

Roll No. ....

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BT-4/J-25

BAYESIAN DATA ANALYSIS

Paper : BS-AIDS-202A

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *five* questions in all, selecting exactly at least *one* question from each unit. All questions carry equal marks.

**UNIT-I**

1. (a) Explain the role of Bayesian Modeling in Data Analysis.
- (b) What is learning? How is it performed using Bayesian Network? (7+8=15)

2. (a) What is Bayesian Interference? How does it work? Discuss.
- (b) Elaborate the process of Dirichlet process. (7+8=15)

**UNIT-II**

3. (a) Write a short note on Hierarchical decision analysis for random measurement.
- (b) What is the difference between personal and institutional decisions? (7+8=15)

4. (a) Explore the concept of Bayesian prediction. What is a posterior predictive check? Discuss.  
(b) Discuss the key principles and applications of Bayesian decision theory. (7+8=15)

### UNIT-III

5. (a) Discuss the Hamiltonian Monte Carlo algorithm in brief.  
(b) Explain the Markov chain simulation with suitable example. (7+8=15)
6. (a) Explore the approximating conditional and marginal posterior densities.  
(b) Describe the concept of posterior modes and their importance in Bayesian Inference. (7+8=15)

### UNIT-IV

7. (a) Describe the importance of weakly informative priors in logistic regression models and their role in improving model performance and inference.  
(b) What is casual inference? What are the criteria for inferring Causality? (7+8=15)
8. Write short note on any *two* :  
(a) Gaussian Process Models.  
(b) Finite Mixture Models.  
(c) Parametric Nonlinear Models. (7.5×2=15)

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**44218**

**BT-4/J-25**

**DATA SCIENCE WITH R PROGRAMMING**

**Paper-PC-CS-AIDS-204-A**

Time : 3 Hours] [Maximum Marks : 75

**Note :** Attempt **five** questions in all, selecting at least **one** question from each unit. All questions carry equal marks.

**UNIT-I**

1. (a) Explain the different phases of Data Science. How is it different from Business Intelligence? (7)
- (b) Explain HDFS and Map Reduce in the big data. Justify with an example. (8)
2. (a) Write about different functions for probability distribution in R that can be used for statistical data analysis. (7)
- (b) Write about Scatter Plot and Histogram with R examples. Explain its importance in graphical display of statistical data. Give appropriate examples. (8)

**UNIT-II**

3. (a) Write an R program to find the maximum and the minimum value of a given vector. Explain the functions with syntax. (7)
- (b) Write an R program to find elements that are present in two given data frames. (8)

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[P. T. O.]

4. (a) Write an R program to create a data frame using two given vectors and display the duplicated elements and unique rows of the data frame. Explain with a syntax. (7)
- (b) Write an R program to add 3 to each element of the first vector. Print the original and new vector. (8)

### UNIT-III

5. (a) Write an R program to add a new column in a given data frame. (8)
- (b) Write an R program to add a new row(s) to an existing data frame. (7)
6. (a) Write an R program to create inner, outer, left, and right join (merge) from given two data frames. (8)
- (b) Explain 'the purpose of statistical graphs in data analysis and provide examples of common types. (7)

### UNIT-IV

7. (a) How does the CART algorithm produce Regression Trees? (8)
- (b) Compare Linear Regression and Decision trees. (7)
8. (a) Describe some cases where k-means clustering fails to give good results. Justify with an example. (8)
- (b) Describe how it is possible to perform Unsupervised learning with random forest. Explain. (7)

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**44219**

**BT-4/J-25**

**INTELLIGENT COMMUNICATION SYSTEMS**

**Paper : ES-CS-AIDS-206A**

**Time : Three Hours]**

**[Maximum Marks : 75**

**Note : Attempt five questions in all, selecting at least one question from each unit. All questions carry equal marks.**

**UNIT-I**

1. (a) Explain the elements of a Communication System and benefits of modulation in Communication Systems. 8
- (b) Discuss Pulse Code Modulation (PCM) and Delta Modulation in detail with relevant diagrams. 7
2. (a) Differentiate ASK, FSK, BPSK, and QPSK modulation techniques. 8
- (b) Explain Time Division Multiplexing (TDM) and Frequency Division Multiplexing (FDM). 7

**UNIT-II**

3. (a) Explain Huffman encoding. How does it reduce redundancy? 8
- (b) Describe Viterbi Algorithm and its use in error detection and correction. 7

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4. (a) Discuss various error control coding techniques. 8  
(b) Define Information Theory. Describe discrete memoryless channels and its usages. 7

### UNIT-III

5. (a) Describe the OSI Reference Model in detail, explaining each layer and its functions. 8  
(b) Explain Integrated Services Digital Network (ISDN) and its applications. 7
6. (a) Elaborate working of Asynchronous Transfer Mode (ATM). 8  
(b) Differentiate between TCP/IP and OSI protocol models. 7

### UNIT-IV

7. (a) Describe Intelligent Communication Systems and its architecture. 8  
(b) Explain design methodology of Telecommunication services using graph theory. 7
8. (a) Discuss the importance of Semantic networks in Telecommunication services. 8  
(b) Elaborate design principles for Intelligent Systems. 7

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Total Pages : 3

**44220**

**BT-4/J-25**

**INTERNET AND WEB TECHNOLOGY**

**Paper : PC-CS-AIDS-208A**

**Time : Three Hours]**

**[Maximum Marks : 75**

**Note :** Attempt *five* questions in all. Selecting at least *one* question from each unit.

**UNIT-I**

1. What are the main types of navigation systems used in information architecture? Explain each type with relevant examples. How does the proper integration of these navigation systems improve website usability and user satisfaction? (15)

2. (a) How does effective collaboration and communication contribute to successful information architecture in web projects? Illustrate with relevant examples. (8)

(b) What is indexing in the context of search systems, and why is it important? (7)

**UNIT-II**

3. (a) Explain how forms are created using HTML5. Describe different input types and their uses with examples. (7)

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- (b) Differentiate between HTML and XHTML with respect to syntax, flexibility, and browser compatibility. (8)

4. Explain the various levels of CSS style sheets. Provide a detailed comparison between Inline, Internal, and External Style Sheets with suitable examples. (15)

### UNIT-III

5. (a) Explain the basic characteristics and structure of JavaScript. How is it different from other scripting languages used in web development? (7)

- (b) What are functions in JavaScript? Explain function declaration, invocation, parameters, and return values with examples. (8)

6. Create a JavaScript program that uses regular expressions to validate user input for a phone number or an email address. Demonstrate the pattern used and how the validation result is handled. (15)

### UNIT-IV

7. (a) Discuss the various data types in Python using suitable example. (7)

- (b) Explain the different control statements in Python using suitable example. (8)

8. (a) Explain the difference between a list and dictionary in Python with examples. (8)
- (b) What is a class in Python? Create a simple class student with attributes and a method to display student details. (7)
-

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Total Pages : 2

**44221**

**BT-4/J-25**

**DATABASE MANAGEMENT SYSTEM**

**Paper : PC-CS-AIDS 210A**

**Time : Three Hours]**

**[Maximum Marks : 75**

**Note :** Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

**UNIT-I**

1. (a) Explain three schema architecture of DBMS with suitable diagram? Also discuss physical data independence and logical data independence. 8
- (b) Describe the functions and responsibilities handled by Database Administrator. 7
2. (a) What is the Role name and Recursive relationship? Discuss various types of relationships and mapping constraints. 9
- (b) Differentiate the following with suitable example:
  - (i) Strong and weak entity set.
  - (ii) Simple and Composite attributes. 6

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## UNIT-II

3. Explore Relational Algebra and Relational Calculus with suitable example. Also illustrate set-oriented operations of Relational Algebra with the help of example. 15
4. (a) What is the difference between TRUNCATE, DELETE and DROP statements? 7  
(b) Identify the role of Views in RDBMS. 8

## UNIT-III

5. What is the requirement of Normalization in DBMS? Compare BCNF and 3NF along with their similarities and dissimilarities by taking suitable example. 15
6. (a) Explain the different types of Functional Dependency. 7  
(b) What kind of anomalies are faced by user during designing a Data Base? 8

## UNIT-IV

7. Describe different types of Deadlock handing and recovery techniques in DBMS. 15
8. Write short note on the following :
  - (a) ACID Properties. 7.5
  - (b) Shadow Paging. 7.5

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**44222**

**BT-4/J-25**

**OPERATING SYSTEM**

**Paper : PC-CS-AIDS-212A**

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

**UNIT-I**

1. (a) Describe the operating system structure. (8)  
(b) Explain different types of Operating Systems. (7)
2. (a) Explain storage hierarchy. (8)  
(b) Describe different types of protections. (7)

**UNIT-II**

3. (a) Differentiate between preemptive and non-preemptive scheduling. (8)  
(b) Discuss the benefits of threads. (7)
4. Explain the following terms :  
(a) Cooperative processes.  
(b) Critical section problem.  
(c) Process states. (15)

### UNIT-III

5. (a) What are the necessary conditions for a deadlock? (8)  
(b) Discuss deadlock prevention. (7)
6. (a) Discuss the concept of paging. (8)  
(b) Explain the term 'Thrashing'. (7)

### UNIT-IV

7. (a) Explain the file organization and access methods. (8)  
(b) Write a short note on DMA. (7)
8. (a) Describe the goals of protection and security. (10)  
(b) Explain threat monitoring. (5)

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Total Pages : 03

**BT-6/J-25**

**46290**

**COMPILER DESIGN**

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *Five* questions in all, selecting at least *one* question *one* question from each Unit.

**Unit I**

1. (a) Explain in brief about closure properties of Regular sets.  
(b) What is formal definition of an N DFA and Regular Expression ? Convert the following RA into its equivalent  $1(0 + 1)^*0$  without Null transition. 15
  
2. Explain various phases of compiler with suitable diagram in detail. Describe how various phases could be combined as a pass in a compiler ? 15

**Unit II**

3. (a) Show that Bottom up parsing is right most derivation in reverse order.

- (b) What are the common conflicts that can be encountered in shift reduce parsers ? **15**
4. (a) Eliminate left recursion in the following grammar : **7.5**  
 $A \rightarrow ABd \mid Aa \mid a$   
 $B \rightarrow Be \mid b$
- (b) Construct predictive parsing table for the grammar : **7.5**  
 $E \rightarrow E + T/T, T \rightarrow T * F/F, F \rightarrow (E)/id.$

### Unit III

5. (a) Write the translation scheme to generate intermediate code for assignment statements with array references. **7.5**
- (b) Draw and explain the Runtime memory organization static storage allocation strategy with pros and cons. **7.5**
6. Define DAG. Explain DAG representation of Basic Blocks. Also construct DAG for the given expression  $((a + a)(a + a)) + ((a + a) + (a + a))$ . **15**

## Unit IV

7. What is Principal Sources of Optimization and also explain about the sources and criterions of code optimization as machine dependent and independent types. **15**
8. (a) Explain in detail about Loop Optimization. **8**  
(b) Explain in brief about Peephole optimization techniques. **7**



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**BT-6/J-25**

**46291**

**APPLIED STATISTICAL ANALYSIS FOR AI  
ES-CS-AIDS-304A**

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

**Unit I**

1. (i) Discuss basic steps involved in research process. 8  
(ii) Describe different Census and sampling methods used in statistics. 7
2. (i) Discuss various methods of examining relationship. 7  
(ii) Explain the framework of SPSS statistics. 8

**Unit II**

3. (i) What are different types of measures of dispersion used in summarizing data ? 7  
(ii) Describe different probability distributions. 8
4. (i) Write and explain the steps involved in finding confidence interval for population mean. 7

- (ii) Discuss various graphical methods in summarizing data. 8

### Unit III

5. (i) Discuss the role of ANOVA in statistical analysis. 7  
(ii) Differentiate type I and type II error. 8
6. (i) Discuss different phases involved in hypothesis testing of population mean. 7  
(ii) Explain the framework for Polynomial regression model. 8

### Unit IV

7. (i) Distinguish linear and non-linear regression. 7  
(ii) Differentiate cluster and factor analysis. 8
8. Write short notes on the following : 7.5×2=15  
(a) Spearman's Rank Order Correlation  
(b) Residual and Plots



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Total Pages : 03

BT-6/J-25

46292

BIG DATA ANALYTICS

PC-CS-AIDS-306A

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

### Unit I

1. (a) What do you mean by Big Data ? Explain the Evolution of Big Data and its characteristics. 7
- (b) What is structured, semi-structured and unstructured data ? Explain with examples. 8
2. (a) Illustrate the Hadoop core components with a neat diagram. 7
- (b) What is Apache Hadoop ? Discuss the Hadoop Ecosystem Components in Four Layers. Explain with a diagram. 8

## Unit II

3. (a) Describe the MapReduce Algorithm in steps with a neat diagram. 7
- (b) Define Big Data Analytics. What is a Pig ? Explain the key features of the Pig. 8
4. (a) What are the key characteristics of MongoDB ? Explain the following in MongoDB : Insert method, Aggregate function and Cursor. 7
- (b) What is Flume ? Explain recoverability and multihop flows, reliability and failure handling in Flume. 8

## Unit III

5. (a) Define HDFS. Describe Name Node, Data Node and Block. Explain HDFS operations in detail. 7
- (b) In Map-Reduce implementation of Word count, write the types of keys and values mapper, reducer, combiner (if any) and which of the types need to be writable. 8
6. (a) Define the Apache Spark. Explain how Spark runs applications with the help of its architecture. 7
- (b) What is NoSQL ? What are the advantages of NoSQL ? Explain the types of NoSQL Databases. 8

## Unit IV

7. (a) Define the Node Manager and Application Manager. Explain with a neat diagram. 7
- (b) Define the Command line interface using HDFS files and give a brief note on Hadoop-specific file system types and HDFS commands. 8
8. (a) What are the limitations of Hadoop 1.0 ? Explain Hadoop 2 : HDFS and Hadoop 2 : YARN. 7
- (b) Explain the Task Tracker and Job Schedulers in the Hadoop. Explain all types of Schedulers with examples. 8

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**BT-6/J-25**

**46293**

**APPLIED MACHINE LEARNING**

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit.

**Unit I**

1. (a) Define a well-posed machine learning problem. Give a mathematical formulation with an example from a real-world application. 8
- (b) A dataset contains two features,  $X_1$  and  $X_2$ , structured as follows :  
$$X_1 = [2, 4, 6, 8, 10] , X_2 = [1, 3, 5, 7, 9].$$
Calculate the covariance matrix and interpret the results. 7
2. Differentiate between structured and unstructured data with examples.
  - (a) A medical research team collects structured and unstructured data. They use statistical learning techniques to infer patterns in the data. 5

- (b) Compute Bayesian probability for a given scenario :  
If 30% of patients have a disease and a test correctly identifies the disease 90% of the time (with a 10% false positive rate), what is the probability that a person who tests positive actually has the disease ?

10

## Unit II

3. (a) Explain the impact of bias and variance in supervised learning. Use mathematical formulations to show how a model can be regularized to reduce over fitting. 7
- (b) Consider a regression problem where the true function is  $f(x) = 3x + 2$ . If the training dataset contains some noise, analyze the mean squared error (MSE) for a simple linear regression model with given predictions :
- $$\hat{A} = [5, 9, 11, 14] \text{ for } x = [1, 2, 3, 4]. \quad 8$$
4. (a) Discuss the working principle of the Support Vector Machine (SVM) algorithm with both hard and soft margin classifiers. 7

- (b) A dataset is linearly separable, with two classes having mean vectors :

$$\mu_1 = [1, 2], \mu_2 = [4, 6]$$

Find the linear discriminant function and the decision boundary assuming equal covariance matrices. 8

### Unit III

5. A dataset contains attributes with varying levels of entropy.

- (a) Compute the entropy for the following class distribution :

$$P(\text{Class A}) = 0.4, P(\text{Class B}) = 0.6.$$

- (b) How does entropy-based discretization help in machine learning ? Discuss with an example. 15

6. (a) Explain, how PCA reduces dimensionality. Consider the following covariance matrix :

$$C = \begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix}.$$

Compute its eigen values and eigen vectors. Use these results to explain how PCA transforms the dataset. 10

- (b) Discuss K-means clustering and implement it on a dataset where :

$$X = [2, 4, 10, 12, 3, 20, 30, 11, 25]$$

Assume two clusters with initial centroids at 2 and 25. Compute the first iteration of cluster formation.

5

#### Unit IV

7. (a) Discuss the limitations of multilayer perceptrons in solving complex nonlinear problems. Suggest techniques to overcome these limitations. 7
- (b) Given an MLP network with 2 hidden layers, derive the weight updates using backpropagation for a simple input-output pair. Assume a learning rate of 0.1 and a squared error loss function. 8
8. (a) Compare and contrast the Mamdani and Takagi-Sugeno fuzzy inference models. Discuss their advantages and computational complexity. 8

- (b) Consider a fuzzy inference system where the membership function for input X is given as :

$$\mu_A(x) = e^{-(x-5)^2} / 2$$

Compute the membership value for  $x = 6$  and discuss the significance of fuzzy quantification of knowledge. 7



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**BT-6/J-25**

**46294**

**SOFT SKILLS AND INTERPERSONAL  
COMMUNICATION**

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *Five* questions in all. All questions carry equal marks.

1. Describe the process of communication and explain, how signs, signals and symbols are used in visual communication. Also illustrate with examples the different modes of communication like intercultural, intracultural, crosscultural and international communication. **15**
2. Write a business letter to a computer hardware supplier placing an order for laptops and printers for your company. (Mention the specifications, quantity, delivery date and payment terms). **15**
3. Prepare a business presentation on "Increasing Brand Awareness through Social Media" for a new startup. Include key strategies, target audience and expected outcomes. **15**

4. You are the HR Manager of a company. Write a circular to all employees informing them about the new work-from-home policy, including guidelines, eligibility and the effective start date. Additionally, write a memo to the department heads instructing them to ensure that all team members are informed about the policy and to report any issues related to its implementation. 15
  
5. Discuss the importance of interpersonal and intrapersonal skills in everyday life. How do these skills impact relationships within a family and society ? Illustrate with suitable examples. 15
  
6. How does group influence shape an individual's interaction skills in workplace settings ? Discuss the importance of human relations in developing effective communication and collaboration. Support your answer with relevant examples, role plays or case studies. 15
  
7. What are leadership skills and why are they essential in both personal and professional life ? Discuss the key qualities of an effective leader and illustrate your answer with real-life examples. 15

8. Imagine you are a sales executive for a software company. You are meeting a client who is interested in your product but is concerned about the pricing and features. Prepare a negotiation plan that includes your negotiation strategy and selling techniques you would use to close the deal successfully.

15



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BT-6/J-25

46296

ENTERPRISE RESOURCE PLANNING

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

**Unit I**

1. (a) Discuss elaborately the 'evolution phases' of Enterprise Resource Planning (ERP) right from 1960s to till date. 9
- (b) Define 'Enterprise Resource Planning' (ERP) and its advantages. 6
2. What is ERP architecture ? Explain any *three* ERP architecture models. 15

**Unit II**

3. (a) Explain ERP Marketplace Dynamics and the impact of changing markets. 8

- (b) Describe Customer Relationship Management (CRM) modules in ERP. 7
- 4. (a) Describe different functional modules of ERP software. 8
- (b) Explain the integration of ERP with the Supply Chain Management process. 7

### Unit III

- 5. (a) "Business Process Re-engineering leads to implementation of ERP". Explain. 8
- (b) Differentiate between data warehousing and data mining. 7
- 6. (a) What are the important aspects of Object Oriented Design and Analysis in ERP ? 8
- (b) Describe the role of SDLC in implementation of ERP. 7

### Unit IV

- 7. (a) Explain the critical success and failure factors in ERP implementation. 8

- (b) How can ERP be integrated into organizational culture ? 7
- 8. (a) Compare SAP and ORACLE ERP tools with a relevant case study. 8
- (b) Discuss the role of ERP in enhancing e-Commerce. 7



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**BT-6/J-25**

**46297**

**SOFT COMPUTING**

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

**Unit I**

1. (a) What do you understand by soft computing ?  
Explain its characteristics and paradigms. 8
- (b) Contrast and Compare hard computing with soft computing. 7
2. (a) Discuss the major application areas of soft computing. 8
- (b) Differentiate supervised and unsupervised learning. 7

**Unit II**

3. (a) What do you understand by Artificial Neural Networks ? Explain some of its important applications. Compare feed forward and feedback networks. 5

- (b) Give the meaning of Adaptive Resonance Theory (ART) network. Moreover, explain ART network in detail using any example. 5
- (c) What do you understand by error back propagation? Explain the back-propagation network in detail. 5
4. (a) Draw and explain the architecture of Back-propagation network. Write its testing algorithm. 8
- (b) What do you understand by self-organizing maps? Explain it in detail using real life example. 7

### Unit III

5. (a) Define Tautology. Prove how that :
- $$(p \wedge q) \rightarrow (p \vee q)$$
- is a tautology using truth values in Fuzzy logic? 5
- (b) Explain any *two* methods for the decomposition of Fuzzy rules. What is Cooperative Neural Fuzzy system? Illustrate its classification types. 5
- (c) Give the canonical form of Fuzzy rule based system. Give the syntax for the formation of Fuzzy rule using : 5
- (i) Assignment statements
- (ii) Conditional statements
- (iii) Unconditional statements.

6. (a) What is Fuzzy Inference System (FIS) ? Illustrate Mamdani FIS and Sugeno FIS with suitable examples. 8
- (b) Differentiate between normal and subnormal Fuzzy set. Also, explain the features of membership functions. 7

#### Unit IV

7. (a) Explain various applications of Genetic Algorithm (GA). What is K-factor and how is it used in GA ? 8
- (b) Explain bit-wise operation in Genetic algorithm. What are Genetic Algorithms (GA) ? Explain the operators in GA. 7
8. (i) Explain *four* mutation methods in Genetic Algorithms.
- (ii) List the stopping condition for Genetic Algorithm flow.
- (iii) State the properties of Genetic Neuro Hybrid System (GNHS). Draw the block diagram of GNHS. 15



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47394

BT-7/J-25

UNIVERSAL HUMAN VALUES – II :

UNDERSTANDING HARMONY

Paper : HSS-403A

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *five* questions in all, selecting at least *one* question from each unit.

**UNIT-I**

1. Discuss the concept of happiness and prosperity for human life. Discuss the basic requirements for fulfillment of human aspiration. (7+8=15)
2. Discuss the process of self exploration with suitable examples. Define and discuss the need of value education in today's world. (9+6=15)

**UNIT-II**

3. Discuss the concept of co-existence of self and body in detail. Discuss the concept of desire, thoughts and expectation for harmony of the self. (8+7=15)
4. Discuss in detail the program of self regulation to maintain harmony of the body. (15)

### UNIT-III

5. Discuss the nine feelings between human-human relationships in detail. (15)
6. Discuss various systems of human order in society to achieve world family. (15)

### UNIT-IV

7. Discuss the concept of nature and harmony within it. Discuss the role on human being in maintaining harmony at nature level. (10+5=15)
8. Discuss the concept of coexistence in detail. Discuss the complete existence as co-existence of various units and role of human being in it. (8+7=15)

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Total Pages : 2

**47395**

**BT-7/J-25**

**CYBER LAW AND ETHICS**

Paper : OE-CS-AIDS-401

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *five* questions in all, selecting at least *one* question from each unit.

**UNIT-I**

1. (a) Differentiate doctrinal approach and real approach with example. (8)
- (b) Discuss the pros and cons of Internet in field of cyber crime. (7)
2. (a) Discuss the working of courts with help of court hierarchy. (7)
- (b) Differentiate civil jurisdiction and cyber jurisdiction with example. (8)

**UNIT-II**

3. (a) Discuss the amendments and limitation of IT Act 2000. (8)
- (b) Explain the working digital signature in detail. (7)

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4. (a) Define cryptography. Discuss various types of cryptography with example. (8)

(b) Discuss various responsibilities and functions performed by cyber regulation appellate tribunal. (7)

### UNIT-III

5. (a) Differentiate copyright and trademark law with example. (8)

(b) Discuss various methods to protect electronics database. (7)

6. Write short notes on :

(a) Indian Evidence Act.

(b) Criminal Procedural Code. (2×7½=15)

### UNIT-IV

7. (a) Discuss various Ethics used for information society. (7)

(b) Define Block chain. Discuss the role of chain in cyber ethics. (8)

8. (a) How AI can play an important role in Cyber ethics? (8)

(b) Discuss the significance of cyber ethics. (7)

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Total Pages : 2

**47400**

**BT-7/J-25**

**DATA MINING & PREDICTIVE MODELLING**

**Paper : PE-CS-AIDS-417A**

Time : Three Hours] [Maximum Marks : 75

**Note :** Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

**UNIT-I**

1. (a) Describe the Concept and Technologies used in Data Mining. (7)  
(b) Describe the steps in Data Mining Process. (8)
2. What are the Applications and Challenges of Data Mining? (15)

**UNIT-II**

3. (a) Discuss Statistical Perspective on Data Mining. (8)  
(b) What is Clustering and requirement for Cluster Analysis? (7)
4. Write notes on the following :  
(a) Decision Tree and Decision Tree induction.  
(b) Association Rule mining. (2×7½=15)

### UNIT-III

5. Describe various Model Development techniques. (15)
6. Explain Bayesian Networks & Cox regression. (15)

### UNIT-IV

7. Describe the Model Evaluation, Deployment and Validation techniques. (15)
8. (a) What is MetaLevel Modeling? (8)  
(b) Explain Evaluation Charts for Model Comparison. (7)

AIDS 8th/10b

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BT-8/J-25

48400

## REINFORCEMENT LEARNING

Paper-PC-CS-AIDS-402A

Time Allowed : 3 Hours]

[Maximum Marks : 75

**Note** : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

### UNIT-I

1. What is Reinforcement Learning and how it is originated? Also explain its connection with other related fields. 15
2. What are the elements of Reinforcement Learning, explain these elements in detail? 15

### UNIT-II

3. Explain the terms Markov property and Markov Chain in relation with Reinforcement learning. 15
4. (a) Elaborate the concept of Bellman Optimality equations. 7½  
(b) What is Markov decision process and under what conditions it is used? 7½

48400/K/988/100

P. T. O.

### UNIT-III

5. What is Monte Carlo method in Reinforcement learning and explain the concept of first and every visit? 15
6. Explain Q-Learning Algorithm with its two variants in detail. 15

### UNIT-IV

7. Explain the use of Gradient Descent in machine learning and its working. 15
8. Explain the following : 15
  - (a) Control with function approximation.
  - (b) Least Squares.

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**BT-8/J-25**

**48401**

## **ENTREPRENEURSHIP AND START-UPS**

Paper-HSS-404A

Time Allowed : 3 Hours]

[Maximum Marks : 75

**Note** : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

### **UNIT-I**

1. In what ways do different types of contribute uniquely to the Economic, Social, and Cultural fabric of a Country?
2. How can Educators and Policymakers dispel common myths about Entrepreneurship to encourage broader participation in Entrepreneurial ventures?

### **UNIT-II**

3. What are the Critical stages in the Entrepreneurial decision-making process, and how do Cognitive biases and Risk perception affect decision quality?
4. How can case studies of Entrepreneurial success stories be used as Learning tools to Build resilience, Vision, and Adaptability among aspiring Entrepreneurs?

**48401/K/1026/100**

**P. T. O.**

### **UNIT-III**

5. How does Customer-focused innovation differ from traditional market research and why is it essential in today's competitive startup ecosystem?
6. What strategies and techniques should Entrepreneurs adopt to deliver persuasive and impactful business pitches to attract funding and partnerships?

### **UNIT-IV**

7. What is the significance of Industry associations and business networks in supporting small business growth, mentorship and access to markets?
8. In what ways can Government policies and Institutional partnerships be designed or improved to create a more enabling environment for Start-ups and Micro-enterprises?

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Total Pages : 2

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**48402**

## **AGILE SOFTWARE ENGINEERING**

Paper-OE-CS-AIDS-408

Time Allowed : 3 Hours]

[Maximum Marks : 75

**Note** : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

### **UNIT-I**

1. (a) State Agile Software Development. 5
- (b) Explain the principles of Agile in detail. 10
2. Discuss the Agile process methods in detail with suitable examples. 15

### **UNIT-II**

3. (a) Describe how Scrum is applied in Agile project development? 8
- (b) Elaborate the structure and elements of the Agile Manifesto. 7
4. (a) Explain in detail the Agile approach to managing product development through Scrum practices. 8

**48402/K/1113/100**

**P. T. O.**

- (b) Discuss Scrum applications in large organizations.

7

### UNIT-III

5. (a) Describe Agile Risk Management with suitable examples. 8

- (b) What is feature-driven development? How is it useful?

7

6. Explain the process of Managing Agile requirements with the help of Tools and Techniques. 15

### UNIT-IV

7. (a) Discuss the importance of Agile metrics in monitoring project progress. 10

- (b) Write short notes on Configuration management in Agile. 5

8. (a) Explain the significance of Automated build tools in Agile environments. 8

- (b) Discuss the benefits of continuous integration and automated tools in Agile. 7

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48403

## APPLICATION OF DATA SCIENCE IN INDUSTRY

Paper-PE-CS-AIDS-416A

Time Allowed : 3 Hours]

[Maximum Marks : 75

**Note** : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

### UNIT-I

1. What is the null space of a Matrix? Explain with an example its role in solving overdetermined systems. 15
2. Explain the concepts of vector projection and distance in high-dimensional data analysis. 15

### UNIT-II

3. What is Hypothesis testing? Describe its steps with an example in a Data science context. 15
4. (a) Explain covariance and covariance matrix. How are they useful in feature selection?  
(b) Describe how confidence intervals are used for estimating population parameters? 15

### UNIT-III

5. Compare logistic regression, k-nearest neighbors (kNN), and k-means clustering for classification tasks. 15
6. What is model assessment in regression analysis? Discuss techniques used for evaluation. 15

### UNIT-IV

7. Explain the working and application of OLAP tools in the fast-food Industry with a relevant case study. 15
8. How are automated data pipelines built using Apache Airflow and PySpark? Illustrate with an example. 15

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**48404**

## **NEXT GENERATION DATABASES**

Paper-PE-CS-AIDS-426A

Time Allowed : 3 Hours]

[Maximum Marks : 75

**Note** : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

### **UNIT-I**

1. Explain basic building blocks of Hadoop with a neat sketch. Also explain Hadoop file system in detail. 15
2. Define database. Explain three database revolutions in detail. 15

### **UNIT-II**

3. Define the Sharding. List some benefits of Sharding. Explain architecture of Amazon Web Services. 15
4. What are Document databases? Explain JSON Document databases in detail. 15

### **UNIT-III**

5. Define XML and its various tools. Describe some advantages of XML databases. Also explain XML database applications. 15

**48404/K/1336/100**

**P. T. O.**

6. Write short notes on following : 15
- (a) Graph Databases.
  - (b) MongoDB.
  - (c) Column Databases.

#### UNIT-IV

7. Define HBase. What are main components of HBase? What do you understand by CAP theorem? Which feature of CAP theorem does HBase follows? 15
8. Explain Nonrelational databases in detail. Also explain sharding and replication in MongoDB. 15