R3657

Sub. Code
546301

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2025

Third Semester

Information Technology

INTERNET OF THINGS

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Which of the following is false about IoT devices? (CO1, K1)
   (a) IoT devices use the internet for collecting and sharing data
   (b) IoT devices need microcontrollers
   (c) IoT devices use wireless technology
   (d) IoT devices are completely safe

2. Which of the following is not an IoT platform? (CO1, K1)
   (a) Amazon Web Services
   (b) Microsoft Azure
   (c) Salesforce
   (d) Flipkart

3. Which of the following is not an application of IoT? (CO2, K2)
   (a) BMP280 (b) Smart home
   (c) Smart city (d) Self-driven car

4. What is the component of an IoT system that executes a program? (CO2, K2)

(a) A sensor

(b) A microcontroller

(c) An actuator

(d) A digital to analog converter

5. Which layer is used for wireless connection in IoT devices? (CO3, K3)

(a) Application layer (b) Network layer

(c) Data link layer (d) Transport layer

6. Which of the following protocol is used to link all the devices in the IoT? (CO3, K3)

(a) HTTP (b) UDP

(c) Network (d) TCP/IP

7. How many number of elements in the Open IoT Architecture? (CO4, K4)

(a) 3 elements (b) 7 elements

(c) 8 elements (d) 6 elements

8. Which of the following is not a feature of the Raspberry PI model B IoT device? (CO4, K4)

(a) It has 256 MB SDRAM

(b) It has a single USB connector

(c) It has its own operating system

(d) It has an Ethernet port

9. Which library is used to access 12C in Arduino IoT devices? (CO5, K5)

(a) EEPROM (b) Wire

(c) DHT11 (d) ArduinoJson

10. What is the standard form of RFID? (CO5, K5)

(a) Radio Frequency Identification

(b) Radio Waves Frequency Identification

(c) Radio Frequency Interdependent

(d) Radio Wave Frequency Independent

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Explain in detail about IoT functional blocks with a neat diagram. (CO1, K1)

Or

(b) Discuss about loT enabling technologies. (CO1, K1)

12. (a) Write a short note on OGC architecture? (CO2, K2)

Or

(b) Discuss about M2M High level ETSI architecture. (CO2, K2)

13. (a) Illustrate the standardized protocols of IoT. (C03, K3)

Or

(b) Summarize the BACNet protocol with a suitable example. (CO3, K3)

14. (a) Compare and contrast different Raspberry Pi interfaces with an example. (CO4, K4)

Or

(b) Write a short note on Arduino and classify the embedded devices in IoT. (CO4, K4)

15. (a) Illustrate the key features of smart grid. (CO5, K5)

Or

(b) Discuss about the real-world design constraints in IoT with suitable examples. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Describe Software Defined Network and Network Function Virtualization for IoT in detail. (CO1, K1)

Or

(b) Discuss in detail about IoT system management with a suitable example. (CO1, K1)

17. (a) Explain in detail about IoT reference model with neat diagram. (CO2, K2)

Or

(b) Outline the IoT Design Methodologies in detail with neat diagram. (CO2, K2)

18. (a) Explain Zigbee architecture with neat diagram. (CO3, K3)

Or

(b) Describe the working flow of COAP security with neat diagram. (CO3, K3)

19. (a) Illustrate the building blocks of Raspberry Pi with an example. (CO4, K4)

Or

(b) Explain the work flow of Raspberry Pi on Linux. (CO4, K4)

20. (a) Discuss about Amazon web services using IoT with suitable examples. (CO5, K5)

Or

(b) Discuss software and management tools for IoT cloud storage models. (CO5, K5)

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R3658

Sub. Code
546302

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2025

Third Semester

Information Technology

BIG DATA ANALYTICS AND R PROGRAMMING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Complexity of data types. new data sources, formats and structures constitute one of the characteristic Vs of Big Data called _____. (CO1, K2)

   (a) Value

   (b) Volunteer computing

   (c) Variety

   (d) Variance

2. _____ architectures, shortly called as MPP enable parallelized data ingest and analysis and so are widely preferred to process complex data. (CO1, K3)

   (a) Maximum power point

   (b) Massively parallel processing

   (c) Management power protection

   (d) Both (a) and (b)

3. What is a generic function in R? (CO2, K3)

(a) A function that can only be used with specific data types

(b) A function that behaves differently depending on the arguments it receives

(c) A function that is used for plotting only

(d) A function that is not commonly used

4. By default, read.delim() function expects the column separator to be a _____. (CO2, K3)

(a) $ (b) \\

(c) \i (d) \t

5. A heuristic using the _____ metric (shortly known as WSS) is examined to determine a reasonably optimal value of k in K-Means. (CO3, K3)

(a) Within Sum of Squares (WSS)

(b) Wilcoxon Standard Sum (WSS)

(c) Both (a) and (b)

(d) Weighted Sum Statistic (WSS)

6. _____ is defined as the measure of certainty or trustworthiness associated with each discovered (Apriori) candidate rule. (CO3, K4)

(a) Lift (b) Confidence

(c) Leverage (d) Both (a) and (c)

7. rpart.plot() function can _____. (CO4, K4)

(a) diagrammatically part the right and left part of a table

(b) visually represent the output in a decision tree

(c) plot only the residual part of logistic regression model

(d) both (a) and (b)

8. ID3 algorithm stands for _____. (CO4, K4)

(a) Iterative Dichotomiser 3

(b) interactive Decision 3

(c) Iterative Distribution 3

(d) Interactive Distribution 3

9. Apache Pig consists of a data flow language called as _____. (CO5, K5)

(a) Pig Latin

(b) Pg French

(c) Pig lang

(d) Both (a) and (c)

10. YARN stands for _____. (CO5, K4)

(a) Yet Analytic Reduced Notations

(b) Yet Applied Rastor Numerals

(c) Yet Another Resource Negotiator

(d) Yet Actual Response Negotiator

Part B

(5 × 5 = 25)

Answer **all** the following questions not more than 500 words each.

11. (a) List and elaborate on the various roles and key stakeholders of an analytics project. (CO1, K3)

Or

(b) Compare Business Intelligence (BI) and Data Science. (CO1, K2)

12. (a) Illustrate with diagrams, the function in R used for visualizing a single variable. (CO2, K3)

Or

(b) Explain the process of hypothesis testing. Illustrate with an example of one of the statistical tests in R programming. (CO2, K4)

13. (a) What is market basket analysis and explain other applications of association rules? (CO3, K5)

Or

(b) Describe the terms: (CO3, K4)

(i) Multicollinearity

(ii) ROC Curve

(iii) Log-likelihood ratio test

(iv) Null and residual deviance

(v) Pseudo – R squared

14. (a) What is Bayes' theorem? Illustrate with numerical examples. (CO4, K5)

Or

(b) Give a brief account on ID3 algorithm and C4.5. (CO4, K4)

15. (a) Explain HDFS and its java daemons used to manage data access. (CO5, K5)

Or

(b) What is NoSQL? Elaborate. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** the following questions not more than 1000 words each.

16. (a) Illustrate the main phases of the data analytics life cycle with explanation. (CO1, K2)

Or

(b) Answer both the following: (CO1, K3)

(i) Explain the four various types of data structures in the big data

(ii) Brief any 3 Vs of Big data

17. (a) Explain the process of importing a CSV file into R using theread.csv()function. Illustrate with examples about how to store the imported dataset in a variable and importance of functions that can be used to examine the dataset about its statistics and distribution. (CO2,K3)

Or

(b) Discuss about the following R data types: (CO2, K4)

(i) Numeric, Character and Logic data types

(ii) Vectors

(iii) Arrays and matrices

(iv) Data Frames

(v) Lists

18. (a) What are the various diagnostic considerations for linear regression model? (CO3, K5)

Or

(b) What are the prior and additional considerations to be taken into account regarding K-Means?(CO3, K4)

19. (a) Elaborate on Naïve Bayes classifier with spam-filtering numerical example. (CO4, K5)

Or

(b) Summarise text analysis steps with an example. (CO4, K4)

20. (a) Elaborate on Hadoop-related Apache projects. (CO5, K5)

Or

(b) Summarise about SQL: joins, grouping extensions and set operations. (CO5, K4)

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R3659

Sub. Code
546303

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2025

Third Semester

Information Technology

MACHINE LEARNING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the questions by choosing the correct option.

1. What is the primary goal of supervised learning? (CO1, K2)

   (a) To discover hidden patterns in data

   (b) To predict labels for unseen data based on labeled training data

   (c) To train without labeled data

   (d) To interact with an environment to maximize a reward

2. Identify an example of unsupervised learning. (CO1, K3)

   (a) Spam email detection

   (b) Predicting house prices

   (c) Clustering customers into segments

   (d) Image classification

3. Which of the following is true for linear discrimination models? (CO2, K3)

(a) They separate data using non-linear boundaries

(b) They require input features to be independent

(c) They aim to separate classes using a linear decision boundary

(d) They cannot be applied to high-dimensional data

4. In a two-class linear discriminant, the decision boundary is determined by : (CO2, K3)

(a) A quadratic equation

(b) A hyperplane

(c) A circular decision region

(d) A cubic polynomial

5. Pick the statement that is true about polynomial regression. (CO3, K3)

(a) It is limited to linear relationships between variables

(b) It introduces polynomial terms to model non-linear relationships

(c) It does not require feature scaling

(d) It is less prone to overfitting compared to linear regression

6. In logistic regression, the output is : (CO3, K2)

(a) A continuous value between 0 and 1

(b) A class label directly

(c) A discrete integer

(d) A probability of being exactly 1 or 0

7. Deep networks outperform shallow networks in tasks that involve : (CO3, K4)

(a) Large datasets with simple patterns

(b) Small datasets with clear separable boundaries

(c) Complex hierarchical patterns in data

(d) Low computational resources

8. Which operation is specific to CNNs? (CO4, K4)

(a) Feature pooling

(b) Matrix multiplication

(c) Recursive processing

(d) Dropout regularization

9. Object detection differs from image classification because it : (CO5, K4)

(a) Predicts bounding boxes and labels for objects

(b) Labels the entire image with a single category

(c) Focuses on pixel-level accuracy

(d) Requires no training data

10. Which deep learning model is commonly used for image segmentation? (CO5, K5)

(a) ResNet

(b) UNet

(c) GAN

(d) LSTM

Part B (5 × 5 = 25)

Answer **all** the following questions not more than 500 words each.

11. (a) Compare and contrast the different types of machine learning (Supervised, Unsupervised, Semi-Supervised, and Reinforcement Learning) with real-world examples. (CO1, K3)

Or

(b) Explain the role of Decision Theory in machine learning, with examples. (CO1, K3)

12. (a) Describe the principle of logistic discrimination and how it differs from simple linear regression. (CO2, K3)

Or

(b) Elaborate the process of Self-Organizing Maps (SOM) and how it can be used for dimensionality reduction. (CO2, K2)

13. (a) Explain the working of Random forest with diagram. (CO2, K4)

Or

(b) Describe the working of the Adaboost algorithm and its role in boosting weak learners. (CO3, K5)

14. (a) Demonstrate how Multilayer Perceptron (MLP) works explain with its Architecture. (CO4, K5)

Or

(b) Highlight the main differences between deep and shallow networks. (CO4, K4)

15. (a) How does object detection work in deep learning? Describe its key techniques. (CO5, K5)

Or

(b) Explain the concept of image segmentation in deep learning. How does deep learning enable more accurate segmentation compared to traditional methods? (CO5, K4)

Part C ($5 \times 8 = 40$)

Answer **all** the following questions not more than 1000 words each.

16. (a) Describe the concepts of pattern recognition, classification, and regression in machine learning. How do they relate to each other? (CO1, K2)

Or

(b) Discuss the role of statistics and probability theory in addressing the challenge of turning data into probability in machine learning. (CO1, K3)

17. (a) Describe the geometry of the linear discriminant analysis. (CO2, K2)

Or

(b) Discuss the gradient descent algorithm. How does it optimize decision boundaries? (CO2, K4)

18. (a) Analyze polynomial regression and how does it extend the concept of linear regression? (CO2, K4)

Or

(b) Explain Linear and Logistic regression. (CO2, K4)

19. (a) Discuss the concepts of Autoencoders, Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs). (CO4, K5)

Or

(b) Summarize the applications of Generative Adversarial Networks (GANs) and explain how they differ from traditional generative models. (CO4, K5)

20. (a) Discuss LSTM models for video-to-text translation. (CO5, K5)

Or

(b) Explain the architecture of GANs and how they are used in image Generation. (CO5, K5)

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R3660	Sub. Code 546509

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2025

Third Semester

Information Technology

Elective – ADVANCED NETWORK SECURITY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Which of these is a part of network identification? (CO1, K1)

   (a) UserID

   (b) Password

   (c) OTP

   (d) fingerprint

2. The process of verifying the identity of a user. (CO1, K1)

   (a) Authentication

   (b) Identification

   (c) Validation

   (d) Verification

3. An algorithm in encryption is called _____ (CO2, K2)

(a) Algorithm (b) Procedure

(c) Cipher (d) Module

4. In asymmetric key cryptography, the private key is kept by _____ (CO3, K4)

(a) sender

(b) receiver

(c) sender and receiver

(d) all the connected devices to the network

5. Which one of the following algorithm is not used in asymmetric-key cryptography? (CO4, K5)

(a) rsa algorithm

(b) diffie-hellman algorithm

(c) electronic code book algorithm

(d) dsa algorithm

6. Message authentication code is also known as (CO3, K2)

(a) key code

(b) hash code

(c) keyed hash function

(d) message key hash function

7. Which one of the following is not an application hash functions? (CO1, K1)

(a) One-way password file

(b) Key wrapping

(c) Virus Detection

(d) Intrusion detection

8. What is a one-way password file? (CO2, K3)

(a) A scheme in which the password is jumbled and stored

(b) A scheme in which the password is XOR with a key and stored

(c) A scheme in which the hash of the password is stored

(d) A scheme in which the password is passed through a PRF, which is then stored

9. Which of the following is an objective of network security? (CO1, K1)

(a) Confidentiality (b) Integrity

(c) Availability (d) All of the above

10. Which of the following is/are the types of firewall? (CO3, K3)

(a) Packet Filtering Firewall

(b) Dual Homed Gateway Firewall

(c) Screen Host Firewall

(d) Dual Host Firewall

Part B (5 × 5 = 25)

Answer **all** the following questions not more than 500 words each.

11. (a) Discuss about the Security attacks with an example. (CO1, K1)

Or

(b) Explain the need for security at multiple level with a real time example. (CO1, K5)

12. (a) Compare linear cryptanalysis and differential cryptanalysis. (CO2, K2)

Or

(b) Explain the concept of key distribution in public key cryptography with an example. (CO2, K3)

13. (a) Describe the Chinese remainder theorem in detail. (CO3, K3)

Or

(b) Write a short note on Euler's Totient function with an example. (CO3, K3)

14. (a) Compare MAC and Hash function in detail with examples. (CO4, K5)

Or

(b) Illustrate the properties of Digital signatures and Authentication protocols in detail. (CO4, K4)

15. (a) Write the concept of IP security and Web security in detail. (CO1, K1)

Or

(b) Classify the malicious software in detail with a suitable example. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** the following questions not more than 1000 words each.

16. (a) Describe in detail about OSI security Architecture. (CO2, K1)

Or

(b) Illustrate various classical Encryption techniques. Give suitable example. (CO1, K2)

17. (a) Explain Advanced Encryption Standard with a neat diagram. (CO2, K2)

Or

(b) Briefly explain about Block cipher principles of DES with an example. (CO3, K3)

18. (a) Explain ElGamal Encryption public key cryptosystem with a neat diagram and example. (CO3, K4)

Or

(b) Explain in briefly about Diffie Heliman key exchange. (CO3, K4)

19. (a) Describe in detail about RSA algorithm for encryption and decryption with an example. (CO2, K2)

Or

(b) Explain about Entity Authentication with real time example. (CO5, K5)

20. (a) Explain about PGP encryption software program in detail with example. (CO5, K3)

Or

(b) Illustrate how can businesses and individuals protect from Intruders. (CO5, K5)

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