

BE/ETRX/SEM-VII/C-2019/DEC. 2023

Duration: 3hrs

[Max Marks:80]

- N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1 Attempt any FOUR (4*5=20)

[20]

- a Draw SCR characteristics and Define Holding and Latching current.
- b What is a cycloconverter? Give some of its industrial applications.
- c IGBT is superior to BJT and power MOSFET: Justify.
- d Draw and explain a basic gate drive circuit for TRIAC.
- e What is pulse width modulation? List the various PWM techniques in inverter.

2 a Explain the effect of source inductance on the performance of a single phase fully controlled bridge converter. Derive expression of output voltage and current. [10]

b Explain the need of commutation in SCR. What are different methods of commutation of SCR. Explain any one force commutation method in detail. [10]

3 a Describe the basic structure of IGBT and Explain the V-I characteristics. [10]

b What is the need of triggering circuits? Draw synchronized UJT triggering circuit for SCR. Describe it briefly with relevant voltage and current waveforms. [10]

4 a Write short note on protection of SCR against di/dt , dv/dt overcurrent and overvoltage. [10]

b Explain continuous mode fly-back converter. Derive the relation for load voltage. [10]

5 a List the advantages and disadvantages of the Buck and Boost converter. [10]

b Explain the working of single phase to single phase cycloconverter with circuit diagram and waveforms. [10]

6 a Explain the principle of operation of on-off controlled AC voltage controller [10]

b Explain the operation of single phase bridge inverter with the help of voltage and current waveform for resistive load. [10]

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Time:(3 Hours)

Total Marks : 80

Note

1. Question No. 1 is compulsory
2. Attempt any three questions from remaining five question
3. Figures to the right indicate full marks

Q.1 Solve any 4 out of 6

(20)

- 1) What are characteristics of IoT based system (5)
- 2) Explain various communication models in IoT. (5)
- 3) Compare HTTP with MQTT protocol (5)
- 4) Explain different types of OLTP (5)
- 5) Illustrate process specification and service model for IoT based. home automation (5)
- 6) What are different REST constraints? (5)

Q.2 a) Explain various sensors and actuators in IoT based systems

(10)

b) Explain the RFID IoT Network Architecture with its application and Security challenges.

(10)

Q.3 a) What is data analytics and explain various methods of the same in IoT

(10)

b) What are the services offered by cloud support your answer with examples.

(10)

Q.4 a) Describe the architecture of COAP protocol, its features and message types associated with it.

(10)

b) How is data organized in IoT based systems and what are different ways of organizing data?

(10)

Q.5 a) Explain the MQTT protocol with an example highlighting the functions of broker.

(10)

b) Describe Tomography and layered attacker model in IoT

(10)

Q.6 Write Short notes on any 4 out of 5

(20)

- a. Features of Beaglebone and PcDUINO
- b. Need of security in IoT based system
- c. Business process and Business Intelligence
- d. XMPP protocol
- e. level 1 of designing in IoT

G.P. code

38993

Time: 3 hours

Max. Marks: 80

- N.B.: (1) Question No. 1 is Compulsory.
 (2) Attempt any three questions out of the remaining four.
 (3) Each question carries 20 marks and sub-question carry equal marks.
 (4) Assume suitable data if required.

- Q.1. 20
- A Explain structure of goal based agent. 5
 - B List properties of environment. Give suitable examples. 5
 - C Explain, in brief, performance evaluation measures of search algorithms. 5
 - D Define following terms with respect to Genetic Algorithm: Initial 5
 - population
 - Fitness function
 - Selection
 - Crossover
 - Mutation
- Q.2. 20
- A Explain depth first search algorithm. Discuss merits and demerits of depth 5
 - first search algorithm.
 - B What is alpha-beta pruning. Give suitable example. 5
 - C A* algorithm is complete and optimal. Justify. 5
 - D Explain Hill climbing algorithm with challenges. 5
- Q.3. 20
- A Explain forward chaining algorithm. Also, discuss how limitations of 10
 - forward chaining algorithm are addressed in backward chaining algorithm.
 - B Look at the following sentences and decide for each if it is valid, 5
 - unsatisfiable, or neither.
 - Smoke \Rightarrow Smoke
 - Smoke \Rightarrow Fire
 - (Smoke \Rightarrow Fire) \Rightarrow (\neg Smoke \Rightarrow \neg Fire)
 - Smoke \wedge Fire \wedge \neg Fire
 - (Big \wedge Dumb) \vee \neg Dumb
 - C How you will represent change in world using FOPL. 5

p. code

40308

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Paper / Subject Code: 42575 / Artificial Intelligence (DLOC - III)

- Q.4. A What is partial order planning? Explain with suitable example. 5
- B Explain the architecture of an Expert system in detail. 10
- C Explain the terms: Prior and Posterior probability. How these probabilities can be used for handling uncertainty? 5
- Q.5. 20
- A Discuss inference using full joint distribution with suitable example. 10
- B Consider the following problem: 10
- The law says that it is a crime for an American to sell weapons to hostile nations. The country Nono, an enemy of America, has some missiles, and all of its missiles were sold to it by Colonel West, who is American.
- Prove that West is criminal using backward chaining.
- Q.6. Write short note on 20
- A Structure of an artificial agent. 5
- B Reinforcement learning. 5
- C Bayesian belief network. 5
- D Issues in knowledge representation 5

(3 Hours)

Marks: 80

NB: (1) Question No.1 is compulsory.

(2) Attempt any **three** out of remaining **five** questions

(3) Assume suitable data, if necessary.

- Q.1 (a) Explain Trunking and Grade of service in cellular communication. (5)
(b) Discuss GSM Hand-off procedures (5)
(c) What is smart Antenna system (5)
(d) Compare Indoor and Outdoor radio propagation Models (5)
- Q.2 (a) Analyze Factors influencing small scale fading in multipath propagation. (10)
(b) Explain Downlink and Uplink physical-layer processing in 4G. (10)
- Q.3 (a) Explain routing protocol in Wireless Sensor Networks. (10)
(b) Explain working of Software defined radio. (10)
- Q.4 (a) Explain contention based protocols in MANETs. (10)
(b) Analyze various Limitations of 3G and how are they overcome in 4G (10)
- Q.5 (a) Explain General Packet Radio Services (GPRS) system architecture. (10)
(b) Explain white holes in Cognitive radio. (10)
- Q.6 Write in detail on any **four** of the following: (20)
(a) Doppler shift
(b) IS95 Physical and Logical Channels
(c) Multicast routing in MANET
(d) W-CDMA
(e) The use of Directional antenna.

G. R. Kodre
33130

Duration: 3hrs

[Max Marks:80]

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(2) Attempt any three questions out of the remaining five.
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(4) Assume suitable data, if required and state it clearly.

- 1 Attempt any **FOUR** [20]
- a What are different facets of data science? 5
 - b Explain different data cleaning and data transformation techniques. 5
 - c What is the difference between business intelligence and data science? 5
 - d Explain the various Data science tools. 5
 - e Explain numerical and categorical variables. 5
- 2 a Elaborate and explain all the steps of the Data Science Process. 10
- b Explain Distributed File system and Hadoop. 10
- 3 a Explain applications of machine learning in data science. 10
- b Explain SVM and decision tree Algorithm. 10
- 4 a There are 2 stocks X and Y. Their share prices on particular days are as follows. 10

Sr No	Stock X	Stock Y
1	58	7
2	50	8
3	53	8
4	45	9
5	60	5

Find out the (R^2) correlation coefficient from the given data.

- b Compare NoSQL database and traditional RDBMS. Explain the architecture of Graph based NoSQL databases. 10
- 5 a Explain CAP Theorem, BASE principles and applications of NoSQL databases. 10
- b Explain fraud detection and stock price prediction in detail. 10
- 6 a Explain Recommendation system in detail. 10
- b Write short note on any two : 10
- 1. Naive Bayes Algorithm
 - 2. Sentiment analysis
 - 3. Information Gain and Entropy

G.P. Code

42150

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- 1 Attempt any FOUR [20]
a Explain how criminals plan the attack
b Explain various security challenges posed by mobile devices
c Explain need of Cyber law in India
d Explain E-contracts and its different types.
e What are Botnets? How it is exploit by attacker to cause cyber-attack?
- 2 a Explain the classification of cybercrimes with examples. [10]
b Explain Phishing and Identity theft in detail. [10]
- 3 a Explain different buffer overflow attacks also explain how to mitigate buffer overflow attack [10]
b Explain electronic banking in India and what are laws related to electronic banking in India [10]
- 4 a What do you understand by DOS and DDOS attack? Explain in detail. [10]
b Write a note on Intellectual Property Aspects in cyber law. [10]
- 5 a Explain SQL injection attack. State different countermeasure to prevent the attack. [10]
b Explain the objectives and features of IT Act 2000 [10]
- 6 a Explain the term evidence and different types of evidences [10]
b Write key IT requirements for SOX and HIPAA. [10]

E.P. code

33595