



**ST. XAVIER'S COLLEGE**  
**KOLKATA**  
**(AUTONOMOUS)**

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**3rd SEMESTER EXAMINATION**  
**DECEMBER 2021**  
**M. Sc. COMPUTER SCIENCE**

**CMSM4322**

**ARTIFICIAL INTELLIGENCE**

Friday, December 10, 2021

12:00 NOON to 3:00 PM

**3 hours**

**Full Marks : 80**

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**PLEASE READ THESE INSTRUCTIONS BEFORE YOU START WRITING:**

1. Of the questions attempted, the answers to only the first required number of questions (as stipulated in the question paper) will be evaluated. **So please do not attempt extra questions.**
2. Use fountain pen or ball-point pen of **blue** or **black ink**.
3. Write (**not type**) the answers legibly, in your own words as far as practicable, on A4 size sheets.
4. Save the pages of your answer sheets (hand-written document) to a single PDF file and name the document accurately i.e. **Roll No\_Paper Code.PDF** (example: 147\_PH36141T).
5. Send the PDF file to the following email address (**in REPLY mode**) **within 30 minutes of the completion of the examination:** [\*\*CMSM43222122@SXCCAL.EDU\*\*](mailto:CMSM43222122@SXCCAL.EDU)
6. The scanned answer scripts should have **enough clarity** to enable evaluation.
7. On top of each page **handwrite** the following information: **Name, Roll Number, Paper Code , Date, and Page Number**
8. No multiple submissions would be allowed.

The marks are given in **brackets [ ]** at the end of each question or part question.

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The question paper consists of **2** pages.

**Of the questions attempted, the answers to only the first required number of questions (as stipulated in the question paper) will be evaluated.**  
**So, PLEASE DO NOT ATTEMPT EXTRA QUESTIONS.**

**Answer QUESTION 1 and ANY FOUR of the rest.**

**USE EXAMPLES OTHER THAN THE ONES DISCUSSED IN THE CLASS**

1. Answer **ANY FOUR** questions. **(5×4=20)**
  - (a) Explain physical symbol system hypothesis with an example.
  - (b) Explain with a suitable example the use of heuristic function in solving complex problems in AI.
  - (c) Explain the difference between solitary and conversational class of problems with an example.
  - (d) Explain the advantage of Best first search over BFS and DFS with an example.
  - (e) Show how computable predicates work using an example.
  - (f) Explain the requirements of a good control strategy with suitable examples.
2.
  - (a) Explain the working of generate and test algorithm with a suitable example.
  - (b) Hence show how it can be improved using hill climbing algorithm. **(10+5)**
3.
  - (a) Show how means end analysis uses a combination of forward and backward search methods for attaining its goal state using an example.
  - (b) Write an algorithm for performing this. **(7+8)**
4. Discuss the various issues associated with knowledge representation. **(15)**
5. Explain with a suitable example how the ALPHA-BETA procedure can be used to optimise MINIMAX algorithm for obtaining the “best” move in a game of tic-tac-toe. **(15)**
6.
  - (a) Write down an algorithm to perform resolution in propositional logic.
  - (b) Show how the algorithm works using a suitable example. **(8+7)**
7.
  - (a) Show how problem reduction algorithm works on AND-OR graphs with a suitable example.
  - (b) Show clearly why best first search cannot be applied to these graphs. **(8+7)**

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