Model Question Paper-1 with effect from 2019-20 (CBCS Scheme)

USN | | | | | | | | | | |

Seventh Semester B.E. Degree Examination
Advanced Artificial Intelligence

TIME: 03 Hours **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

		Module – 1	
Q.1	**(a)**	What is PEAS? Explain different agent types with their PEAS descriptions.	**10M**
	(b)	Explain in detail the properties of Task Environments.	**10M**
		OR	
Q.2	**(a)**	What are the four basic types of agent program in any intelligent system? Explain how did you convert them into learning agents?	**10M**
	(b)	Explain with algorithm and example: i. Minimax algorithm ii. Alpha-Beta Pruning	**10M**
		Module – 2	
Q.3	**(a)**	Three persons A, B and C have applied for a job in a private company. The chance of their selections is in the ratio 1: 2: 4. The probabilities that A, B and C can introduce changes to improve the profits of the company are 0.8, 0.5 and 0.3, respectively. If the change does not take place, find the probability that it is due to the appointment of C.	**10M**
	(b)	Consider the set of all possible five-card poker hands dealt fairly from a standard deck of fifty-two cards. 1. How many atomic events are there in the joint probability distribution (i.e., how many five-card hands are there)? 2. What is the probability of each atomic event? 3. What is the probability of being dealt a royal straight flush? Four of a kind	**10M**
		OR	
Q.4	**(a)**	A bag contains 4 balls. Two balls are drawn at random without replacement and are found to be blue. What is the probability that all balls in the bag are blue?	**10M**
	(b)	Three urns are there containing white and black balls; first urn has 3 white and 2 black balls, second urn has 2 white and 3 black balls and third urn has 4 white and 1 black balls. Without any biasing one urn is chosen from that one ball is chosen randomly which was white. What is probability that it came from the third urn?	**10M**
		Module – 3	
Q.5	**(a)**	We have a bag of three biased coins a, b, and c with probabilities of coming up heads of 20%, 60%, and 80%, respectively. One coin is drawn randomly from the bag (with equal likelihood of drawing each of the three coins), and then the coin is flipped three times to generate the outcomes X1, X2, and X3. 1. Draw the Bayesian network corresponding to this setup and define the necessary CPTs. 2. Calculate which coin was most likely to have been drawn from the bag if the	**10M**

		observed flips come out heads twice and tails once	
	(b)	Write the variable elimination algorithm and rejection-sampling algorithm for inference in Bayesian networks	**10M**
		OR	
Q.6	**(a)**	Write the likelihood-weighting algorithm for inference in Bayesian networks and explain the working of the algorithm.	**10M**
	(b)	A patient has a disease N. Physicians measure the value of a parameter P to see the disease development. The parameter can take one of the following values {low, medium, high}. The value of P is a result of patient's unobservable condition/state S. S can be {good, poor}. The state changes between two consecutive days in one fifth of cases. If the patient is in good condition, the value for P is rather low (having 10 sample measurements, 5 of them are low, 3 medium and 2 high), while if the patient is in poor condition, the value is rather high (having 10 measurements, 3 are low, 3 medium and 4 high). On arrival to the hospital on day 0, the patient's condition was unknown, i.e., P r (S0 = good) = 0.5. 1. Draw the transition and sensor model of the dynamic Bayesian network modeling the domain under consideration, 2. calculate probability that the patient is in good condition on day 2 given low P values on days 1 and 2, 3. can you determine the most likely patient state sequence in days 0, 1 and 2 without any additional computations?, justify.	**10 M**
		Module – 4	
Q.7	**(a)**	Explain the concept of Pinhole camera for the formation of images with a neat diagram.	**10M**
	(b)	List and explain early image processing operations.	**10M**
		OR	
Q.8	**(a)**	Write short notes for the following using vision: □ Words and Pictures □ Reconstruction from many views □ Controlling movement.	**10M**
	(b)	Explain the concept of reconstructing the 3D world with neat diagram.	**10M**
		Module – 5	
Q.9	**(a)**	List and explain different phases of analysis in Natural Language Processing with an example for each.	**10M**
	(b)	Write the algorithm for Minimum edit distance and compute the minimum edit distance between tutor and tumour.	**10M**
		OR	
Q.10	**(a)**	Consider the following Corpus of three sentences □ There is a big garden. □ Children play in a garden □ They play inside beautiful garden Calculate P for the sentence "They play in a big Garden" assuming a bi-gram language model.	**10M**
	(b)	Write Regular Expression for the following: 1. To accept strings book or books 2. To accept color and color. 3. To accept any +ve integer with an optional decimal point 4. To check a string is an email address or not. 5. To accept all variations of MHz,Mhz,mHz,mhz,MegaHertz,Megahertz,megaHertz,megahertz	**10M**

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome				
Question		**Bloom's Taxonomy Level attached**	**Course Outcome**	**Programme Outcome**
Q.1	(a)	L1	CO1	PO1
	(b)	L1	CO2	PO1
Q.2	(a)	L2	CO2	PO2
	(b)	L3	CO2	PO2
Q.3	(a)	L3	CO3	PO3
	(b)	L4	CO2	PO3
Q.4	(a)	L2	CO1	PO3
	(b)	L2	CO2	PO3
Q.5	(a)	L2	CO2	PO3
	(b)	L2	CO2	PO4
Q.6	(a)	L1	CO3	PO5
	(b)	L2	CO2	PO6
Q.7	(a)	L4	CO2	PO9
	(b)	L2	CO3	PO12
Q.8	(a)	L3	CO2	PO6
	(b)	L4	CO2	PO9
Q.9	(a)	L3	CO2	PO9
	(b)	L3	CO3	PO4
Q.10	(a)	L3	CO3	PO5
	(b)	L3	CO3	PO12

Bloom's Taxonomy Levels	**Lower order thinking skills**		
	Remembering(knowledge):L_1	Understanding Comprehension): L_2	Applying (Application): L_3
	Higher order thinking skills		
	Analyzing (Analysis): L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6