
 2. Solve any three questions out of the remaining five questions  
 3. Assume suitable data if necessary  
 4. Figure to right indicate full marks

**Q.1** Solve any Four of the following.

(a) Explain different definitions of artificial intelligence according to different categories. **05**

(b) Solve the given problem using Crypt Arithmetic method. **05**

$$\begin{array}{rcccccc}
 & & S & E & N & D & \\
 + & & M & O & R & E & \\
 \hline
 & M & O & N & E & Y & 
 \end{array}$$

(c) Represent each of the following sentences in first-order logic. **05**

- i) A whale is a mammal.
- ii) Jane likes John.
- iii) If it's raining, then the ground is wet.
- iv) If the switch is on and the light is off then the light-bulb is broken.
- v) All computers have a processor.

(d) Differentiate between STRIPS language and ADL. **05**

(e) Explain main components of a Cognitive Computing system. **05**

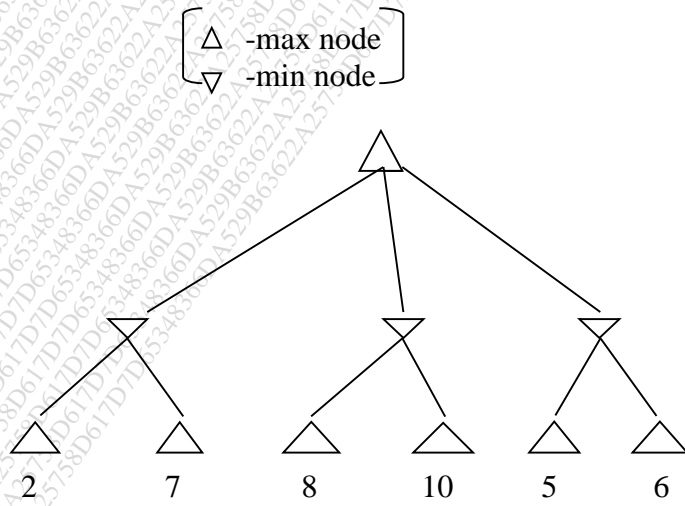
**Q.2** (a) Explain Model based Reflex agent and Utility based agent with block diagram. **10**

(b) Explain different knowledge representation methods with example. **10**

**Q.3** (a) Differentiate between Informed and Uninformed search techniques. Also explain A\*algorithm with suitable example. **10**

(b) Explain Planning in AI. Compare Partial Order Planning with Conditional Planning. Also, explain the real time application of hierarchical planning. **10**

**Q.4** (a) Apply Mini-max and Alpha-Beta Pruning on given game tree and find which is the next move. **10**



- Q.4 (b)** Consider two medical tests, A and B, for a virus. Test A is 95% effective at recognizing the virus when it is present, but has a 10% false positive rate (indicating that the virus is present, when it is not). Test B is 90% effective at recognizing the virus, but has a 5% false positive rate. The two tests use independent methods of identifying the virus. The virus is carried by 1% of all people. Say that a person is tested for the virus using only one of the tests, and that test comes back positive for carrying the virus. Which test returning positive is more indicative of someone really carrying the virus? Justify your answer mathematically. **10**
- Q.5 (a)** Explain Forward-chaining and Backward-Chaining algorithm with the help of example. **10**
- (b)** Explain different components of Natural Language processing? Also, explain different levels of knowledge used in language understanding? **10**
- Q.6** Write a short note on any **Four**.
- (a)** Bayesian Network with example **05**
- (b)** Supervised and Unsupervised learning **05**
- (c)** Role of NLP in Cognitive System **05**
- (d)** Conditional Probability and Its role in AI **05**
- (e)** Knowledge based agent **05**

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( 3 Hours)

[Total Marks: 80]

- N.B.:** (1) Question No.1 is **Compulsory**.  
 (2) Attempt **any three** from **remaining five** questions.  
 (3) **Assume** suitable data, **if necessary**.

1. (a) Discuss the Android Architecture with all layers. Also discuss the role of DVM in detail. (10)
- (b) Explain Various Android features. Why android is popular mobile operating system discuss with reasons. (10)
2. (a) Implement the Android Mobile App to accept UserID and Password from user (Use TextView and EditText). App should contain three Buttons, namely, Submit, Reset and Exit. On Submit button click, the UserId and Password should be authenticated (Assume any UserId and Password, hardcoded in Java Activity), On Reset click the UserId and Password fields should get empty and on Exit Button click, App should be terminated. (10)  
 (Discuss steps and Java code in detail, also explain how UI can be created using XML code).
- (b) What is the role of Activity in Android? Discuss the life cycle of Activity in Android. (10)
3. (a) What is Intent in Android? Differentiate between explicit and implicit intent. (10)
- (b) Discuss the various Layout in Android. Demonstrate any Layout with suitable example. (10)
4. (a) Discuss how data persistency can be achieved in Android. What is Content Provider in Android? Explain Content Provider in detail. (10)
- (b) Discuss how SQLite is different than other database approach in Android. Write a code in SQLite to fetch data from any table and display on screen using Cursor. (10)  
 (Assume table is already created with sample records in it).
5. (a) Explain the Camera API in Android with suitable examples. (10)
- (b) Discuss what type of App we can build using Location API in Android. Also explain how to get the current location of User in Android Apps. (10)
6. Write short note on (**any four**):
- (a) Role of Android.Manifest.xml file in Android (5)
- (b) Android App publishing (5)
- (c) Android Download Manager (5)
- (d) Android Security Issues (5)
- (e) XML and JSON Parsing in Android (5)

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(3 Hours)

**[Total Marks : 80]****Note: Question No. 1 is Compulsory****Attempt any 3 Questions from the Remaining Questions.**

- Q. 1 20
- Differentiate the following: Convex and nonconvex fuzzy set.
  - Discuss any two methods of defuzzification.
  - Explain activation functions in ANN.
  - List the application of GA.
- Q. 2 10
- Design neural networks with only one M-P neuron that implements the three basic logic operations:  
(i) NOT ( $x_1$ ); (ii) OR ( $x_1, x_2$ ); (iii) NAND ( $x_1, x_2$ ), where  $x_1$  and  $x_2 \in \{0, 1\}$ . 10
  - Discuss any two learning techniques in Neural Network in detail. 10
- Q. 3 10
- List the stages involved in training of back propagation network. 10
  - Write short note on Adaptive Resonance Theory 1. 10
- Q. 4 10
- Explain architecture of Character Recognition algorithm using ANN 10
  - Explain in detail selection and encoding operators involved in genetic algorithm. 10
- Q. 5 10
- With a neat flowchart, explain the steps of a simple genetic algorithm. 10
  - Explain FIS in detail. Compare Mamdani FIS and sugeno FIS. 10
- Q. 6 10
- Draw and explain ANFIS architecture in detail. 10
  - List and explain the advantages of Neuro-Genetic Hybrid systems in detail. 10

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(3 Hours)

[Total Marks: 80]

- N.B.:**
- 1) Question number 1 is compulsory.
  - 2) Attempt any three questions form remaining questions.
  - 3) Figures to the right indicate full marks.

**1. Answer any four**

- a) Write short notes on Access Control Policies (05)
  - b) Write short notes on Buffer overflow (05)
  - c) Explain WLAN Security attacks (05)
  - d) Write Cross Site Request Forgery with example (05)
  - e) Explain Business Continuity Plan (05)
- 
2. a) Explain the different types of Malware in Software Security (10)
  - b) Explain the different types of authentication methods (10)
- 
3. a) Explain UTMS Security with neat diagram (10)
  - b) Explain OAuth 2.0 architecture and its grant type with neat diagram (10)
- 
4. a) Explain the different types WLAN Security attacks (10)
  - b) Explain OWASP and its ten vulnerabilities (10)
- 
5. a) Explain different types of Email Attacks (10)
  - b) Explain File protection System in software security (10)
- 
- 6. Write short notes on (Any four)**
- a) Explain the incidental management (05)
  - b) Secure Socket Layer (05)
  - c) Multilevel Database Security (05)
  - d) Data protection in cloud (05)
  - e) Cloud Identity and Access Management (05)
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( 3 Hours )

( Total Marks : 80 )

- N.B:** 1) **Q.1** is compulsory.  
2) Attempt **any THREE** questions from the remaining questions.  
3) Assume suitable **data** if **necessary**.

Q.1 Attempt **any four** :

- a) Compare active attacks vs Passive attacks. [5]
- b) Explain various types of key-loggers in brief. [5]
- c) Classify the cybercrimes and explain any one briefly. [5]
- d) Explain how the appeals can be made under The IT ACT 2000. [5]
- e) Write brief note on : Cyber-terrorism. [5]

Q.2 a) How criminals plan the attack? Discuss various steps involved [10]

b) Explain how Intellectual property laws protect the rights of the owner of the intellectual Property. [10]

Q.3 a) Compare Vishing, Phishing and Smishing in cyber security. [10]

b) What is E-commerce? Explain different types of e-commerce with suitable examples. [10]

Q.4 a) What is Bluetooth hacking? Explain Bluetooth hacking tools in brief. [10]

b) How the Indian penal code IPC 1860 addresses cybercrime? [10]

Q.5 a) Discuss basic security precautions to be taken to safeguard Laptops and wireless devices. [10]

b) What is E-contract? Discuss E-contract Act 1872. [10]

Q.6 Write short note on (Any 2) : [20]

- 1) Computer Sabotage.
- 2) Indian Information Technology Act 2000
- 3) Write key IT requirements for SOX and HIPAA.

(3 Hours)

[Total Marks : 80]

Note : Question No. 1 is compulsory.  
 Attempt Any Three from remaining questions.  
 Assume suitable data if required.

Q1

- A. Explain the need of automation in testing ? Differentiate between manual testing and Automated Testing 10
- B. What are Key elements of Test Management ? Explain the structure of testing group. 10

- Q2 A. Classify different types of bugs based on Software development lifecycle 10  
 B. A program reads three numbers, A, B, and C, with a range [1, 50] and prints the largest number. Design test cases for this program using equivalence class testing technique. 10

- Q3 A. Discuss verification and validation activities. 10  
 B. What is Mutation Testing ? Explain Mutation Testing Process 10

- Q4 A . Consider the program for calculating the factorial of a number. 10  
 (a) Draw the DD graph for the program.  
 (b) Calculate the individual cyclomatic complexity number for main() and fact() and then,

the cyclomatic complexity for the whole program.

```

main()
{
int number;
int fact();
1. clrscr();
2. printf("Enter the number whose factorial is to be found out");
3. scanf("%d", &number);
4. if(number < 0)
5. printf("Facorial cannot be defi ned for this number);
6. else
7. printf("Factorial is %d", fact(number));
8. }
int fact(int number)
{
int index;
1. int product =1;
2. for(index=1; index<=number; index++)
3. product = product * index;
4. return(product);
5. }
    
```

- B. What is Test Plan ? Explain Different components of Test plan document. 10



Q5 A. Explain challenges in Agile Testing **10**  
B. Comment on regression testing process. **10**

Q6. **20**  
Write Short Note on following

- A. Test point analysis
- B. Unit testing and Integration testing
- C. Bug Lifecycle
- D. McCall's Quality Factors and Criteria

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3 Hours

Total: 80 marks

- N.B:** (1) Question no 1 is compulsory  
 (2) Attempt any **three** out of remaining **five** questions  
 (3) Figures to the right indicate full marks  
 (4) Assume Suitable data if necessary  
 (5) Notations carry usual meaning

**Q.1** Answer **any four** of the following questions:

a) Write the dual of the following LPP

**Maximise  $Z = 4x_1 + 2x_2$**

Subject to ,

$x_1 - 2x_2 \geq 2$

$x_1 + 2x_2 = 8$

$x_1 - x_2 \leq 10$

Where  $x_1 \geq 0, x_2$  is unrestricted in sign.

**(05)**

b) What are assumptions made in game theory

**(05)**

c) Write short note on special cases in Linear Programming Problem.

**(05)**

d) Enlist assumptions in sequencing problem.

**(05)**

e) Briefly explain Monte Carlo simulation with suitable example.

**(05)**

**Q.2** a) Solve by Simplex Method:

Maximize  $Z = 3x_1 + 2x_2$

Subject to

$x_1 + x_2 \leq 4,$

$x_1 - x_2 \leq 2$

Where  $x_1, x_2 \geq 0$

**(10)**

b) Workers come to tool store room to receive special tools (required by them) for accomplishing a particular project assigned to them. The average time between two arrivals is 60 seconds and the arrivals are assumed to be in Poisson distribution. The average service time (of tool room attendant) is 40 seconds. Determine

- 1) Average queue length
- 2) Average length of non empty queue
- 3) Average number of workers in system
- 4) Mean waiting time of an arrival
- 5) Average waiting time of an arrival (worker) who waits.

**(10)**

**Q.3** a) Solve the following by Vogel's Approximation Method (VAM) and find optimal transportation plan. **(10)**

	<b>D<sub>1</sub></b>	<b>D<sub>2</sub></b>	<b>D<sub>3</sub></b>	<b>D<sub>4</sub></b>	<b>Supply</b>
<b>S<sub>1</sub></b>	19	30	50	10	<b>7</b>
<b>S<sub>2</sub></b>	70	30	40	60	<b>9</b>
<b>S<sub>3</sub></b>	40	8	70	20	<b>18</b>
<b>Demand</b>	<b>5</b>	<b>8</b>	<b>7</b>	<b>14</b>	

b) Iyengar Bakery keeps stock of a popular brand of cake. Previous experience indicates the daily demand as given here: **(10)**

<b>Daily Demand</b>	0	10	20	30	40	50
<b>Probability</b>	0.01	0.20	0.15	0.50	0.12	0.02

Consider the following sequence of random numbers:  
**48,78,19,51,56,77,15,14,68,09**

Using this sequence simulate the demand for the next 10 days. Find out the stock situation if the owner of the bakery decided to make 30 cakes every day. Also estimate the daily average demand for this cake on the basis of simulated data.

**Q.4** a) Solve the following Assignment Problem. **(10)**

<b>Contractors</b>	<b>Cost of Repairs (Rs.in Lakhs) of Roads</b>			
	<b>R<sub>1</sub></b>	<b>R<sub>2</sub></b>	<b>R<sub>3</sub></b>	<b>R<sub>4</sub></b>
<b>C<sub>1</sub></b>	9	14	19	15
<b>C<sub>2</sub></b>	9	17	20	19
<b>C<sub>3</sub></b>	9	18	21	18
<b>C<sub>4</sub></b>	10	12	18	19
<b>C<sub>5</sub></b>	10	15	21	16

**Rs.50 Lakhs is total cost of repair.**

- 1) Find the best way of assigning the repair work to the contractors and cost.
- 2) If it is necessary to seek supplementary grants, then what should be the amount?
- 3) Which of the 5 contractors will be unsuccessful in his bid?

b) A distance network consists of eleven nodes which are distributed as shown in following table. Find the shortest path from node 1 to node 11 using dynamic programming. The corresponding distance are: **(10)**

<b>Arc</b>	<b>Distance</b>	<b>Arc</b>	<b>Distance</b>
1-2	8	5-8	12
1-3	7	5-9	7
1-4	1	6-9	9
2-5	5	7-9	6
3-5	9	7-10	13
3-6	2	8-11	4
3-7	8	9-11	2
4-7	10	10-11	15

**Q.5** a) A and B play a game in which each has three coins a 5p, a 10p and 20p. Each player selects a coin without the knowledge of the others choice. If the sum of the coin is an odd amount, A wins B's coin; if the sum is even, B wins A's coin. Find the best strategy for each player and the value of the game. **(10)**

b) Solve by **Big-M or Charne's Penalty Method** **(10)**

**Maximize**  $Z = 4x_1 + x_2$   
 Subject to  $3x_1 + x_2 = 3$   
 $4x_1 + 3x_2 \geq 6$   
 $x_1 + 2x_2 \leq 4$   
 Where  $x_1, x_2 \geq 0$

**Q.6** a) A book binder has one printing press, one binding machine and the manuscript of number of different books. The time required to perform the printing and binding operation for each book are given below. Determine the order in which book should be processed, in order to minimise the total time required to turn out all the books. Also find the idle time of binding machine. **(10)**

Books	1	2	3	4	5	6
Printing time (hr)	30	120	50	20	90	110
Binding time (hr)	80	100	90	60	30	10

b) Mini Computer Company purchases a component of which it has a steady usage of 1000 units per year. The ordering cost is Rs.50 per order. The estimated cost of money invested is 25% per year. The unit cost of the component is Rs.40. Calculate the optimal ordering policy and total cost of inventory system, including purchase cost of the components. If the component supplier agrees to offer price discounts of minimum lot supplies as per schedule given below, reassess the decision on optimal ordering policy and total cost. **(10)**

Lot size	Price
Upto 149	Rs.40
150-499	Rs.39
500 or More	Rs.38

-----The End-----

Time: 3 Hours

Marks: 80

- N:B** (1) Question 1 is Compulsory.  
(2) Attempt any three from the remaining questions.  
(3) Figures to the right indicate full marks.

- Q.1** Attempt any four **5\*4=20M**  
**A** What is information system? Explain the necessary element with neat diagram  
**B** Define Big Data and discuss its basic characteristics?  
**C** Explain the Ethical issues and threats of information security?  
**D** Describe how social computing inspires customer service  
**E** Differentiate between computer network wired and wireless technology

- Q.2 A** List the types of Information system? Explain in brief **10M**  
**B** Discuss competitive advantage achieved in Information System **10M**

- Q.3 A** Explain the architecture of Data mart and Data warehouse in an organization **10M**  
**B** Discuss the Impact of BI on Decision Making. **10M**

- Q.4 A** What are the potential benefit of social commerce to the customers and to the business? **10M**  
**B** What are major security threats to the information system? Discuss the measures taken to control information security. **10M**

- Q.5 A** Discuss the significance of social computing in marketing in detail **10 M**  
**B** What are the functional areas of Information system. Explain in detail **10 M**

- Q.6 A** Define CRM. Describe the different types of CRM **10M**  
**B** Design MIS for the Educational System **10M**

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