6E1552

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B.Tech. VI Sem. (Main/Back) Examination June- 2022
Information Technology
6IT4-02 Machine Learning

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 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 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)

Part - A

(Answer should be given up to 25 words only)

All questions are **compulsory**   (10×2=20)

1. *"Is Machine Learning just another name for Artificial Intelligence"?* Comment.

2. Write one difference and one similarity between classification and regression.

3. Let C be a candidate item set in C_k generated by the Apriori algorithm. How many length (K-1) subsets do we need to check in the prune step?

4. It is difficult to assess classification accuracy when individual data objects may belong to more than one class at a time. In such cases, comment on what criteria you would use to compare different classifiers modeled after the same data.

5. Differentiate between feature extraction and feature selection.

6. Suppose we clustered a set of N data points using two different clustering algorithms, such as K-means and Gaussian mixtures. In both cases, we obtained five clusters and in both cases, the centers of the clusters are the same. Can three points that are assigned to different clusters in the K - means solution be assigned to the same cluster in the Gaussian mixture solution? Why or why not?

7. In outlier detection by semi - supervised learning, what is the advantage of using objects without labels in the training data set?

8. *Is reinforcement learning an appropriate abstract model for evolution?* Why or why not?

9. Briefly describe an application of Artificial Neural Network that is used for learning to steer an autonomous vehicle.

10. You are provided with data from a music streaming platform. Each of the 450,000 records indicates the songs a user has listened to in the past month. How would you build a music recommendation system? List the steps.

Part - B

(Analytical/Problem solving questions)

Attempt any **five** questions   (5×8=40)

1. a. Assume you have roughly classified a set of your previous e - mail messages as junk, unimportant, normal, and important. Describe how a machine learning system may take this as the training set to automatically classify new e-mail messages or unclassified ones.

   b. Give application examples for each of the following cases and also explain them :

      i. An application that uses clustering as a major machine learning function.

      ii. An application that uses clustering as a pre - processing tool for data preparation and other machine learning tasks.   **(8)**

2. a. Why is the naive bayesian classification called "naive"? Explain.

   b. The support Vector Machine (SVM) is a highly accurate classification method. However, SVM classifiers suffer from slow processng when training with a large set of data tuples. Describe how to overcome this difficulty and design a scalable SVM algorithm for efficient SVM classification in large datasets. **(8)**

3. a. Give an example to show that items in a strong association rule actually may be negatively correlated.

   b. Suppose that you are to allocate several Automatic Teller Machines (ATMs) in a given region to satisfy several constraints. Households or workplaces may be clustered so that typically one ATM is assigned per cluster. The cluster may be constrained by two factors :

      i. Obstacle objects. (i.e. there are bridges, rivers, and highways that can affect ATM accessibility), and

      ii. Additional user - specified constraints such as that each ATM should serve at least 10,000 households.

      How can a clustering algorithm such as K - means be modified for quality clustering under both constraints? (8)

4. a. Explain the concept of Principal Component Analysis with a suitable example.

   b. Precision and recall are two essential quality measures of a machine learning system. Explain why it is the usual practice to trade one measure for the other. Explain why the F-score is a good measure for this purpose. (8)

5. a. Write the differences among dynamic programming, Monte Carlo, and temporal methods of reinforcement learning. How is policy evaluation performed in Monte Carlo? Explain.

   b. How can you perform sentiment analysis of 'multiple - choice questions' using reinforcement learning? Explain. (8)

6. a. What is the Markov decision process? Explain it with a suitable example.

   b. Explain various methods of SARSA. (8)

7. a. Explain the role of collaborative - based and content - based recommendation systems in machine learning along with their advantages and disadvantages.

   b. How does the collaborative recommendation system differ from a typical classification or predictive modeling system? Explain. (8)

Part - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any **Four** questions   (4×15=60)

1. The following table shows the midterm and final exam grades obtained for students in a database course.   (4+5+6)

Midterm Exam (x)	Final Exam (y)
72	84
50	63
82	77
74	78
94	90
86	75
59	49
83	79
65	77
33	52

   i.   Do x and y seem to have a linear relationship? Explain.

   ii. Use the method of least squares to find an equation for the prediction of a student's final exam grade based on the student's midterm grade in the course.

   iii. Predict the final exam grade of a student who received a 94 on the midterm exam.

2. The following table consists of training data from an employee database. The data have been generalized. For example, '31..........35' for 'Age' represents the age range of 31 to 35. For a given row entry, 'Count' represents the number of data tuples having the values for Department, Status, Age, and Salary given in that row.   (4+5+6)

Department	Status	Age	Salary	Count
Sales	Senior	31.........35	46K.........50K	30
Sales	Junior	26.........30	26K.........30K	40
Sales	Junior	31.........35	31K.........35K	40
Systems	Junior	21.........25	46K.........50K	20
Systems	Senior	31.........35	66K.........70K	5
Systems	Junior	26.........30	46K.........50K	3
Systems	Senior	41.........45	66K.........70K	3
Marketing	Senior	36.........40	46K.........50K	10
Marketing	Junior	31.........35	41K.........45K	4
Secretary	Senior	46.........50	36K.........40K	4
Secretary	Junior	26.........30	26K.........30K	6

Let 'Status' be the class label attribute.

i. How would you modify the basic decision tree algorithm to take into consideration the 'Count' of each generalized data tuple? Explain.

ii. Use the algorithm to construct a decision tree from the given data.

iii. Given a data tuple having the values 'Systems', '26.........30', and '46K.........50K' for the attributes Department, Age, and Salary, respectively, what would a Naive Bayesian classification of the status for the tuple be? Explain.

3. A database has five transactions, where minimum support (s) is 60% and minimum confidence (c) is 80%. (7+8)

TID	Items Bought
T100	{M,O,N,K,E,Y}
T200	{D,O,N,K,E,Y}
T300	{M,U,C,K,Y}
T400	{M,A,K,E}
T500	{C,O,O,K,I,E}

i. Find all frequent itemsets using Apriori and FP - growth, respectively.

ii. List all the strong association rules (with s and c) matching the following meta - rule, where X_i is a variable representing customers, and $item_j$ denotes variables representing items :

$\forall x \in$ transaction, buys $(X, item_1) \wedge$ buys $(X, item_2) \rightarrow$ buys $(X, item_3)$ [s, c].

4. Suppose that you are a data scientist who has been recruited to help detect fraud during the college admissions process. It requires the process to narrow the focus to fraudulent information submitted in the college application forms, whether it is an inflated GPA, an invented sports achievement, or a fake community service achievement, or other types of forgeries. You will be building a set of fraud detection models. Explain. **(2+2+3+2+3+3)**

i. In this case, which classification methods would you recommend to develop the model : neural networks, random forest, or naive Bayes?

ii. Why did you choose that as your first method?

iii. How would you build this model?

iv. What training data will you need to run that model?

v. Where and how will you obtain the data?

vi. What cross - validation technique would you use on a time series dataset? If needed.

5. a. Suppose that a training set contains only a single sample, repeated 100 times. In 80 of the 100 cases, the single output value is 1; in the other 20, it is 0. What will a backpropagation network predict for this sample, assuming that it has been trained and reaches a global optimum? Explain. **(7)**

b. Suppose you had a neural network with linear activation functions? For each unit, the output is some constant c times the weighted sum of the inputs.(4+4)

    i. Assume that the network has one hidden layer. For a given assignment to the weights W, write down equations for the value of the units in the output layer as a function of W and the input layer I, without any explicit mention of the output of the hidden layer. Show that there is a network with no hidden units that compute the same function.

    ii. Repeat the calculation part (i), this time for a network with any number of hidden layers. What can you conclude about linear activation functions?
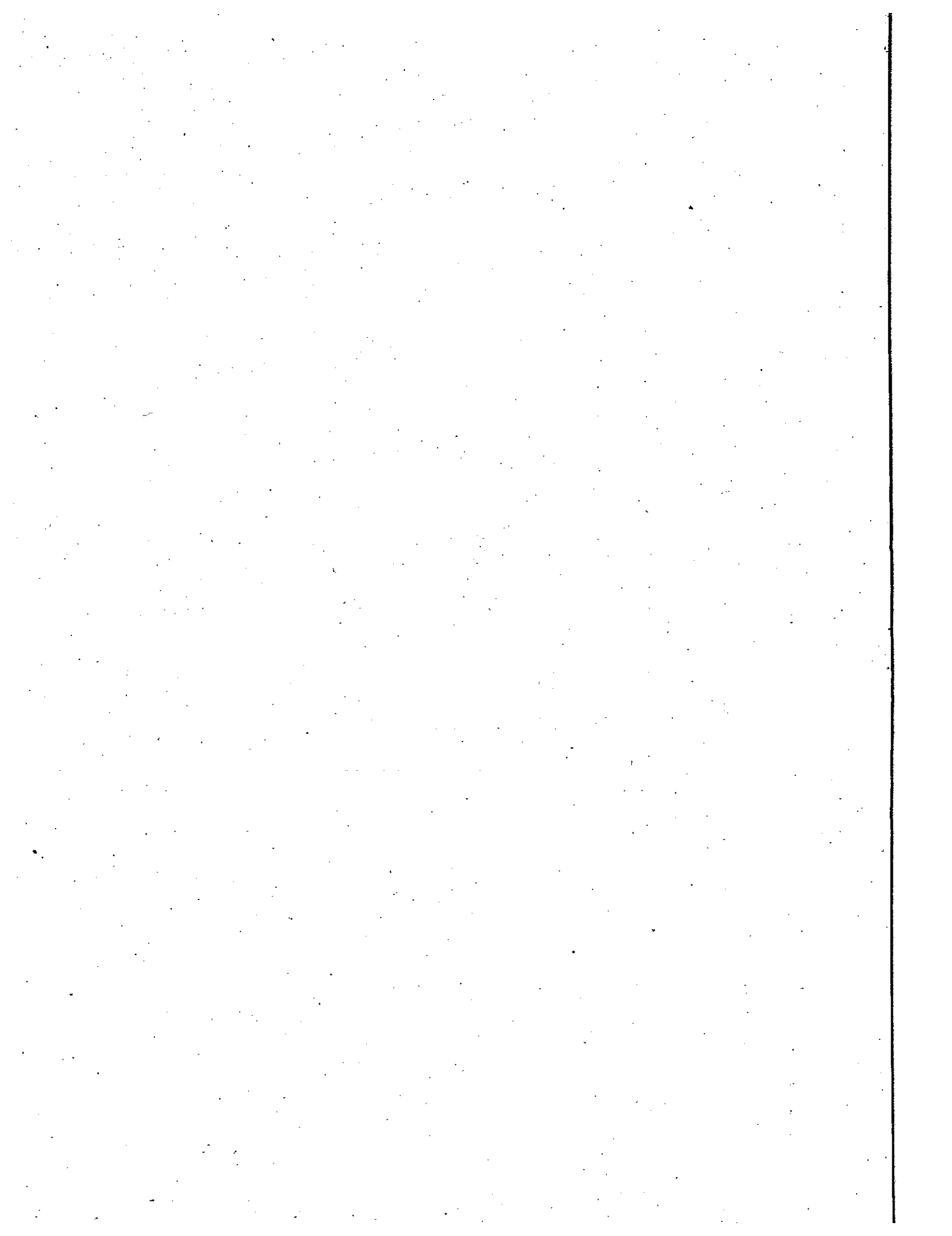
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B.Tech. VI Sem. (Main/Back) Examination, June - 2022
Information Technology
6IT4-03 Information Security System

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

*Attempt **all five** questions from **Part A**, **four** questions out of **six** questions from **Part B** and **two** questions out of **three** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing 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)

Part - A

(Answer should be given up to 25 words only)

All questions are **compulsory**   (5×2=10)

1. What is encryption?

2. Define Cryptanalysis.

3. What is digital signtaure?

4. Write down the name of five web security threats.

5. Define block ciphers.

Part - B

(Analytical/Problem solving questions)

Attempt any **four** questions   (4×10=40)

1. What are security attacks? Explain substitution ciphers and transposition ciphers.

2. Explain Data Encryption standard with the help of an example.

3. Explain the design principles of block cipher in detail.

4. What are public key cryptosystams? Explain its requirements and cryptanalysis in detail also explain RSA cryptosystem.

5. Explain the concept of hash functions along with its requirement and security also describe secure hash algorithm (SHA).

6. Explain following in detail.

   a. HTTPS and SSH.

   b. SSL architecture and protocol.

Part - C
(Descriptive/Analytical/Problem Solving/Design Questions)
Attempt any **two** questions   (2×15=30)

1. Explain Rabin Cryptosystem, Elgamal cryptosystem and Elliptic curve cryptosystem in detail.

2. What are Message Authentication codes. Explain MACs based on Hash functions and MACs based on Block ciphers in detail.

3. What is Symmetric key distribution? How it can be achieved using symmetric and Asymmetric encryptions also explain concept of public key infrastructure.

6E1555

6E1555

**B.Tech. VI Sem. (Main/Back) Examination, June - 2022
Informaiton Technology
6IT4-05 Artificial Intelligence**

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

*Attempt **all five** questions from **Part A**, **four** questions out of six questions from **Part B** and **two** questions out of **three** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing 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)

PART - A

(Answer should be given up to 25 words only)

All questions are **compulsory**   (5×2=10)

1. What is Artificial Intelligence?

2. What is Alpha - beta pruning?

3. Define NLP (Natural Language Processing).

4. What is Expert system?

5. Write the difference between supervised and unsupervised learning?

PART - B

(Analytical/Problem solving questions)

Attempt any **four** questions   (4×10=40)

1. Explain the steepest Hill - Climbing techniques. Also explain the various potential problems associated with hill climbing. How we can overcome these problems?

2. What are the steps in natural language processing (NLP)? List and explain in detail.

3. Explain Approaches to knowledge representation using predicate logic with example.

4. Enumerate classical "water Jug problem". Describe the state space for this problem. Solve this problem by giving its operation sequence.

5. What do you mean by learning? Explain any one technique which is used in learning.

6. Discuss the algorithm of A* with the advantage over best first search procedure?

PART - C
(Descriptive/Analytical/Problem Solving/Design Questions)
Attempt any **two** questions   (2×15=30)

1. Describe Alpha - beta pruning and give the other modifications to minimax procedure to improve its performance.

2. Explain with neat diagram the architecture of expert system and mention its features.

3. i. Discuss the need and structure of Bayesian Network.
   ii. Discuss the various types of machine learning with appropriate examples.

6E1560

6E1560

B.Tech. VI-Sem. (Main/Back) Examination, June - 2022
Computer Sc. & Engg.
6CS4-06 Cloud Computing

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 from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing 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).

PART - A

(Answer should be given up to 25 words only)

(All questions are compulsory)   (10×2=20)

1. Define Cloud Computing.

2. Write the name of top ten obstacles and opportunities for adoption and growth of cloud computing?

3. Write the advantages of SaaS.

4. Why should one prefer public cloud over private cloud?

5. What are the main features of cloud computing?

6. How many types of deployment models are used in cloud?

7. Explain hybrid cloud?

8. Mention platforms which are used for large scale cloud computing?

9. What is the difference in cloud computing and computing for mobiles?

10. What are the security aspects provided with cloud?

PART - B

(Analytical/Problem Solving Questions)

(Attempt any Five questions) (5×8=40)

1. What is Amazon SQS? How buffer is used to Amazon web services?

2. Mention what is Hypervisor in cloud computing and their types?

3. What is a cloud service? As a infrastructure as a service what are the resources that are provided by it? Explain.

4. In cloud computing what are the different layers? Explain Also How important is the platform as a service?

5. Define cloud architecture? What are the characteristics of cloud architecture that separates it from traditional one?

6. What is google app engine? In cloud computing explain the role of performance cloud.

7. State the limitation of virtualization. What is the goal of encrypted cloud storage?

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

(Attempt any Four questions) (4×15=60)

1. a) Explain briefly the security concerns of cloud computing. (8)

   b) Write a short note on origins of cloud computing. (7)

2. Discuss the regulatory issues of cloud computing & the government policies.

3. a) Explain in detail about cloud delivery model. (7)

   b) Discuss the operational and economic benefits of SaaS. (8)

4. a) Explain in detail the various aspects for the need of virtualization in cloud computing? (9)

   b) Explain briefly about virtual threats. (6)

5. Write a short notes on:

   a) Software Virtualization

   b) Network Virtualization

6E1559

6E1559

B.Tech. VI Sem. (Main/Back) Examination, June - 2022
Computer Sc. & Engg.
6CS5-13 E-Commerce and ERP

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

Attempt all Five questions from Part A, Four questions out of Six questions from Part B and Two questions out of Three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing 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).

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory   (5×2=10)

1. What are the modes of Payments used in e-commerce?

2. Differentiate traditional marketing and E-marketing?

3. Define digital cash or e-cash.

4. What are the components of E-Commerce?

5. What are the different types of issues to be considered in E-Commerce?

PART - B

(Analytical/Problem solving questions)

Attempt any Four questions   (4×10=40)

1. What are the different types of issues to be considered in E-Commerce? Explain.   (10)

2. What is an EDI? Explain the advantages of EDI.   (10)

3. a) Explain about E-marketing?   (5)

    b) What are the different models of E-Commerce?   (5)

4. What are the requirements of web based E-Commerce? (10)

5. What is E-Commerce? Explain advantages and disadvantages of E-Commerce. (10)

6. What are the different security methods for E-Commerce? (10)

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any TWO questions (2×15=30)

1. a) What do you know the history of the internet and www? Also explain their services for electronic commerce? (8)

   b) Explain CRM in current scenario. (7)

2. a) Discuss the revenue generation models for spelling on the web also explain how communication take place with consumer on the web (8)

   b) Explain the advantages of online marketing. (7)

3. Write a short note on

   a) ISP (5)

   b) Technology issues in E-commerce (5)

   c) Business importance in using XML based Technology (5)

6E1557

6E1557

B.Tech. VI Sem. (Main Back) Examination June - 2022
Computer Sc. and Engg.
6CS5-11 Distribution System

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing 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)

Part - A

(Answer should be given up to **25** words only)

All questions are **compulsory.** (5×2=10)

1. What are the main characteristics of Distributed system?

2. What are the different models of Distributed system?

3. Define Distributed Filed system (DFS) with its requirements.

4. What is the need of multicast communication in Distributed system?

5. Define replication. What are the needs of replication?

Part - B

(Analytical/Problem solving questions)

Attempt any **four** questions. (4×10=40)

1. "Transparency is one the most important feature of Distributed system", Justify the statement with example.

2. Give the reason for "Access transparency is not maintained by conventional Remote procedure call (RPC)".

3. How does Distributed file system (DFS) encourage sharing a storage device, explain with the help of DFS architecture.

4. Define Distributed mutual exclusion. In how many ways the mutual exclusion can be achieved in Distributed system?

5. In which situations, the following election algorithms are suitable

    i. Bully.

    ii. Ring.

6. Explain transaction recovery techniques with example.

Part - C
(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **two** questions.   (2×15=30)

1. Why do we need a Distributed system? What are the challenges in achieving the requirements of Distributed system? Explain.

2. Define distributed objects. What are the needs of event notification during the communication among distributed system? Explain the distributed event notification architecture in detail.

3. Define fault tolerance. Explain how fault tolerance is ensured in distributed system. What are the different fault tolerance techniques?

Total No. of Questions:

Total No .of Pages:

Roll No. _____

B.Tech. VI-Sem (Back) Exam 2022
Computer Sc. & Engg.
6CS6.2A Artificial Intelligence
6E6027

Time: 3 Hours

Maximum Marks: 80
Min Passing Marks: 24

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing 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_____ 2. _____

UNIT-I

Q.1 (a) What is Artificial Intelligence? [8]
    (b) Discuss various Production Systems in detail. [8]
                    OR

Q.1 (a) Differentiate between BFS and DFS. [8]
    (b) Explain Hill Climbing technique in detail. [8]

UNIT-II

Q.2 (a) What are the problems behind representing knowledge? [8]
    (b) Explain knowledge representation using Predicate logic. [8]
                    OR

Q.2 (a) Explain Monotonic and Non-Monotonic reasoning in detail. [10]
    (b) What is refutation? [6]

UNIT-III

Q.3 (a) What do you mean by Probabilistic reasoning?   [8]

      (b) What is Fuzzy Logic?   [8]

<p align="center">OR</p>

Q.3 (a) Explain Baye's Theorem in detail.   [8]

      (b) Explain forward and backward reasoning.   [8]

UNIT-IV

Q.4 Discuss Game Playing Techniques in detail   [16]

<p align="center">OR</p>

Q.4 What is Natural Language Processing (NLP)? Explain different algorithms to implement NLP in Artificial Intelligence.   [16]

UNIT-V

Q.5 (a) What is learning? Explain supervised and unsupervised learning.   [8]

      (b) What is Expert System?   [8]

<p align="center">OR</p>

Q.5 (a) What is Neural Network? Explain its applications.   [8]

      (b) Discuss softmax and relu functions in Neural Network.   [8]

6E1551

6E1551

B.Tech. VI Sem. (Main/Back) Examination, June - 2022
Information Technology
6IT3-01 Digital Image Processing

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing 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)

Part - A

(Answer should be given up to 25 words only)

All questions are **compulsory** (5×2=10)

1. Define Histogram?

2. What are the gray level transformation function of an image?

3. What is minimum mean square error filtering?

4. What do you mean by image registration?

5. Explain gradiant operator?

Part - B

(Analytical/Problem solving questions)

Attempt any **four** questions (4×10=40)

1. Explain Image sensing and acquisition with suitable diagram.

2. What is spatial filtering? Define spatial correlation and convolution with an example.

3. Explain image restoration model with diagrams.

4. What is data redundancy? Also write its take?

5. Explain descriptor in detail.

6. Explain :

   a. IHPF.

   b. Image - Enhancemnet.

Part - C
(Descriptive/Analytical/Problem Solving/Design Questions)
Attempt any **two** questions   (2×15=30)

1. What is segmentation? Explain point, line and edge detection in brief. Also explain how to improve fast scanning algorithm by using morphological?

2. What is noise PDF. Explain erlang noise and Impulse noise. Differentiate between Gaussion noise and impulse noise?

3. What is image sharpening? Explain first and second order derivatives of image sharpening?