B.Tech. (CSE AI & MLE) 7th Semester

G-Scheme Examination, December–2024

ADVANCED PYTHON PROGRAMMING

Paper–PEC-DS-405-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt five questions in total, first being compulsory and selecting one question from each unit.*

1. Explain following : 6×2½=15
   (i) Define TUPLES in python.
   (ii) What is abstraction in python ?
   (iii) What is multiprocessing in python ?
   (iv) Define MATPLOTLIB in python.
   (v) Define data mugging.
   (vi) What is Web2Py in python ?

Unit–I

2. List the features of standard data types in python. Give the difference between list and tuple. 15

3. Define polymorphism. Give the difference between runtime and compile-time polymorphism in python using suitable examples. 15

Unit–II

4. Define multithreading. Write a python program to find the square and cube of a number using multithreading. 15

5. Define Indexing and slicing. Write a python program to compare two NumPy arrays. 15

Unit–III

6. Explain following : 3×5=15
   (a) Merge data frames
   (b) Creating metrics for analysis
   (c) Grouping

7. Define data wrangling. Explain various data handling techniques in python using suitable examples. 15

Unit–IV

8. Define NoSQL. Write and explain the steps to build predictive for IOT using python. 15

9. Define IOT. Explain the features and applications of Flask web framework. 15

B.Tech. (Artificial Intelligence and Machine Learning)

7th Semester (G-Schme)

Examination, December - 2024

ARTIFICAL INTELLIGENCE FOR CYBER SECURITY

Paper - PEC-AI-411G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, selecting **one** question from each section **and Question No. 1 is compulsory.***

1. Explain the following :

(a) Define how AI improves cybersecurity over traditional methods.

(b) Explain the role of Time Series Analysis in detecting DDoS attacks.

(c) What are neural network, and how are they applied to crack CAPTCHA?

(d) Describe the architecture of Intrusion Detection System (IDS) based on neural networks.

(e) Differentiate between supervised and unsupervised learning in the context of cybersecurity.

(f) How does Logistic Regression help in spam filtering for mail servers? 6×2.5=15

Section - A

2. (a) Explain the differences between supervised, unsupervised, and reinforcement learning in solving cybersecurity challenges. 7

(b) Discuss the classification and clustering problems in cybersecurity with suitable examples. 8

3. (a) Why is AI important in cybersecurity? Discuss its advantages over traditional methods. 8

(b) Explain the differences between structured and unstructured data with examples from cybersecurity. 7

Section - B

4. (a) Describe the types of Time Series and their relevance to cybersecurity. 7

(b) Discuss the steps involved in detecting DDoS attacks using Time Series analysis. 8

5. (a) Explain lexical and host-based feature extraction for detecting malicious URLs. 7

(b) How can heuristics be used to identify drive-by-download and phishing URLs? 8

Section - C

6. (a) What are the types of CAPTCHA? Explain how neural networks are used to solve CAPTCHA? 8

(b) Discuss machine learning applications in scan detection with examples. 7

7. (a) Explain the concept of context-based malicious event detection and its importance in cybersecurity. 8

(b) Describe the methods used to detect threats such as ransomware, rootkits, and trojans using AI. 7

Section - D

8. (a) Describe the architecture of an Intrusion Detection System (IDS) based on neural networks. 8

(b) Discuss anomaly detection techniques for SMTP and HTTP in mail servers. 7

9. (a) Explain how Naive Bayes theorem is applied to detect spam e-mails, including Laplace smoothing. 7

(b) Discuss anomaly detection techniques for SMTP and HTTP in mail servers. 8

B.Tech. 7th Semester (CSE) (G-Scheme)
Examination, December-2024
NEURAL NETWORKS
Paper - PCC-CSE-401G

Time allowed : 3 hours] *[Maximum marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : *Attempt **five** questions in all, selecting **one** question from each section. **Question No. 1 is compulsory.** All questions carry equal marks.*

1. Explain the following : 6×2.5=15

(a) Role of Dendrites and Axons in a Biological Neuron

(b) Applications of Neural Network

(c) Linear Separability

(d) Supervised Learning

(e) Generalized Delta Learning rule

(f) Hetro Associative Memory

Section-A

2. Describe the structure of a biological neuron in detail and explain how its components contribute to signal processing and transmission. 15

3. What are activation functions in artificial neural networks? Explain their role and importance with examples of threshold, sigmoid and tanh functions. 15

Section-B

4. Describe the McCulloch-Pitts (MCP) model in detail. Discuss its architecture, working and the solution for OR functions. 15

5. Illustrate the concept of linear separability with the solution of the OR function. 15

Section-C

6. Describe the architecture of Backpropagation network. Discuss the training and testing processes in detail. 15

7. Explain competitive learning. Discuss its applications and how it differs from conventional learning methods. 15

Section-D

8. What is Associative Memory? How does associative memory handle errors in data, such as missing or mistaken inputs? Discuss the mechanisms with examples. 15

9. Explain Hebb model and implement logic 'AND' function using Hebb network. 15

B.Tech. 7th Semester (CSE) Open Elective-I

G-Scheme Examination, December–2024

ENGLISH FOR PROFESSIONALS

Paper–HSMC-10-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt any **five** questions in all, selecting **one** question from each unit. **Question No. 1 is compulsory.** All questions carry equal marks.*

1. (a) What are the characteristics of writing a technical report ? 2½

(b) Discuss the salient features of Business Letter ? 2½

(c) Define Negotiation. 2½

(d) Define Communication. 2½

(e) Discuss the ways to prepare for professional interview. 2½

(f) What do you mean by media Convergence ? 2½

Unit–I

2. "The objective of communication process is that the receiver should understand the message as the sender intends". Comment. 15

3. What do you mean by effective Communication ? Give its advantages. Discuss the guidelines for effective communication. 15

[P.T.O.

Unit–II

4. (a) Discuss the ways to prepare for professional interview. 7½

(b) Describe the role of voice modulation in communication ? 7½

5. (a) Write a Group Discussion on "Ways to prevent Global Warming in India". Use A, B, C and D as spokesperson. 7½

(b) What is meant by oral presentation ? How can it be made effective ? 7½

Unit–III

6. (a) Draft a memo for the employee of a company warning them against using mobile phones during working hours. 7½

(b) Write a notice for the notice board of your college informing students about the youth festival to be held in your institution. 7½

7. (a) Discuss the differentiate memos and notice as type of Business correspondence. 10

(b) Explain the parts of a technical report. 5

Unit–IV

8. What is the role and influence of Mass Media ? 15

9. What is the most important media to communicate ? Explain with examples. 15

B. Tech. (CSE-AI & MLE) 7th Semester G-Scheme

Examination, December, 2024

DEEP LEARNING

Paper : PCC-AI-401-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt **five** questions in all, selecting **one** question from each section.* ***Question No. 1 is compulsory.***

1. Describe the following : 15

(a) Why is the vanishing gradients problem especially bad in RNNs?

(b) What is a dynamic memory model in deep learning?

(c) How does the Convolutional Layer work? Explain briefly.

(d) What is Named Entity Recognition used for? Explain with the help of an example.

(e) Discuss the Applications of Dynamic Memory Networks in NLP.

(f) What is visual attention model? Discuss.

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Section-A

2. (a) Explain in architecture of Convolutional Neural Network with Pooling layer, Dense Layer. How Regularization and dropout layer is helpful to reduce over-fitting? Explain. 10

(b) What is Nesterov Accelerated Gradient? Briefly discuss. 5

3. Describe the following briefly : 15

(a) How is ReLU Heuristics used for avoiding bad local minima?

(b) What is vanishing gradient problem? Discuss briefly.

(c) Business Intelligence vs. Big Data

Section-B

4. What is Recurrent Neural Network? How LSTM and GRU network differ in their architecture? Is GRU more accurate than LSTM? Explain. 15

5. Describe the following : 15

(a) 5 Deep Learning Software Libraries.

(b) Generative Adversarial Networks.

(c) What is the difference between auto-encoder and variational auto-encoder?

Section-C

6. (a) What is the objective function of the continuous bag of words model? Explain the step to construct bag-of-words for image presentation. 8

(b) How to generate the image Generation using Generative Adversarial Networks (GANs)? Discuss with the help of example. 7

7. Discuss the following : 15

(a) Continuous Skip-Gram Model

(b) What are vector semantics in NLP?

(c) Attention models for computer vision task.

Section-D

8. (a) Explain the Neural Summarization architecture in detail. 8

(b) How Opinion Mining is done using Recurrent Neural Networks? Explain with the help of example. 7

[P.T.O.

9. Write short note on : 15

(a) Difference between Factoid question and non-factoid question answering system.

(b) Dialogue topic tracking

(c) Sentiment Analysis using Recursive Neural Networks

B.Tech. (CSE) Professional Elective - IV 7th Semester

(G-Schme), Examination, December - 2024

WEB MINING

Paper - PEC-CSE-405-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt any **five** questions in all selecting **one** question from each section and **Question No. 1 is compulsory.***

1. Explain the following : 6×2.5=15

(a) Data mining and web mining

(b) Text Mining

(c) Web Search

(d) Classification and Clustering

(e) Information retrieval

(f) Classification of Web Pages

Section - A

2. (a) Discuss the differences and similarities between web mining and data mining, also list various applications of web mining. 8

(b) How is knowledge discovered from hypertext data, and what are the key challenges involved in the process? 7

3. (a) Discuss the key issues and challenges faced in web mining. 8

(b) What are some common applications of web mining? How do they benefit from web mining techniques to improve decision-making processes? 7

Section - B

4. Discuss various Information Retrieval (IR) models and their role in web search and explain how do these models the effectiveness of information retrieval? 15

5. Explain the following : 3×5=15

(a) Web Spamming

(b) Web Content Mining

(c) Latent Semantic Indexing

Section - C

6. What are the key models and concepts of computational intelligence? How they can be applied to solve complex real-world problems? 15

7. (a) Describe Discrete and Continuous Optimization Problems. 8

(b) Compare the various types of optimization algorithms, highlighting their key characteristics. 7

Section - D

8. Explain the following :

(a) Ant colony optimization and Particle swarm optimization 8

(b) Hybridization and Comparisons of Swarm Techniques 7

9. Discuss various applications of swarm intelligence techniques in various domains and provide examples of how they effectively solve real-world optimization problems. 15

B. Tech. (CSE AI & MLE) 7th Semester

G-Scheme Examination, December–2024

R PROGRAMMING

Paper–OEC-AI-434-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in total, **first being compulsory** and selecting **one** question from each unit.*

1. Explain following : 6×2½=15

(i) Write the name of the inventor of R programming and the first stable version of R.

(ii) Define calling Functions in R programming.

(iii) Define Binary files in R programming.

(iv) What are conditional statements in R ?

(v) Define correlation.

(vi) Define PAM.

Unit–I

2. Define R Lists. Explain categorical variables in R with examples. 15

3. Explain features and operation on List data structures with examples. 15

Unit–II

4. Write and explain various operations that can be performed on a data frame. 15

[P.T.O.

5. What is the function argument? Write a R program to understand the concept of For loop. 15

Unit–III

6. What is the group function in R ? Explain aggregate, plyr and data.table with examples. 15

7. Define Covariance. Explain ANOVA with examples. 15

Unit–IV

8. Explain hierarchical clustering with examples. 15

9. Define random forests. Explain generalized additive model. 15

B. Tech. (CSE) Professional Elective-V 7th Semester

G-Scheme Examination, December, 2024

CYBER SECURITY THREATS

Paper : PEC-CSE-415-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: ***Q. No. 1 is compulsory.*** *Attempt* ***four*** *more questions selecting* ***one*** *question from each unit. All questions carry equal marks.*

1. Compulsory question :

(i) What are the main sources of security threats?

(ii) Define the difference between active and passive network threats.

(iii) List common vulnerability assessment tools used in threat management.

(iv) What are threat modeling, and why is it important?

(v) What are the different types of authentication mechanisms?

(vi) What is the role of firewalls in network security?

(vii) What is access control, and why is it important in cyber security?

(viii) Define trusted computing in the context of cyber security.

Unit-I

2. Describe the different types of network threats, including active and passive attacks. How do these threats affect network security?

3. Discuss email and web threats, including how intruders and hackers exploit vulnerabilities to launch cyber attacks. What are the consequences of these threats?

Unit-II

4. Discuss the importance of vulnerability assessment tools. How do they assist in identifying and mitigating security threats?

5. Explain the concept of threat modeling. How is it used to plan and implement effective information security strategies?

Unit-III

6. Discuss the role of firewalls, intrusion detection systems (IDS), and honeypots in network security. How do they complement each other? 15

7. Explain the importance of security policies and procedures in an organization. How do they ensure compliance with security standards?

Unit-IV

8. Explain the human factors involved in cyber security, including the importance of security awareness and training. How do these factors impact the security of an organization? 5=15

9. Discuss the significance of physical and infrastructure security in cyber security. How can organizations safeguard their physical assets?

B.Tech. 7th Semester (CSE) (G-Scheme) Examination, December-2024

NEURAL NETWORKS

Paper - PCC-CSE-401G

Time allowed : 3 hours] *[Maximum marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : *Attempt **five** questions in all, selecting **one** question from each section. **Question No. 1 is compulsory.** All questions carry equal marks.*

1. Explain the following : 6×2.5=15

(a) Role of Dendrites and Axons in a Biological Neuron

(b) Applications of Neural Network

(c) Linear Separability

(d) Supervised Learning

(e) Generalized Delta Learning rule

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Section-C

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B.Tech. (Artificial Intelligence and Machine Learning)

7th Semester (G-Schme)

Examination, December - 2024

ARTIFICAL INTELLIGENCE FOR CYBER SECURITY

Paper - PEC-AI-411G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, selecting **one** question from each section **and Question No. 1 is compulsory.***

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(e) Differentiate between supervised and unsupervised learning in the context of cybersecurity.

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Section - C

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B.Tech. (CSE AI & MLE) 7th Semester

G-Scheme Examination, December–2024

ADVANCED PYTHON PROGRAMMING

Paper–PEC-DS-405-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in total, **first being compulsory** and selecting **one** question from each unit.*

1. Explain following : 6×2½=15
   (i) Define TUPLES in python.
   (ii) What is abstraction in python ?
   (iii) What is multiprocessing in python ?
   (iv) Define MATPLOTLIB in python.
   (v) Define data mugging.
   (vi) What is Web2Py in python ?

Unit–I

2. List the features of standard data types in python. Give the difference between list and tuple. 15

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Unit–II

4. Define multithreading. Write a python program to find the square and cube of a number using multithreading. 15

[P.T.O

5. Define Indexing and slicing. Write a python program to compare two NumPy arrays. 15

Unit–III

6. Explain following : 3×5=15
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   (c) Grouping

7. Define data wrangling. Explain various data handling techniques in python using suitable examples. 15

Unit–IV

8. Define NoSQL. Write and explain the steps to build predictive for IOT using python. 15

9. Define IOT. Explain the features and applications of Flask web framework. 15

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B.Tech. (Artificial Intelligence and Data Science)

7th Semester (G-Schme)

Examination, December - 2024

NATURAL LANGUAGE PROCESSING AND SPEECH RECOGNITION

Paper - PCC-ADS-401G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : ***Question No. 1 is compulsory*** *having six parts and each part is of 2.5 marks total of 15 marks and the remaining questions are of 15 marks. And attempt* ***one*** *question from each unit.*

1. Write a short note on the following : 15

(a) Ambiguity in NLP

(b) Applications of machine translation

(c) N-gram language models

(d) Hidden Markov Models in speech recognition

(e) Features structures in context-free grammar

(f) Advantages of probabilistic parsing

Unit - I

2. Explain the significance of regular expressions in NLP. Discuss how finite state automata are used to match patterns in text. 15

3. Describe the process of raw text extraction and tokenization. Explain how terms are extracted from tokens for text processing. 15

Unit - II

4. What is Singular Value Decomposition (SVD)? Explain its application in topic modeling and text analysis. 15

5. Discuss the components of Text-to-Speech (TTS) system. Explain the role of prosody in TTS and how it enhances speech synthesis. 15

Unit - III

6. Describe the architecture of speech recognition systems. Explain how acoustic probabilities are computed to train a speech recognizer. 15

7. What is part-of-speech tagging? Compare stochastic tagging with rule-based tagging. Provide examples of their application. 15

Unit - IV

8. Explain the Earley algorithm for parsing context-free grammars. Discuss its advantages over basic top - down parsers. 15

9. What is probabilistic parsing? Explain its advantages and how it represents meaning and Deep Learning in NLP. 15

7. What is part-of-speech tagging? Compare stochastic tagging with rule-based tagging. Provide examples of their application. 15

Unit - IV

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B.TECH. (COMPUTER SCIENCE AND ENGINEERING) 8th Semester

(G- Scheme) Examination, December - 2024

MACHINE LEARNING

Paper -PCC-CSE-402G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *All questions carry equal marks.* ***Question No. 1 is compulsory.*** *In addition* ***to the compulsory question,*** *students will have to attempt* ***four*** *more questions, selecting* ***one*** *question from each unit.*

1. Compulsory Question :-

(a) Define Machine Learning.

(b) Explain the need for Machine Learning in various industries.

(c) Explain Ensemble Learning.

(d) List three features of Machine Learning algorithms.

[P.T.O.

(e) Provide an example of a block diagrammatic representation of learning machines.

(f) Explain the row vector.

Unit - I

2. What is Machine Learning and how does it differ from traditional programming approaches? Discuss its historical development and key milestones.

3. Discuss the ML life cycle. Also, provide examples of real-world applications where Machine Learning has made significant advancements.

Unit - II

4. Define Dimensionality Reduction and explain its significance in handling high-dimensional data. Discuss common techniques used for Dimensionality Reduction.

5. Differentiate between row vectors and column vectors. How are they represented mathematically, and what roles do they play in data representation?

Unit - III

6. Define Supervised Learning and explain its working principle. Provide a step-by-step example of how a Supervised Learning algorithm processes training data and makes predictions. Explain the concept of overfitting and underfitting in Supervised Learning. What techniques can be used to address these issues?

7. Describe the k-Nearest Neighbour (k-NN) algorithm in detail. How does k-NN classify data points and what are its strengths and weaknesses?

Unit - IV

8. Explain the K-means clustering algorithm in detai including its initialization methods, iterative proces and convergence criteria. Discuss the advantages a limitations of K-means clustering and provide examp of real-world applications where K-means clusterin used.

9. Explain the importance of performance measurement in evaluating machine learning models. Discuss the metrics used for model evaluation, such as accuracy, confusion matrix, precision, recall, and F1-score. How do these metrics provide insights into the model's predictive power and generalization capability?