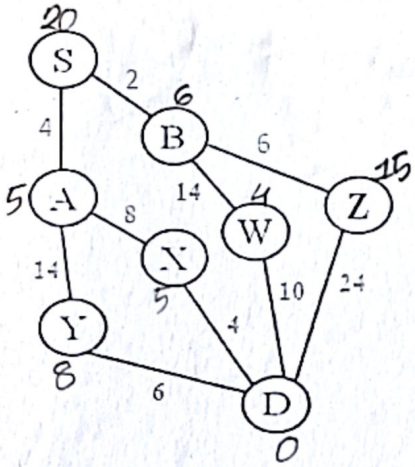
Daffodil International University

Department of Business Admiration
Faculty of Business & Entrepreneurship
Midterm Examination, Fall-2025
Course Code: 0613-324, Course Title: Artificial Intelligence in Business Applications
Batch: 64 Teacher: TR/ MFH

Time: 1 Hour and 30 Minutes **Marks: 25**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	Let us consider a closed room, where windows and doors are made with glasses. There is an AC (Air conditioner) placed in the top of the room, which works for '*Temperature Controlling System (TMP)*' for this room. If the desired temperature set for the room is more than the current temperature, TMP adjusts temperature by dissipating cool air. If the desired temperature set for the room is less than the current temperature, TMP adjusts temperature by dissipating hot air. If the desired temperature set for the room equals the current temperature, TMP performs no operation.			
	a)	**Show** the PEAS description of the task environment for TMP.	[2]	CLO1
	b)	**Relate** TMP to distinguish its agent type and describe the type in details with figure.	[3]	CLO1
2.	Consider the following scenario, where start node is *S* and goal node is *D*.  Values for h: A 5, B 6, D 0, S 20, W 4, X 5, Y 8, Z 15			
	a)	**Demonstrate** uniform cost search to find the solution path from S to D.	[5]	CLO2
	b)	**Interpret** a search tree using A* algorPithm to find the solution path from S to D.	[5]	

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3.	*a)*	**Define** Artificial Intelligence (AI) and **describe** its major branches. Provide real-life examples.	[3]	CLO1
	b)	**Differentiate** between Classification and Regression based on their working principles, advantages, and applications.	[2]	
4.	You are designing an **AI-powered delivery robot** for a logistics company. The robot must navigate city roads, avoid obstacles, and deliver packages to customer locations. During design discussions, your team debates whether the robot's environment should be considered **fully observable and deterministic** or **partially observable and stochastic**.			
	a)	**Illustrate** which type of environment best represents the **real-world city delivery scenario.**	[3]	CLO2
	b)	**Demonstrate** your answer by comparing it with a **fully observable, deterministic environment** such as a chess game or an automated sorting system.	[2]	

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Department of Business Admiration
Faculty of Business & Entrepreneurship
Final Examination, Fall-2025
Course Code: 0613-324, Course Title: Artificial Intelligence in Business Applications
Batch: 64 Teacher: TR/ MFH
Time: 2 Hours Marks: 40

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1. A telecom company wants to reduce customer churn. They collected data on monthly usage, contract length, and monthly bill amount. They also classify each customer as **"Likely to Churn"** or **"Not Likely to Churn."**

	Using this business scenario, explain how the company can: • Use **regression** to predict monthly bill amount for new customers • Use **correlation** to identify whether usage or contract length has a stronger relationship with churn behavior • why regression and classification serve **different business objectives** Your answer must be business-focused with proper reasoning.	10	CLO1

2. A bank uses an AI model to classify loan applicants as *High Risk* or *Low Risk*. After testing, the confusion matrix is:

	Predicted High Risk	Predicted Low Risk
Actual High Risk	120	30
Actual Low Risk	25	225

	Compute the following with full steps: 1. Accuracy 2. Error Rate 3. True Positive Rate (TPR) 4. True Negative Rate (TNR) Finally, explain in business terms what these metrics tell the bank about the reliability of the loan approval model.	10	CLO2

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3.	*A clothing retailer wants to predict whether a new customer will purchase a* ***Premium*** *or* ***Regular*** *product based on similarity to past customers. Dataset:* **Customer** | **Income(kS)** | **Score** | **Product** C1 | 30 | 40 | Regular C2 | 80 | 85 | Premium C3 | 50 | 60 | Premium C4 | 28 | 30 | Regular C5 | 75 | 70 | Premium *New customer:* ***Income = 60k, Score = 78***		
	Using k = 3 (Euclidean distance): • Compute distance from each existing customer • Identify 3 nearest neighbors • Predict whether the new customer will choose Premium or Regular • Explain why kNN is useful for business customer segmentation All steps must be shown clearly.	10	CLO3
4.	A **fashion retail chain** wants to increase sales using AI. They collect transaction data from their stores. The transactional dataset is: • **T1:** {T-Shirt, Jeans, Sneakers} • **T2:** {T-Shirt, Jacket} • **T3:** {Jeans, Sneakers} • **T4:** {Jacket, Sneakers} • **T5:** {T-Shirt, Jeans}		
	Using this dataset: 1. Generate frequent item-sets using Apriori (minimum support = 40%). 2. Extract two strong association rules (minimum confidence = 60%). 3. Describe how deep learning creates value in fashion retail through: o Demand forecasting o Dynamic pricing o Personalized style recommendations o Trend prediction	10	CLO4

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