



7E1821

Roll No. _____

Total No. of Pages: 2

7E1821

B. Tech. VII - Sem. (Main / Back) Exam., Nov-Dec 2025
Computer Science & Engineering
7CS4-01 Internet of Things
CS, CSD, CSR

Time: 3 Hours

Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL2. NIL**PART - A****[10×2=20]****(Answer should be given up to 25 words only)****All questions are compulsory**

- Q.1 What do you mean by Internet of Things (IoT)?
 Q.2 Explain communication API in context of IoT.
 Q.3 Define sensor and actuator.
 Q.4 Explain LiteOS.
 Q.5 Define REST in context of IoT.
 Q.6 Mention two design challenges faced when building IoT devices.
 Q.7 What is Software Defined Networks (SDN)?
 Q.8 Explain Network Function Virtualization (NFV).
 Q.9 What type of sensors are commonly used in environmental IoT systems?
 Q.10 How can IoT improve fleet management?

PART – B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

- Q.1 Explain the role of the data processing functional block in the logical design of IoT system.
- Q.2 How does cloud computing support IoT in terms of data storage and processing?
- Q.3 Explain Arduino and its applications.
- Q.4 Define IoT reference model and its importance.
- Q.5 State some major differences between IoT and M2M.
- Q.6 Differentiate SDN and NFV in context of IoT.
- Q.7 How does IoT support predictive maintenance in industrial automation systems?

PART – C

[3×10=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

- Q.1 Describe different communication models used in IoT systems. Discuss the advantages and disadvantages of each model and explain which one is more suitable for real-time applications like a smart healthcare system?
- Q.2 Explain how Contiki OS can be used to build a smart water distribution network. Discuss node communication, data aggregation and system scalability.
- Q.3 Write a detailed note on the role of Uniform Resource Identifiers (URIs) in IoT systems. Explain how they help to identify and interact with resources. Give some examples of URIs used in smart home or industrial IoT systems.
- Q.4 Explain different communication technologies used in M2M systems. Discuss how these technologies enable automation in industrial and healthcare applications.
- Q.5 Describe the applications of IoT in the retail sector. Explain how IoT helps in inventory management, personalized shopping experiences, supply chain optimization and store automation. Discuss the benefits to both businesses and customers with examples.



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7E1882

Roll No. _____

Total No. of Pages: 2**7E1882**

B. Tech. VII - Sem. (Main / Back) Exam., Nov-Dec 2025
Computer Science and Engineering (Artificial Intelligence)
7CAI4-01 Deep Learning and Its Applications

Time: 3 Hours**Maximum Marks: 70***Instructions to Candidates:*

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL2. NIL

PART - A

[10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

- Q.1 Define multilayer perceptron.
- Q.2 What problem does Leaky ReLU (LReLU) solve compared to ReLU?
- Q.3 State one key application of autoencoders.
- Q.4 What is parameter sharing in CNNs?
- Q.5 What is an encoder-decoder model in sequence-to-sequence learning?
- Q.6 What is one major use of deep learning in computer vision?
- Q.7 What is the purpose of using a regularized autoencoder?
- Q.8 Define deep feedforward network.
- Q.9 Write one difference between supervised and unsupervised learning.
- Q.10 Name one regularization technique commonly used in CNNs.

PART – B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

- Q.1 Explain the Back-Propagation algorithm. Derive the weight update rule for a multilayer perceptron using back-propagation.
- Q.2 Explain the architecture and working principle of Restricted Boltzmann Machines (RBMs).
- Q.3 What is the purpose of regularization in CNNs? Discuss any two techniques used.
- Q.4 Describe the encoder-decoder sequence-to-sequence model with a neat diagram.
- Q.5 Differentiate between under-complete autoencoders and regularized autoencoders.
- Q.6 Explain how deep networks are applied in computer vision with one real-world example.
- Q.7 What is unsupervised training of neural networks? Mention two approaches with examples.

PART – C

[3×10=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

- Q.1 Differentiate between Machine Learning and Deep Learning. Explain with suitable examples how deep learning improves representation power compared to traditional ML methods.
- Q.2 What is Representation Learning? Explain how deep learning automates feature engineering. Illustrate with an example from image or speech recognition.
- Q.3 Describe the architecture of AlexNet. How did it improve over earlier deep learning models in the ImageNet competition?
- Q.4 Compare RNN, LSTM and GRU in terms of structure, training efficiency and applications.
- Q.5 What is an Undercomplete Autoencoder? How does it prevent the network from learning an identity function?



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7E1811

Roll No. _____

Total No. of Pages: 2**7E1811****B. Tech. VII - Sem. (Main / Back) Exam., Nov-Dec 2025****Open Elective - I****7AG6-60.2 Environmental Engineering and
Disaster Management****Time: 3 Hours****Maximum Marks: 70***Instructions to Candidates:*

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL2. NIL**PART – A****[10×2=20]****(Answer should be given up to 25 words only)****All questions are compulsory**

- Q.1 State the per capita domestic water requirement for urban and rural areas in India.
- Q.2 List two main sources of surface water supply.
- Q.3 What is the function of intake structure?
- Q.4 State the desirable values/range of pH, TDS, NO₃ and turbidity as per BIS standards for drinking water.
- Q.5 Define BOD of wastewater.
- Q.6 Name any two types of sewers.
- Q.7 Give one example of primary treatment of wastewater.
- Q.8 Define air pollution.
- Q.9 List two gaseous air pollutants.
- Q.10 What is the full form of NDMA? What is its main function?

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PART – B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

- Q.1 Compare domestic water requirements of urban and rural areas in India with suitable examples.
- Q.2 Describe the role and working mechanism of sedimentation tanks in water treatment.
- Q.3 Write a note on BIS drinking water quality standards (IS 10500 : 2012).
- Q.4 Explain the significance of hydraulic design of sewers.
- Q.5 Discuss the major physical, chemical and biological characteristics of wastewater.
- Q.6 Describe composting as a method of solid waste management.
- Q.7 Explain the concept of disaster preparedness and its importance.

PART – C

[3×10=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

- Q.1 Explain different sources of water supply and factors influencing the choice of a source for urban water supply schemes.
- Q.2 Explain the various stages in conventional water treatment including their functions and significance.
- Q.3 Describe in detail the methods of solid waste disposal and their suitability under Indian conditions.
- Q.4 Discuss various types of air pollutants, their sources and health/environmental impacts.
- Q.5 Explain the importance of disaster management in India and discuss different phases (prevention, preparedness, response, recovery).



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Roll No. _____

Total No. of Pages: 2

7E1824

B. Tech. VII - Sem. (Main / Back) Exam., Nov-Dec 2025

Information Technology

7IT4-01 Big Data Analytics

AID, IT

Time: 3 Hours

Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL2. NIL**PART – A****[10×2=20]****(Answer should be given up to 25 words only)****All questions are compulsory**

- Q.1 Define Big Data.
 Q.2 What is Semi-structured data?
 Q.3 Define Data Node.
 Q.4 Mention any two important XML configuration files in Hadoop.
 Q.5 What is MapReduce?
 Q.6 What is the function of a Partitioner?
 Q.7 Define Pig Latin.
 Q.8 Write two Simple Pig Latin commands.
 Q.9 List two advantages of using Hive.
 Q.10 Define Hive QL.

PART – B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

- Q.1 Explain the 3V's of Big data with suitable example.
- Q.2 Explain & differentiate Structured, Semi-structured and Unstructured data with examples.
- Q.3 Explain the role of Record Reader in Hadoop. Why it is important?
- Q.4 What is a Raw Comparator? How can Custom Comparators improve MapReduce performance? Explain.
- Q.5 Write and explain a Pig Latin Script to analyse student marks and calculate average scores.
- Q.6 Explain the interfaces available to run Pig Scripts.
- Q.7 Compare Hive QL with traditional SQL. How does Hive simplify Querying on Hadoop data?

PART – C

[3×10=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

- Q.1 Explain different sources of Big data. Also describe the problems faced by traditional large scale systems in handling Big data.
- Q.2 Explain MapReduce framework with a suitable example. Also write a MapReduce program for weather dataset analysis with the explanation of Driver, Mapper and Reducer code.
- Q.3 Explain the following Writable classes with example -
- (a) Text
 - (b) BytesWritable
 - (c) NullWritable
 - (d) ObjectWritable
 - (e) GenericWritable
- Q.4 Explain the Architecture of PIG with neat diagram. Also explain the application flow of PIG Latin Scripts with an example.
- Q.5 Explain the Hive architecture with diagram. Also describe the different Hive clients along with its roles.
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7E1724

Roll No. _____

Total No. of Pages: **2****7E1724****B. Tech. VII - Sem. (Re-Back) Exam., - 2025****Information Technology****7IT4-01 Big Data Analytics****Time: 3 Hours****Maximum Marks: 120****Min. Passing Marks: 42***Instructions to Candidates:*

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL2. NIL**PART – A****[10×2=20]****(Answer should be given up to 25 words only)****All questions are compulsory**

- Q.1 What are the 3V's of Big Data? [2]
Q.2 Define Google File System. [2]
Q.3 Write the difference between Job Tracker and Task Tracker. [2]
Q.4 What is Reducer Code? [2]
Q.5 Define Combiner. [2]
Q.6 Explain Null writable and Generic writable. [2]
Q.7 What are writable collections? [2]
Q.8 Explain Scripting with Pig Latin. [2]
Q.9 Examine Hive Data types [2]
Q.10 What is Hive Client? [2]

PART – B

[5×8=40]

(Analytical/Problem Solving Questions)

Attempt Any Five Questions

- Q.1 Explain the problems with Traditional Large-Scale System. Also mention the sources of Big Data. [6+2=8]
- Q.2 What is HDFS? List all the components of HDFS and explain any four components. [2+2+4=8]
- Q.3 Explain the Hadoop API for MapReduce Framework (old and new). [4+4=8]
- Q.4 Explain writable comparable and comparators in detail. Explain writable classes in detail. [4+4=8]
- Q.5 How can you create and Manage Databases and tables? Explain it. [8]
- Q.6 Explain the application flow of Pig Latin. [8]
- Q.7 Explain Hive Data Manipulation Language in detail. [8]

PART – C

[4×15=60]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt Any Four Questions

- Q.1 What is HDFS? Explain HDFS architecture with diagram. [15]
- Q.2 Write short notes on -
- (a) Driver Code [5]
 - (b) Mapper Code [5]
 - (c) Record Reader [5]
- Q.3 How will you implement a RawComparator for Speed? Also Explain implementation of Custom writable. [8+7=15]
- Q.4 How will you evaluate Local and Distributed modes of Running Pig Scripts? [15]
- Q.5 Explain the creating, dropping and altering databases using APACHE Hive. Also Explain Querying and Analyzing Data of APACHE Hive. [8+7=15]



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7E1811

Roll No. _____

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Disaster Management****Time: 3 Hours****Maximum Marks: 70***Instructions to Candidates:*

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- Q.6 Name any two types of sewers.
- Q.7 Give one example of primary treatment of wastewater.
- Q.8 Define air pollution.
- Q.9 List two gaseous air pollutants.
- Q.10 What is the full form of NDMA? What is its main function?

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[4580]

PART – B

[5×4=20]

(Analytical/Problem solving questions)

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- Q.1 Compare domestic water requirements of urban and rural areas in India with suitable examples.
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- Q.4 Explain the significance of hydraulic design of sewers.
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- Q.6 Describe composting as a method of solid waste management.
- Q.7 Explain the concept of disaster preparedness and its importance.

PART – C

[3×10=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

- Q.1 Explain different sources of water supply and factors influencing the choice of a source for urban water supply schemes.
- Q.2 Explain the various stages in conventional water treatment including their functions and significance.
- Q.3 Describe in detail the methods of solid waste disposal and their suitability under Indian conditions.
- Q.4 Discuss various types of air pollutants, their sources and health/environmental impacts.
- Q.5 Explain the importance of disaster management in India and discuss different phases (prevention, preparedness, response, recovery).