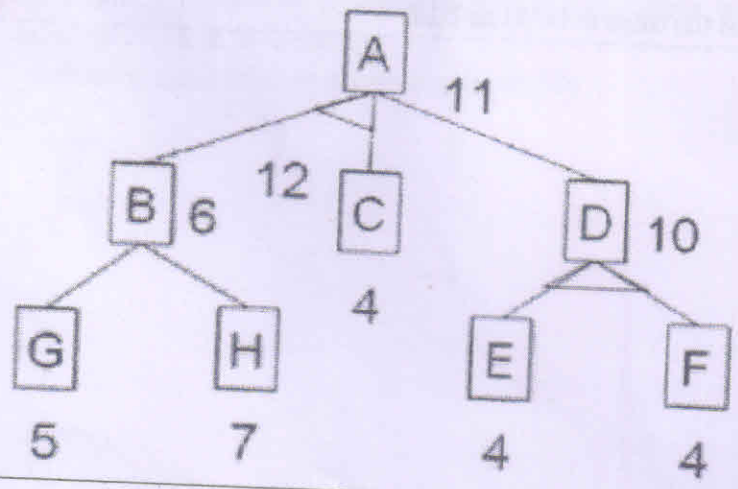
K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)

End Semester Examinations
May-June 2022

Max. Marks: 100 **Duration: 3 hours**
Class: TY Semester: VI
Name of the Course: Artificial Intelligence Branch: Computer
Course Code:2UCC603

Instructions:
(1) **All Questions are Compulsory**
(2) **Draw neat diagrams**
(3) **Assume suitable data if necessary**

Question No.		Marks
Q 1 (a)	State and explain the "AI Problems". Brief on Mundane, Formal and Expert tasks. OR (i) List 5 things AI cannot do yet. (ii) List 5 applications of AI in daily life.	10M 5M 5M
Q 1 (b)	Describe each of the components of the Utility based agent. Support with a neat diagram. Comment on the example of a Mars lander on the surface of mars with obstacles in its way and how would it be different in a Goal based agent with learning.	3M 3M 4M
Q2 (a)	What are Production rules? Enumerate the steps to problem formulation in Block's world problem.	02M 08M
Q2 (b)	Define straight line distance as a heuristic. Distinguish between AO* Search Algorithm and A* search algorithm. Solve using AO* search algorithm  	02M 03M 05M

Q3 (a)	Solve using CSP and show all steps clearly. TWO + TWO = FOUR OR 3A in Addendum	10M
Q3 (b)	Explain the steps of knowledge engineering process for a detective agent. Give sample output for every step.	10M
Q4 (a)	Brief on the following (i) Universal Generalization (ii) Universal Instantiation. (iii) Existential Instantiation (iv) Existential Introduction. OR 4A in Addendum	10M
Q4 (b)	Translate the following set of sentences into FOL. Use backward chaining on the goal- Joel is at museum. a Joel is a bulldog. b. John is Joel's master. c. The day is Saturday d. It is cold on Saturday. e. Joel is trained. f. Trained bulldogs are good dogs. g. If a dog is a good dog and has a master and at some place, then he will be with his master. h. If the day is Saturday and the day is cold, John is at the museum. Give	10M
Q5 (a)	STRIPS solution for the problem of changing flat tire with a spare one in car trunk. Clearly specify initial state, goal(s), actions and their pre-post conditions	10M
Q5 (b)	Differentiate between Supervised learning, Unsupervised learning, Semi supervised learning and reinforcement learning. OR List and explain the steps to build an NLP	10M 10M

Addendum to the question paper.

K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)

End Semester Exam
MAY-JUNE 2022

Class: TY B.Tech
Name of the Course: Artificial Intelligence
Course Code: 2UCC603

Semester: VI
Branch: Computer Engg.

Q. 3 A. Consider an instance of 0/1 knapsack as:

N=6, Capacity = 20, weight = {2,4,5,3,4,2} and profit = {10,15,15,20,200,50}

Solve the problem using genetic algorithms.

a. Clearly state thresholds or any other assumptions
b. Show step by step output after every step.

Compute solution upto only ONE generation.

Q. 4 A Consider the Lung Cancer Problem- Pollution and smoking are the factors those affect a patient's chance of having cancer. Similarly, having cancer affects the patient's breathing and the chances of having a positive X-ray result.

a. Draw Bayesian network for the above stated problem 2M
b. Assign probabilities to every node in the network 2M
c. Compute probability of a smoker having lung cancer, has a positive X-ray result but faces no problem in breathing. 3M
d. State reasons of uncertainty in general. 3M