# MCA 3rd Semester Examination, 2022

## MCA

(*Artificial Intelligence*)

PAPER – MCA-302

*Full Marks* : 70

*Time* : 3 hours

Answer any **five** questions from **Q. No. 1** to **8** which are compulsory and answer any **four** questions from the rest

*The figures in the right hand margin indicate marks*

*Candidates are required to give their answers in their own words as far as practicable*

## (Compulsory)

A. Answer any *five* questions : $2 \times 5$

1. What do you mean by exhaustive search ?

2. Why do we need natural language processing ?

3. Write down the following English statement into predicate calculus– "All drinkers are not bad".

4. What are meta-heuristics ?

5. What do you mean by artificial intelligence ?

6. Show the truth table of implication connective.

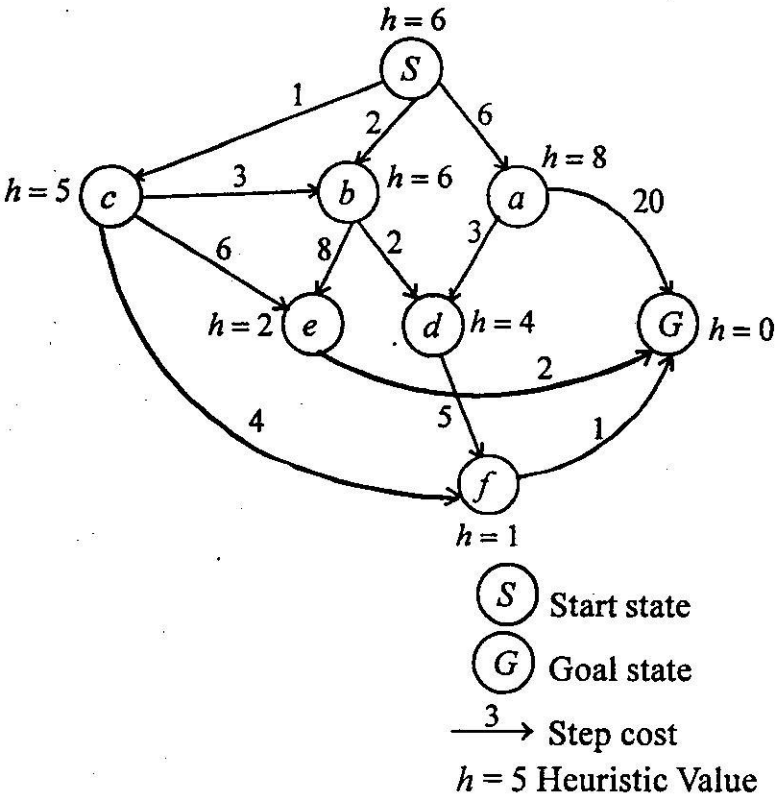
7. What is state-space search ?

8. What is heuristic function ?

B. Answer any **four** questions : $15 \times 4$

9. Explain Turing test. Why it is called test of intelligence ? $12 + 3$

10. Consider the following graph. Apply A* algorithm on the following graph. 15




**11.** There are two jugs of volume 4 litre and 3 litre. Neither has any measuring mark on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2

litre of water into the 4 litre jug. Assuming that we have unlimited supply of water. 3 + 3 + 3 + 6

(*a*) Formulate the problem at state space search problem.

(*b*) Draw the implicit search graph.

(*c*) Solve the problem.

(*d*) Use depth first search to find the solution.

12. Consider the following sentences. Translate these sentences into predicate logic. 3 × 5

(*a*) Anything anyone eats and is not killed by is food

(*b*) All that glitters is not gold.

(*c*) All that is gold does not glitter.

(*d*) Everything that is a cigar is nothing other than cigar.

(*e*) The only completely consistent people are the dead.

**13.** Using the truth table show the following wff is a tautology,

$$(p \rightarrow (q \rightarrow r)) \leftrightarrow ((p \wedge q) \rightarrow r)$$

What are absurdity ? Give examples. 10 + 5

**14.** Show each steps of genetic algorithm using one example. Show only one iteration. 15

**15.** What do you mean by alpha-beta pruning ? Give examples of alpha pruning and beta pruning. 8 + 7

**16.** Write short notes on (any *three*) : 5 × 3

(*i*) Existential and Universal Quantifier

(*ii*) Hill climbing

(*iii*) IDA* search

(*iv*) Bidirectional search

(*v*) Tabu search.

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