B. TECH. (COMPUTER SCIENCE & BUSINESS SYSTEMS) (CBCS - 2018 COURSE)
B.Tech. (CSBS) Sem - VI : WINTER : 2023
SUBJECT : ARTIFICIAL INTELLIGENCE

Day : Wednesday
Date : 22-11-2023

Time : 10:00 AM-01:00 PM
W-20471-2023
Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagram **WHEREVER** necessary.
4) Assume suitable data if necessary.
5) Use of non-programmable **CALCULATOR** is allowed.

Q.1 List types of agents. Also explain in detail goal-based agents, utility-based agents, learning agents. **(10)**

OR

Q.1 While driving, which is the best policy? **(10)**

i) Always put your directional blinker on before turning,
ii) Never use your blinker,
iii) Look in your mirrors and use your blinker only if you observe a car that can observe you?

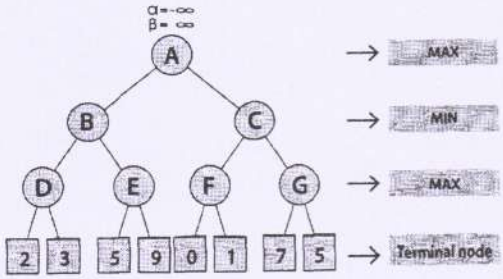
What kind of reasoning did you need to do arrive at this policy (logical, goal-based, or utility based)? What kind of agent design is necessary to carry out the policy (reflex, goal-based, or utility-based)?

Q.2 Define state space search? Solve water jug problem using production rule we use two jugs called four and three; four holds a maximum of four gallons of water and three a maximum of three gallons of water. How can we get two gallons of water in the four jug? **(10)**

OR

Q.2 Discuss the concept of Hill climbing search Algorithm. Solve below example using Hill Climbing Algorithm. **(10)**

Q.3 Discuss the concept of Alpha-Beta Pruning with below example. **(10)**



P.T.O.

OR

Q.3 Explain Mini-Max Algorithm with example in Artificial Intelligence. **(10)**

Q.4 In this question we will use the following sentences. To answer a question, use a back ward chaining algorithm. **(10)**

i) Horses, cows and pigs are mammals
ii) An offspring of a horse is a horse
iii) Bluebeard is a horse
iv) Bluebeard is Charlie's parent
v) Offspring and parent are inverse relation
vi) Every mammal has a parent

OR

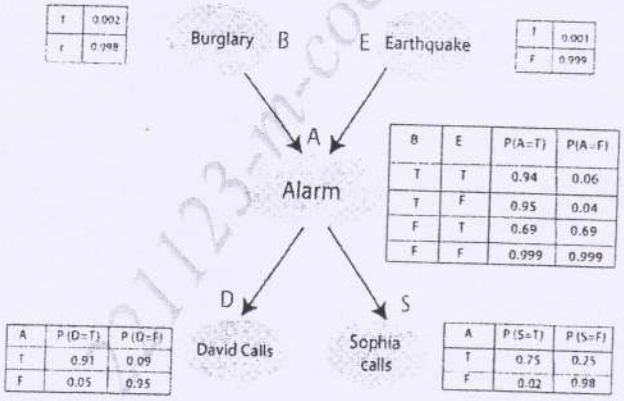
Q.4 Here are two sentences in the language of first order logic: **(10)**

$(A): \forall x \ \exists y (x \geq y)$

$(B): \exists y \ \forall x (x \geq y)$

a) Assume that the variables range over all the natural numbers 0, 1, 2, ..., 00, and that the ">" predicate means "greater than or equal to". Under this interpretation, translate these sentences into English.
b) Is (A) true under this interpretation?
c) Is (B) true under this interpretation?
d) Does (B) logically entail (A)?
e) Does (A) logically entail (B)?

Q.5 From below figure calculate the probability of David calls? **(10)**



B	E	P(A=T)	P(A=F)
T	T	0.94	0.06
T	F	0.95	0.04
F	T	0.69	0.69
F	F	0.999	0.999

A	P(D=T)	P(D=F)
T	0.91	0.09
F	0.05	0.95

A	P(S=T)	P(S=F)
T	0.75	0.25
F	0.02	0.98

OR

Q.5 Describe the components of planning system? Describe the Goal stack planning with suitable example.

Q.6 Define an Expert System? Discuss in detail any five applications of expert system. **(10)**

OR

Q.6 Describe the structure of Rule-based expert system in detail.

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