END SEMESTER EXAMINATION, DECEMBER - 2024

B. Tech. (CSE) Semester – VII/ B.Sc. (Hons.) in DS Semester - V

Course Name: Operations Research **Course Code: OCS473/BDS352**

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully. Attempt all Sections & Questions.

Q.1. Attempt all. (10×2=20)

QN	Questions	CO	PO
a.	While solving a linear programming model graphically, the area bounded by the constraints is called…..	1	8
b.	In two-phase method, an……variable is never considered for re-entry into the basis	1	8
c.	A……..variable represent amounts by which solution values exceed a resource.	1	1
d.	The amount of time that is expected to complete the activity is called……	3	1
e.	The saddle point of the following table is……. -5 5 0 7 2 6 1 8 -4 0 1 -3	3	2
f.	A linear programming technique improves the quality of ……..	1	2
g.	The……method is useful for game with larger payoff matrix without saddle point.	3	2
h.	The saddle point of the following table is…….. 1 7 3 4 5 6 4 5 7 2 0 3	3	2
i.	For a maximization problem the objective function coefficient for an artificial variable is	1	2
j.	Expected length of non-empty queue is given by……..	4	2

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

QN	Questions	CO	PO
a.	Solve given assignment problem I II III IV V A 85 15 65 125 75 B 90 78 66 132 78 C 75 66 57 114 69 D 80 72 60 120 72 E 76 64 56 112 68	2	2
b.	Solve the following LPP by graphical method Min.Z $=5x_1+8x_2$ .s.t. $x_1 \leq 4$ $x_2 \geq 2$ $x_1+x_2=5$ $x_1,x_2 \geq 0$	1	2

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c.	Solve the following LPP Max.Z $=2x_1+x_2+3x_3$ s.t. $x_1+x_2+2x_3 \leq 5$ $2x_1+3x_2+4x_3 = 12$ $x_1,x_2 \geq 0$	1	2
d.	Solve the following LPP by 2-Phase method Min.Z $= 6x_1+3x_2$ .s.t. $x_1+x_2 \geq 1$ $2x_1 - x_2 \geq 1$ $x_2 \leq 2$ $x_1,x_2 \geq 0$	1	2
e.	Solve the given transportation problem by N-W corner method.	2	2
f.	Solve the following LPP Max.Z $=x_1+2x_2+3x_3$ s.t. $x_1+2x_2+3x_3 \leq 10$ $x_1+x_2 \leq 5$ $x_1,x_2,x_3 \geq 0$	1	2
g.	Find the optimal strategy for each of the player and the value of the game	3	1

	I	II	III	IV	Capacity
A	6	3	5	4	22
B	5	9	2	7	15
C	5	7	8	6	8
Demand	7	12	17	9	

1	3
4	2

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

QN	Questions	CO	PO
a.	Solve the following LPP by dual simplex method Min Z= $10x_1+6x_2+2x_3$ s.t. $-x_1+x_2+x_3 \geq 1$ $3x_1+x_2-x_3 \geq 2$ $x_1,x_2,x_3 \geq 0$	1	1
b.	Consider a situation where the mean arrival time (λ) is one customer every 6 minutes and the mean service time $(\frac{1}{\mu})$ is 4.5 minutes. Calculate the average number of customers in the system, average queue length, the average time a customer spend in the system and the average time a customer wait before being served.	4	2
c.	Explain simplex method for a linear programming problems.	1	1
d.	Solve the following game to find the optimal strategy	3	1

3	2	4	0
3	4	2	4
4	2	4	0
0	4	0	8

Q.4. Attempt any two out of three. (2x15=30)

QN	Questions	CO	PO
a.	Determine the optimal sequence of job which minimize the total elapsed time based on the following information	2	1

Job	A	B
1	3	8
2	12	10
3	15	10
4	6	6
5	10	12
6	11	1
7	9	3

b.	The production department of a company requires2400 kg of raw material for manufacturing a particular item per year. It has been estimated that the cost of placing an order is Rs 24and the holding cost is Rs 105 per kg per year. Help the purchase manager to determine the (i) Annual ordering cost. (ii) The optimal lot size. (iii) The minimum yearly total inventory cost.	4	2
c.	A project has the following activities and other characteristics	3	1

Activity	Preceding Activity	Optimistic Time (a)	Pessimistic Time(m)	Most likely Time(b)
A	-	4	7	16
B	-	1	5	15
C	A	6	12	30
D	A	2	5	8
E	C	5	11	17
F	D	3	6	15
G	B	3	9	27
H	E,F	1	4	7
I	G	4	19	28

(i) Draw the network diagram for the project.
(ii) Identify the critical path.
(iii) Prepare the activity schedule for the project.
(iv) Determine the mean project completion time.
(v) Find the probability that the project is completed in 36 days.

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, DECEMBER- 2024

MCA Semester – III/ B. Sc. (Hons.) in DS Semester - V

Course Name: Cloud Computing/ Introduction to Cloud Computing **Course Code: MCE231/DDS352**

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully.

Q.1. Attempt all. **(10×2=20)**

a.	Name three models of Cloud Computing.	1	1
b.	What are the advantages of cloud computing?	1	1
c.	What is IAAS?	1	1
d.	What is IAM?	2	1
e.	Define Cloud Computing.	2	2
f.	What is the name of Microsoft's Cloud Service?	3	1
g.	What is full form of PaaS?	3	3
h.	What is S3?	3	1
i.	Name different Business Benefits of Cloud Computing.	4	1
j.	What is the full form of AWS?	5	2

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

a.	What are the security challenges in cloud computing	2	2
b.	List disadvantage of cloud computing. Elaborate.	1	3
c.	Explain about 3 cloud models.	3	1
d.	Explain in detail the various aspects for the need of virtualization in cloud computing	1	2
e.	Discuss in brief about the cloud computing and data security risk.	4	1
f.	What is the need for Migration in the cloud?	1	2
g.	State any three essential benefits of cloud computing.	5	1

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

a.	Can You share some best practices for securing customer data on the cloud?	3	2
b.	Describe 3 top / Key Learnings from the Siemens Cloud Case Study	2	3
c.	Describe the infrastructure requirements for Cloud computing	3	2
d.	Describe the cloud supplychain (C-SC).	4	3

Q.4. Attempt any two out of three. **(2×15=30)**

a.	In the IBM Case Study, what is the single biggest factor in determining the success of the company i.e. how do we, as consumers, know how well the company is doing?	2	2
b.	In the IBM Case Study, what are Microservices? How did they help American Airlines achieve what they did in terms of transformation?	3	3
c.	What are the key methods to secure a cloud environment?	4	3

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END SEMESTER EXAMINATION, DECEMBER - 2024

B. Sc. (Hons.) in DS Semester - V

Course Name: Introduction to Natural Language Processing **Course Code: DDS355**

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully.

Q.1. Attempt all. (10×2=20)

QN	Questions	CO	PO
a.	What is named entity recognition in NLP?	3	1
b.	What is word sense disambiguation?	3	1
c.	Define information extraction.	5	1
d.	Explain the term language translation.	1	1
e.	What do you mean by text summarization?	4	1
f.	Define sentiment analysis.	1	1
g.	What do you mean by N-Gram language modeling?	1	1
h.	What does evaluating a Model Mean?	1	1
i.	What are the main challenges in NLP?	1	1
j.	How does part of speech tagging work in NLP?	2	1

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

QN	Questions	CO	PO
a.	Discuss various application domains of Morphological Analysis.	2	1,2
b.	Define Morphemes and give examples.	2	1,2
c.	Differentiate between Orthographic & Morphological Rules.	2	1
d.	Draw parse tree for the following sentence- (a) She saw the man with the telescope. (b) He is reading a book.	2	1
e.	Explain following with suitable example: Synonymy, Antonymy, Hypernomy, Hyponomy,	3	1
f.	Why CFG is used to represent natural language in parsing?	3	1,2
g.	Identify the morphological type (Noun phrase, Verb Phrase, Adjective Phrase) of following sentence segments: 1. important to Bill 2. looked up the tree	2	1,2, 3

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

QN	Questions	CO	PO
a.	i. What do mean by lexical ambiguity and syntactic ambiguity in Natural language? ii. Explain block diagram of generic NLP system.	1,2, 3	1,2
b.	i. What are different ways to resolve these ambiguities? ii. What is Morphology? Explain with example.	2	1,2
c.	i. Discuss various challenges in processing natural language. ii. Why do we need to do Morphological Analysis?	1,2	1
d.	i. List various applications of NLP and discuss any 2 applications in detail. ii. What do you mean by web mining? Explain with example.	1,5	1,2

Q.4. Attempt any two out of three. (2×15=30)

QN	Questions	CO	PO
a.	i. Explain how AI can play a role in sentiment analysis of human beings? ii. What do you mean by ambiguity in Natural language? Explain with suitable example.	2,3	1,2
b.	i. Why are human languages complicated for a computer to understand? Explain. ii. Discuss various ways to resolve ambiguity in NLP.	2,3	1,2
c.	i. Describe the concept of CFG. Explain all the tuples and limitations of CFG. ii. Draw a derivation tree for the string "bab" from the CFG given by $S \rightarrow bSb \mid a \mid b$	3	1,2, 3

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, DECEMBER - 2024

B. Sc. (Hons.) in DS Semester - V

Course Name: Social Media Analysis **Course Code: GDS355**

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully.

Q.1. Objectives Type

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

QN	Questions	CO	PO
a.	Name two authentication methods used in social media APIs.	1	1
b.	What is web scraping, and how does it differ from API-based data collection?	1	1
c.	Define stemming in the context of text preprocessing.	1	1
d.	What is the purpose of handling duplicates in a dataset?	1	2
e.	Describe the term "topic modeling."	1	2
f.	What is the purpose of using sentiment analysis in social media studies?	1	2
g.	Define the term "edge" in a social network graph.	1	2
h.	Name one real-world application of social network analysis.	1	1
i.	What is LDA, and where is it used in social media analysis?	1	1
j.	Mention one advantage of using tools like Gephi for network visualization.	1	1

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

(5×4=20)

QN	Questions	CO	PO
a.	Explain the business importance of social media analysis with an example.	2	3
b.	What are the limitations of data collection using social media APIs?	2	3
c.	Discuss the difference between stemming and lemmatization.	2	3
d.	What is JSON, and why is it important for social media data?	2	3
e.	Outline the steps involved in handling multimedia data for analysis.	2	2
f.	How does keyword extraction help in understanding trends on social media?	2	2
g.	Briefly explain how centrality is used to identify influential users in a network	2	2

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

(3×10=30)

QN	Questions	CO	PO
a.	Compare and contrast lexicon-based and machine learning-based approaches to sentiment analysis.	3	1
b.	Discuss the challenges and best practices in managing large datasets for social media analysis.	3	2
c.	Explain the process of building and analyzing a network graph, including the importance of community detection.	4	3
d.	What are the key steps in preprocessing social media text data for analysis?	4	2

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

(2×15=30)

QN	Questions	CO	PO
a.	Provide a detailed overview of how social media APIs work, including authentication and data collection methods.	5	1
b.	Analyze the societal impact of social media analysis, emphasizing ethical and privacy issues	4	2
c.	Discuss the application of topic modeling (e.g., LDA) in social media analysis, including its limitations and advantages.	4	2

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END SEMESTER EXAMINATION, DECEMBER - 2024

B. Sc. (Hons.) in DS Semester - V

Course Name: Machine Learning for Data Science **Course Code: BDS351**

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully.

Q.1. Objectives Type

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

		CO	PO
a.	What is weather forecasting?	1	1
b.	Define significance of ML in data science.	1	1
c.	What is Machine Learning?	1	1
d.	Define simple linear Regression	1	1
e.	What is BI?	1	1
f.	Compare Data Science and Statistics.	2	2
g.	Like the probabilistic view, the _____ view allows us to associate a probability of membership with each classification i) Deductive ii) Exemplar iii) Classical Inductive	2	2
h.	Database query is used to uncover this type of knowledge. i) Hidden ii) Shallow iii) Deep multidimensional	2	2
i.	Application of machine learning methods to large databases is called_____ i) Big data computing ii) Artificial intelligence iii) Data mining iv) Internet of things	2	2
j.	Name the applications of Sentiment Analysis.	2	2

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

		CO	PO
a.	What is Noisy data or Outliers , border point in DBSCAN clustering	2	2
b.	Differentiate between Linear Regression and Logistic Regression.	3	2
c.	Discuss the concept of Model Selection in Machine Learning.	3	3
d.	Define Generalized Linear Models and mention their applications.	3	3
e.	What are the key challenges associated with modeling time-series data in Machine Learning?	2	3
f.	Explain the basic idea behind the K-means clustering algorithm.	2	3
g.	What is machine learning, and how does it differ from traditional programming? Describe the three main types of machine learning: supervised learning, unsupervised learning.	1	2

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

		CO	PO
a.	Illustrate Q-learning Algorithm.	3	1
b.	Solve the numerical (FIND-S)	3	1

Example	*Sky*	*AirTemp*	*Humidity*	*Wind*	*Water*	*Forecast*	*EnjoySport*
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

1. Initialize *h* to the most specific hypothesis in *H*

h0 = <Ø, Ø, Ø, Ø, Ø, Ø>

c.	Draw the hyper plane for the following data set: positively labeled data (3,1) (3, -1) (6, 1) (6, -1) and the dataset for negatively labeled data is (1,0) (0,1) (0,-1) (-1,0)	2	1
d.	Runs scored by a cricket team in a league of 12 matches – 100, 20, 110, 150, 110, 140, 130, 170, 120, 220, 140, 110.To draw a box plot for the given data first we need to arrange the data in ascending order and then find the minimum, first quartile, median, third quartile and the maximum	2	2

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

		CO	PO
a.	The give table represented our data set, we have two columns- Brightness and Saturation. Each row in the table has a class of either Red or Blue. Perform KNN classifier algorithm in following dataset and predict the class for (Brightness=20, Saturation= 35) where assume the value of K=5.	3	2

Brightness	Saturation	Class
40	20	Red
50	50	Blue
60	90	Blue
10	25	Red
70	70	Blue
60	10	Red
25	80	Blue

b.	Perform Agglomerative clustering on the following data and plot a dendrogram using Complete Linkage Approach. The given data indicates the distance between elements.	4	3

Item	A	B	C	D	E
A	0				
B	9	0			
C	3	7	0		
D	6	5	9	0	
E	11	10	2	8	0

c.	First, calculate the covariance matrix of a data set. Then, calculate the eigenvectors of the covariance matrix. x1= 2.5 0.5 2.2 1.9 3.1 2.3 2.0 1.0 1.5 1.1 x2= 2.4 0.7 2.9 2.2 3.0 2.7 1.6 1.1 1.6 0.9	5	3

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