

B.TECH.
(SEM VI) THEORY EXAMINATION 2022-23
ARTIFICIAL INTELLIGENCE

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief.

2 x 10 = 20

- (a) Define Artificial Intelligence (AI).
- (b) Define Industry 4.0 & its scope in India?
- (c) Describe First Order Logic in AI.
- (d) What is resolution?
- (e) What is Bayes Classifier.
- (f) Define Utility Theory.
- (g) Differentiate between classification and regression?
- (h) Explain labelled and unlabeled data set
- (i) Write some applications of Speech Recognition.
- (j) Define Practical Natural Language Processing.

SECTION B

2. Attempt any three of the following:

10x3=30

- (a) Differentiate between Artificial Intelligence, Machine Learning & Deep Learning.
- (b) What is Propositional Logic? Define the various Inference Rules with the help of examples
- (c) Explain the unification algorithm used for reasoning under predicate logic with an example
- (d) Describe Supervised Learning and Unsupervised Learning.
- (e) Define Intelligent Agents. Define the types of communicating agent.

SECTION C

3. Attempt any one part of the following:

10x1=10

- (a) How is artificial intelligence used in the manufacturing industry? Also explain the industry 4.0 with suitable example.
- (b) Differentiate between Human, robotic & software -Agent

4. Attempt any one part of the following:

10x1=10

- (a) Differentiate between Forward and Backward chaining of Inference with the help of an example.
- (b) Show the possible approaches to solve typical AI problems with an appropriate example.

5. Attempt any *one* part of the following:

10x1=10

- (a) Construct the decision tree for the given data set & calculate the entropy and information gain for VMC (CNC-milling M/C) machining parameters.

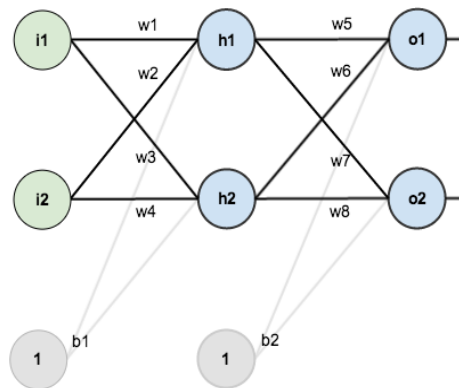
Spindle speed (rpm)	Feed (mm/min)	Lubrication	Depth of cut (mm)	Surface roughness (R_a)
Low	Low	Off	1	High
Medium	Low	On	2	Medium
High	Medium	off	1.5	High
Very High	High	On	1	Low
High	Low	on	2	Low

- (b) Explain the method of handling Approximate Inference in Bayesian Network.

6. Attempt any *one* part of the following:

10x1=10

- (a) Draw the cluster of following 8 points into 3 clusters:
 $A_1=(12,8)$, $A_2=(4,7)$, $A_3=(9,3)$, $A_4=(6,3)$, $A_5=(7,5)$, $A_6=(7,4)$, $A_7=(3,2)$, $A_8=(4,9)$. Use the k-means algorithm and Euclidean distance and take the Initial cluster centers are $A_1(12, 8)$, $A_4(6, 3)$ & $A_8(4,9)$. The solution up to two iterations.
- (b) Let us consider an artificial neural network (ANN) as shown in fig. with input values $i_1= 0.04$, $i_2=0.06$, Bias values $b_1=0.35$, $b_2=0.60$, Target vales $T_1=0.01$, $T_2=0.99$, initial weights $w_1=0.15$, $w_2=0.20$, $w_3=0.25$, $w_4=0.30$, $w_5=0.40$, $w_6=0.45$, $w_7=0.50$, $w_8=0.55$. Calculate Input & Output of hidden stage & output stage. Finally, calculate the total Error in one iteration of forward pass in back propagation Algorithm.



7. Attempt any *one* part of the following:

10x1=10

- (a) Define the Architecture and Configuration Bases of Robots.
- (b) Show operations of Image- Processing. Define how Vision can be used for navigation and manipulation