

Level:4 Term:1 Batch: 62

Marks: 40

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

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	iv) Check whether “Device Status” and “Usage Intensity” are independent. v) Calculate the probability that a device Works given that usage is not Low.		
	b) At a carnival there is a prize wheel with three colored sectors: Red, Blue and Green. The carnival operator reports the following probabilities for a single spin: $P(\text{Red})=0.45$, $P(\text{Blue})=0.30$, $P(\text{Green})=0.20$. i) Demonstrate Uncertainty, is this a valid probability model under Kolmogorov’s axioms? ii) If not valid, explain which axiom(s) fail; if valid, compute $P(\text{not Green})$.	[5]	
3.	Suppose, Abdullah is planning a weekend trip. He has three conditions for deciding whether she will go on the trip. 1. If the weather is good, then she will go hiking or visit the lake. 2. If she does not go hiking, she will visit her grandmother. 3. She will go on the trip only if she visits the lake.	[5]	CO2
	a) Now, Convert all the above statements into propositional logic formulas and also Construct a truth table for the combined knowledge base.	[5]	
	b) Does the knowledge base entail the statement: $\alpha=(T \wedge W) \rightarrow L$. Use the truth table to determine whether $\mathbf{KB} \models \alpha$.		
4.	a) A robotics company is designing a custom command language to control a fleet of robots in a warehouse. The robots can move forward, backward, turn left or right, and perform pick-and-place operations. The grammar for the command language is defined as follows: Commands $\rightarrow$ Command Commands ϵ Command $\rightarrow$ Move Turn Action Move $\rightarrow$ Forward Move Backward Move Forward Backward Forward $\rightarrow$ f Backward $\rightarrow$ b Turn $\rightarrow$ Left Turn Right Turn Left Right Left $\rightarrow$ l Right $\rightarrow$ r Action $\rightarrow$ Pick Place Pick $\rightarrow$ p Place $\rightarrow$ q Convert the grammar into Chomsky Normal Form (CNF). Examine the language remains unchanged.	[5]	CO4
	b) Analyze the robotic command language from Question 4(a) to multilayer perceptron design on advanced architecture for input encoding.	[5]	