

B. Tech 6th Semester Examination
Artificial Intelligence (OS)
IT-6003

Time : 3 Hours

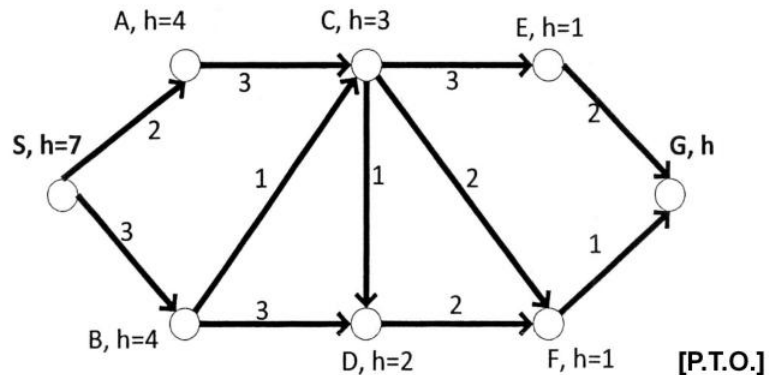
Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all selecting one question each from section A, B, C, and D. Section E is compulsory

SECTION - A

1. (a) Explain how state space search model is useful in solving AI problems. Use the water jug problem to substantiate your answer. (10)
- (b) Apply A* algorithm on the graph below to find the shortest path from node S to node G. Indicate the f, g, and h values of each node on the queue. Show the path found by the A* algorithm. State also whether the h values are admissible. (10)



Iteration	Node Expanded	Priority queue at end of this iteration
0		S = 0 + 7 = 7
1		

2. (a) Transform the following predicate logic expressions into prenex normal form
 - (i) $\exists x \forall w \forall y \exists z ((P(w, x, y) \wedge Q(y, z) \rightarrow (Q(z, y) \wedge R(w)))$
 - (ii) $\neg \exists x \forall y \forall z (P(x, y, z) \wedge Q(y, z))$ (10)
- (b) Consider the following facts:
 - Most things don't fly.
 - Most birds do fly, unless they are too young or dead or have a broken wings.
 - Penguins and ostriches don't fly.
 - Magical ostrich fly.
 - Tweety is a bird.
 - Chirpy is either a penguin or ostrich.
 - Feather is a magical ostrich.

Use semantic network to , answer the following questions:

1. Does Tweety fly?
2. Does Chirpy fly?
3. Does feather fly?
4. Does Paul fly? (10)

3

15225

SECTION - B

3. (a) Explain the execution steps for the following queries in Prolog
?-append(A, [a|B], [b,a,d, a, c, a]).
?-append(X, [A, B|Y], [ab,c,d,e]). (10)
- (B) Write a Prolog procedure truncated which returns the first N elements of a given list.
Example:
?- truncated ([1,2,3, 6,7,8], 3, L).
L=[1,2,3] (10)
4. (a) What is the result of evaluating the following LISP expression?
((lambda (x y) (+ x y y)) 3 5) (10)
- (b) Write a recursive LISP function called 'get last' that takes a list as input and returns the last element of the list. (10)

SECTION - C

5. (a) Describe Bayes Net for reasoning with uncertainty. (10)
(b) Explain the role of certainty factor in handling uncertainty in the system. (10)
6. a) Describe learning by induction. (10)
(b) Describe back propagation network. (10)

SECTION - D

7. (a) Describe various components of planning system. (10)
(b) Compare and contrast forward and backward planning algorithms. (10)

[P.T.O.]

4

15225

8. (a) Describe rule based expert system. (10)
(b) Describe Augment transition networks. (10)

SECTION - E

9. Write short note on the following
- (a) Black cut and Red cut.
(b) Non monotonic logic.
(c) Hill climbing.
(d) MYCIN.
(e) Min-Max. (4×5=20)