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END SEMESTER EXAMINATION, JUNE- 2025**B. Tech. (Hons.) CSE in AI/DS Semester - VI****Course Name: Internet of Things (IoT)****Course Code: CS603T****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1 Attempt all.****(10×2=20)**

QN	Questions	CO	PO
a.	Name one programming language used in IoT.	2	1,2,5
b.	True/False: The Internet of Things is limited to home automation.	5	1,2,5
c.	What is the function of an actuator in IoT hardware?	3	1,2
d.	What is the use of sensors in smart cities?	5	1,2,5
e.	Which one is not an embedded platform? a) Arduino b) Raspberry Pi c) Intel Galileo d) Microsoft Word	4	1,2,5
f.	Name a tool used for Arduino coding.	4	1,2,5
g.	RFID stands for.....	3	1,2,5
h.	The _____ station is the final destination where WSN data is collected and processed.	3	1,2,5
i.	Which of the following is an example of IoT in agriculture? a) Smart Irrigation b) Email system c) Online Banking d) Video Conferencing	5	1,2,5
j.	Name one wireless communication technology used in IoT.	2	1,2,5

Q.2 Attempt any five out of Seven**(5 x 4=20)**

QN	Questions	CO	PO
a.	How does the memory organization differ between Von Neumann and Harvard architectures?	1	1,2,3
b.	Write a short note on smart city automation.	5	1,2,5
c.	Explain IoT technology and framework.	2	1,2,3
d.	Describe Raspberry Pi and its use.	5	1,2,5
e.	Discuss communication protocols in IoT.	2	1,2,5
f.	Explain Arduino emulator usage.	4	1,2,5
g.	Write a short note on tablets in IoT systems.	3	1,2,5

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Q.3 Attempt any three out of four

(3 x 10=30)

QN	Questions	CO	PO
a.	Comment on wireless sensor networks. Explain different types of WSNs.	3	1,2,5
b.	Compare and contrast the request-response, publish-subscribe, and push-pull communication models in IoT in terms of architecture, scalability, and real-world applications.	2	1,2,5
c.	How can you categorize the different addressing modes in IoT networks and explain their role in ensuring effective data transmission?	1	1,2
d.	How would you compare the features of M2M communication, such as direct device communication, low-power consumption, and scalability, with traditional communication methods in IoT?	2	1,2,5

Q.4 Attempt any two out of three

(2 x 15=30)

Q N	Questions	CO	PO
a.	(i) Elaborate on the core technologies that power IoT systems, such as sensors, communication protocols, and cloud computing, and analyze how they contribute to the overall functionality of IoT networks."	1	1,2,3
	(ii) Explain the concept of fog computing and edge computing.	2	1,2,5
b.	(i) Compare and contrast the features of popular IoT boards such as Arduino, Raspberry Pi, and ESP32, and analyze their suitability for different IoT applications.	5	1,2,5
	(ii) Compare Cortex-A, Cortex-R, and Cortex-M families of ARM cortex.	4	1,2,5
c.	(i) Discuss the role of IoT in healthcare (e-health) and home automation. Provide examples of devices, data communication, and potential benefits in each domain.	5	1,2,5
	(ii) Elaborate on the usage of RFID along with the working principle.	3	1,2,5

Enrol. No. **S R H U** Regn. No. **D D** **END SEMESTER EXAMINATION, JUNE- 2025****B. Tech. (Hons.) CSE in AI/DS & ML Semester - VI****Course Name: NoSQL Database****Course Code: CS601T**

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objectives Type (Very short/MCQ, Fill in the Blank, True/ False) Attempt all.
(10×2=20)

QN	Questions	CO	PO
a.	What is the \$push & \$pull operator used for?	3	1
b.	Define event-driven consistency	2	2
c.	List two aggregation operators used in MongoDB.	3	2
d.	Define a distributed database	2	1
e.	What is a keypace?	4	1
f.	Define information system	5	1
g.	What is the role of document in MongoDB?	3	2
h.	Name any two NoSQL query languages	2	1
i.	Define adjacency matrix.	5	2
j.	Name two graph database.	5	1

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)
(5×4=20)

a.	Explain BASE vs ACID.	2	2
b.	How is data partitioned in columnar databases?	3	1
c.	Compare & Contrast document and key-value databases.	2	1,2
d.	Describe the use of \$lookup in MongoDB aggregation.	3	2
e.	How do graph databases help in recommendation systems	5	1
f.	What is the significance of MapReduce in NoSQL?.	2	1
g.	What is the purpose of _id in MongoDB?	3	2

Q.3. Structured Question (Attempt any three out of four)
(3×10=30)

a.	How do you perform CRUD operations in Redis?	2	3
b.	(i) Write the advantages of document databases. (ii) Write a MongoDB script to: 1. Create a database and collection 2. Insert 5 student documents 3. Retrieve all documents sorted by name	3	1,3
c.	Describe in detail the structure of a graph database and how relationships are stored.	5	2
d.	Compare and contrast RDBMS and NoSQL databases with practical examples.	1	1,2

Q.4. Long Answer / Essay type (Attempt any two out of three)

(2×15=30)

a.	(i) Describe the advantages and disadvantages of columnar models. (ii) Write a columnar data file using Cassandra to create a Column-family store and insert data.	4	3
b.	(i) Explain key components of the ER model (entities, relationships, attributes, keys). (ii) Draw an ER diagram for a university database with Students, Courses, and Instructors	1	1,3
c.	(i) Define key-value databases and explain their structure with an example. (ii) Using Redis write basic commands to set, get, update, and delete a key-value pair.	2	3

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END SEMESTER EXAMINATION, JUNE- 2025**B. Tech.(Hons.) CSE AI/DS Semester - VI****Course Name: Cryptography and Network Security****Course Code: CS602T****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Objectives Type (Very short/, MCQ, One-liners, Fill in the Blank, True/ False) Attempt all. (10×2=20)**

QN	Questions	CO	PO
a.	What network device directs traffic?	2	1
b.	What kind of software identifies malware?	2	1
c.	What network model uses layered architecture?	2	1
d.	What layer in OSI handles encryption?	4	1
e.	What layer of OSI handles routing?	2	1
f.	What is plaintext converted into during encryption?	3	1
g.	What is the process of decoding ciphertext?	5	1
h.	What is used to encrypt and decrypt in symmetric cryptography?	2	1
i.	Which cryptographic method uses a public and private key?	3	1
j.	What asymmetric algorithm uses prime factorization?	3	1

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven) (5×4=20)

a.	Discuss the following (i) Security services. (ii) Security mechanisms.	2	1,2
b.	State and Describe Fermat's theorem. Evaluate $3^{21} \bmod 11$ using Fermat's theorem.	1	1,2,3,5
c.	Discuss the properties that are satisfied by modular arithmetic.	1	1
d.	Analyze the purpose of Diffie Hellman key exchange	5	1,2,3
e.	State any three requirements for authentication.	3	1
f.	List and briefly describe categories of passive and active security attacks.	3	1,2,3
g.	Explain about the model for network Security with neat diagram.	1	1,2,3

Q.3. Structured Question (Attempt any three out of four) (3×10=30)

a.	Describe RSA Algorithm. Perform encryption and decryption using RSA algorithm for $p=17$, $q=11$, $e=7$ $m=88$.	4	1,2,3,4
b.	State Chinese Remainder theorem Find X for the given set of congruent equations using CRT. $X=2 \pmod{5}$ $X=4 \pmod{7}$ $X=9 \pmod{11}$	3,5	1,2,3,4,5
c.	What do you mean by AES? Diagrammatically illustrate the structure of AES and describe the steps in AES encryption process with example.	2,4	1
d.	User A and B use Diffie-Hellman key exchange a common prime $q=71$ and a primitive root $\alpha = 7$. Calculate the following. If user A has private key $X_A=5$, what is A's public key Y_A . If user A has private key $X_B=12$, what is B's public key Y_B and what is shared secret key?	3	1,2,5

Q.4. Long Answer / Essay type (Attempt any two out of three) (2×15=30)

a.	What do you mean by AES? Diagrammatically illustrate the structure of AES and describe the steps in AES encryption process with example.	2,4	1,2,3,5
b.	Illustrate the various types of firewalls with neat diagrams.	2	1,2,3,5
c.	Explain the DES and working of DES with diagrams.	3,4	1,2,3,4,5

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END SEMESTER EXAMINATION, JUNE- 2025**B Tech (Hons.) CSE in AI/DS ML Semester- VI****Course Name: English – II****Course Code: HS601T****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Objective Type.****(Very short/ short Answer, MCQ, One-liners, Fill in the blanks, True/ False) Attempt all.****(10×2=20)**

QN	Questions	CO	PO
a.	State one advantage of using email in business communication.	2	7,8
b.	Mention two software tools commonly used for presentations.	3	7,8
c.	Why is objectivity important in technical communication?	1	7,8
d.	What is the role of visual aids in a presentation?	3	7,8
e.	How can a technical writer ensure conciseness in a report?	1	7,8
f.	State one limitation of vertical communication.	5	7,8
g.	Mention one persuasive technique used in a sales letter.	2	7,8
h.	Give one example of a non-verbal cue that differs across cultures.	4	7,8
i.	Define business etiquette.	4	7,8
j.	What does "adoption of minutes" mean in meetings?	3	7,8

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)**(5×4=20)**

QN	Questions	CO	PO
a.	Analyze the structure of an effective agenda. What key elements must it contain?	2	7,8
b.	Analyze the influence of non-verbal communication in group discussions.	3	7,8
c.	Discuss how technical writing style differs from general writing.	1	7,8
d.	Develop a set of cross-cultural communication guidelines for a team working on a global project.	5	7,8
e.	Analyze the impact of dressing, punctuality, and body language on business etiquette.	4	7,8
f.	Compose a professional email to a supplier requesting urgent delivery of inventory items.	2	7,8
g.	Examine the role of storytelling in business presentations. When and how should it be used?	3	7,8

Q.3. Structured Question (Attempt any three out of four)**(3×10=30)**

QN	Questions	CO	PO
a.	Analyze the role of technical communication in supporting decision-making, teamwork, and product development in an organization.	1	7,8
b.	Compare vertical and diagonal communication in terms of speed, clarity, and hierarchy.	5	7,8
c.	Discuss the parameters on which a company HR evaluates a candidate's performance in Group Discussion.	3	7,8
d.	Write a cover letter applying for the role of a junior marketing executive at a multinational company.	2	7,8

Q.4. Long Answer / Essay type (Attempt any two out of three)**(2×15=30)**

QN	Questions	CO	PO
a.	Critically evaluate the key skills that contribute to an effective presentation. In your answer, assess the importance of content structure, verbal and non-verbal delivery, visual support, audience interaction, and time management. Use relevant examples to support your evaluation."	3	7,8
b.	Create the outline of a technical report on the implementation of AI in customer service.	2	7,8
c.	Critically assess the role of style principles like clarity, completeness, or correctness in writing of a manual.	1	7,8

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END SEMESTER EXAMINATION, JUNE- 2025**B. Tech. (Hons.) CSE in AI/DS & ML Semester - VI****Course Name: Image Processing****Course Code: PC626T/PC616T**

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objective Type

(Very short/ short Answer, MCQ, One-liners, Fill in the blanks, True/ False) Attempt all. (10×2=20)

QN	Questions	CO	PO
a.	Explain image segmentation.	1,2	1,2,3
b.	What is region extraction?	3,4,5	4
c.	What is a pixel-based approach?	1,2	1,2,3
d.	What is a multi-level threshold?	3,4,5	4
e.	What is a local threshold?	3,4,5	4
f.	What is region-based segmentation?	1,2	1,2,3
g.	Explain edge detection.	3,4,5	4
h.	What are edge operators?	3,4,5	4
i.	Explain the pattern fitting approach.	1,2	1,2,3
j.	What is edge linking?	1,2	1,2,3

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)

(5×4=20)

QN	Questions	CO	PO
a.	What is a structuring element?	3,4,5	4
b.	What are connected components?	1,2	1,2,3
c.	Explain feature extraction? Explain in detail.	3,4,5	4
d.	What are topological attributes? Explain in detail.	1,2	1,2,3
e.	Why are geometric attributes needed?	3,4,5	4
f.	What is boundary-based description?	1,2	1,2,3
g.	What is a region-based description?	3,4,5	4

p.t.o./-

Q.3. Structured Question (Attempt any three out of four)

(3×10=)

QN	Questions	CO	PO
a.	(i) Describe the steps involved in the process of image registration. (ii) Discuss the challenges in implementing segmentation in complex images. (iii) Illustrate the application of segmentation in medical or satellite imaging.	1,2	1,2,3
b.	(i) Explain the fundamentals of color perception and its impact on image processing. (ii) Describe different color models (RGB, CMY, HSI) and their uses. (iii) Explain the conversion process between various color models.	3,4,5	4,5
c.	(i) Discuss color transformations and their applications. (ii) Describe smoothing and sharpening techniques in color image processing. (iii) Explain the process of color segmentation with examples.	1,2	1,2,3
d.	(i) Compare grayscale and color image processing. (ii) What is the role of binary images in morphological processing? (iii) Describe logical operations used in binary image processing.	3,4,5	4,5

Q.4. Long Answer / Essay type (Attempt any two out of three)

(2×15=30)

QN	Questions	CO	PO
a.	(i) Define and explain dilation and erosion with examples. (ii) Describe the opening and closing operations and their uses.	3,4,5	4,5
b.	(i) Discuss how morphological operations are used in noise removal. (ii) Explain the algorithm for boundary extraction.	1,2	1,2,3
c.	(i) Describe the process of region filling in binary images. (ii) Explain how connected components are extracted in binary images.	3,4,5	4,5

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END SEMESTER EXAMINATION, JUNE- 2025**B. Tech. (Hons.) CSE in DS & ML Semester - VI****Course Name: Big Data Analytics****Course Code: PC627T**

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objective Type

(Very short/ short Answer, MCQ, One-liners, Fill in the blanks, True/ False) Attempt all. (10×2=20)

QN	Questions	CO	PO
a.	Name the three main characteristics of Big Data.	1	1
b.	Name one tool in the Hadoop Ecosystem.	2	2
c.	What is the default block size in HDFS?	1	2
d.	What is the goal of descriptive analytics?	2	1
e.	Can HDFS be mounted like a regular file system?	3	1
f.	What is meant by "Velocity" in Big Data?	2	5
g.	What Java class is used to interact with HDFS?	3	2
h.	What is Apache Spark known for?	5	2
i.	What are the roles of DataNodes?	4	1
j.	How is Big Data different from traditional data?	3	1

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)**(5×4=20)**

QN	Questions	CO	PO
a.	Describe the evolution of Big Data and the factors that led to its emergence as a dominant data paradigm.	2	1
b.	Briefly describe any four key terminologies commonly used in Big Data environments.	1	2
c.	What are the common challenges in distributed computing that Hadoop helps to overcome?	3	2
d.	Discuss any two limitations of HDFS that affect its suitability for certain applications.	3	5
e.	Describe the roles of the Map and Reduce functions in the MapReduce programming model.	4	2
f.	List the steps involved in installing and running Pig in local or MapReduce mode.	5	1
g.	Differentiate between relational operators and evaluation functions in Pig with examples.	5	2

P.T.O./-

Q.3. Structured Question (Attempt any three out of four)

QN	Questions	CO	PO
a.	Your organization is deciding between Cloudera and MapR for a real-time analytics system that includes stream processing and tight integration with AI/ML workflows. Analyze both options and justify which distributor is more suitable for this requirement.	4	2
b.	Discuss the significance of Hive DDL in managing data warehousing tasks. Explain how DDL commands are used in creating tables, managing partitions, and modifying table schema in Hive.	5	5
c.	Discuss the features of MapReduce that make it suitable for processing large-scale datasets in a distributed environment.	4	2
d.	In an HDFS environment, a job fails due to a DataNode failure. Explain the steps that HDFS takes to recover from this failure. Discuss how HDFS's fault tolerance mechanism helps ensure data integrity during this process.	3	1

Q.4. Long Answer / Essay type (Attempt any two out of three)

(2×15=30)

QN	Questions	CO	PO
a.	(i) Discuss the evolution of Big Data and the factors that led to the need for distributed data processing frameworks like Hadoop. What were the limitations of traditional data processing methods? (ii) What are the key differences between RDBMS and Hadoop in terms of data storage and processing? Explain the advantages of using Hadoop over traditional databases for big data applications.	3	2
b.	(i) Describe the process of writing and reading data in HDFS. How does HDFS handle large files, and why is it optimized for write-once, read-many access patterns? (ii) What is the role of InputFormat and OutputFormat in controlling data flow during MapReduce execution? How do they affect job performance and scalability?	4	5
c.	(i) A transportation company wants to analyze historical traffic data to optimize delivery routes. How would you use Hadoop and its tools to process the data and find the most efficient routes based on traffic patterns? (ii) In a financial institution, a large set of credit card transaction data needs to be processed to detect fraudulent activities. Explain how you would use the Hadoop ecosystem (e.g., Pig, Hive, and MapReduce) to detect suspicious transactions.	5	2

END SEMESTER EXAMINATION, JUNE- 2025

B. Tech. (Hons.) CSE in AI & ML Semester - VI

Course Name: Natural Language Processing

Course Code: PC617T

Max. Marks: 100

Time allotted: 03 Hours

Note: Read all the instructions carefully.

(10×2=20)

Q.1. Attempt all.

Q.1. Attempt all.		CO	PO
QN	Questions		
a.	What is named entity recognition in NLP?	3	1
b.	What is word sense disambiguation?	3	1
c.	Define information extraction.	5	1
d.	What is corpus?	1	1
e.	What do you mean by text summarization?	4	1
f.	Define sentiment analysis.	1	1
g.	What do you mean by N-Gram language modeling?	1	1
h.	What Does Evaluating a Model Mean?	1	1
i.	Write two libraries used in NLP?	1	1
j.	How does part of speech tagging work in NLP?	2	1

Q.2. Attempt any five out of Seven.

(5×4=20)

Q.2. Attempt any five out of Seven.		CO	PO
QN	Questions		
a.	Outline the steps involved in training a summarizer.	5	1,2
b.	Discuss any two applications of NLP	1	1,2
c.	Differentiate between Orthographic & Morphological Rules.	2	1
d.	Define features and unifications	4	1
e.	Explain with suitable example following relationships between word meanings: Homonymy, Polysemy, Synonymy, Antonymy, Hypernymy, Hyponymy, Meronymy	3	1
f.	Differentiate between text mining and web mining	5	1,2
g.	Identify the morphological type (Noun phrase, Verb Phrase, Adjective Phrase) of following sentence segments: 1. Important to Bill 2. looked up the tree	2	1,2, 3

Q.3. Attempt any three out of four.

(3×10=30)

QN	Questions	CO	PO
a.	i. What do mean by lexical ambiguity and syntactic ambiguity in Natural language? ii. Explain POS Tagger in text mining	1,4	1,2
b.	i. Explain compositional Semitic approach ii. What is Morphology? Explain with example.	2	1,2
c.	i. Discuss various challenges in processing natural language. ii. Why do we need to do Morphological Analysis?	1,2	1
d.	i. List and discuss various issues in NLP. ii. What do you mean by web mining? Explain with example.	1,5	1,2

Q.4. Attempt any two out of three.

(2×15=30)

QN	Questions	CO	PO
a.	i. Explain how AI can play a role in sentiment analysis of human beings? ii. Explain architecture of Text Mining	2,4	1,2
b.	Explain the following terms: i. Web Mining ii. IE Application	5	1,2
c.	i. Describe the concept of CFG. Explain all the tuples and limitations of CFG. ii. Draw a derivation tree for the string "bab" from the CFG given by $S \rightarrow bSb \mid a \mid b$	3	1,2,3

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END SEMESTER EXAMINATION, JUNE- 2025**B. Tech. (CSE) Semester - VI****Course Name: Compiler Design****Course Code: CCS362**

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objectives Type

(Very short/ Short Answer, MCQ, One-liners, Fill in the Blank, True/ False) Attempt all. (10×2=20)

	CO	PO
a. Differentiate token, pattern, lexeme.	2	1
b. Write a short note on compiler construction tools.	1	1
c. Define operator precedence grammar.	2	1
d. Explain cross compiler.	1	1
e. Define leaders.	3	2
f. Explain handle pruning.	2	2
g. Define augmented grammar.	2	1
h. Mention the types of LR parser.	2	1
i. Define constant folding.	3	2
j. Define reduction in strength.	4	1

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)

(5×4=20)

a. Explain in detail about input buffering.	1	1
b. Elaborate specification and recognition of tokens.	2	2
c. Write the features of good compiler.	1	1
d. Write a short note on bootstrapping.	2	1
e. Describe the function of the LALR parser generator "Yacc".	2	2
f. Write a short note on Backpatching.	4	1
g. Explain the peep-hole optimization.	5	1

P.T.O/-

Q.3. Structured Question (Attempt any three out of four)

(3×10=30)

a.	(i) Explain the various data structures used for implementing the symbol table and compare them. (ii) Describe parameter passing mechanism for a procedure call.	2	2
b.	(i) Discuss about the syntax directed translation of case statements. (ii) With a suitable example discuss various transformation on the basic blocks.	3	1
c.	(i) Construct the DAG for the following basic block- $A := B + C$ $B := B - D$ $C := C + D$ $E := B + C$ (ii) Translate the following expression to quadruple, triple and indirect triple: $-(a + b) * (c + d) - (a + b + c)$	4	1
d.	(i) Do left factoring the following grammar: $S \rightarrow aS \mid aA \mid b$ $A \rightarrow aAb \mid aA \mid a$ (ii) Remove left recursion from the following grammar: $S \rightarrow SSa \mid Ab \mid c$ $A \rightarrow AAb \mid d$	2	2

Q.4. Long Answer / Essay type (Attempt any two out of three)

(2×15=30)

a.	Consider the grammar: $S \rightarrow Aa \mid bAc \mid dc \mid bda$ $A \rightarrow d$ Check whether the grammar is LALR (1) but not SLR (1)?	2	1
b.	(i) Draw and explain several phases of a compiler. (ii) Compare the top-down and bottom-up parsing techniques.	1	1
c.	(i) Explain the difference between static, stack and heap allocation. (ii) Define activation record. Explain various fields of activation record.	3	2
