

**FINAL EXAMINATION****DIPLOMA IN COMPUTER SCIENCE****COURSE : ARTIFICIAL INTELLIGENCE****COURSE CODE : SWC3723****DURATION : 2 HOURS AND 30 MINUTES****INSTRUCTIONS TO CANDIDATES:**

1. This question paper consists of **TWO (2)** parts. : PART A (30 questions)
: PART B (4 questions)
2. Answer **ALL** questions from PART A and PART B.
 - i. Answer PART A in the Objective Answer Sheet
 - ii. Answer PART B in the Answer Booklet provided.
3. Please check to make sure that this examination pack consists of:
 - i. The Question Paper
 - ii. An Answer Booklet
 - iii. An Objective Answer Sheet
4. Do not bring any material into the examination hall. Electronic calculator is allowed.
5. Please write your answer using permanent ink.

MYKAD/ PASSPORT NO. : _____**ID. NO. :** _____**LECTURER :** _____**SECTION :** _____

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

This question paper consists of 11 printed pages including the front page.

PART A : MULTIPLE CHOICE QUESTIONS

Instruction: Choose the CORRECT answer.

1. Which type of AI is currently implemented in most commercial applications?
 - A. Narrow AI
 - B. General AI
 - C. Conscious AI
 - D. Artificial Superintelligence

2. Which of the following characteristics is most closely associated with human intelligence?
 - A. Storing large quantities of information
 - B. Executing predefined instructions accurately
 - C. Processing millions of calculations per second
 - D. Applying intuition and judgement in unfamiliar situations

3. In AI systems, what is the primary role of data?
 - A. To replace algorithms
 - B. To store program instructions
 - C. To increase hardware performance
 - D. To provide information from which patterns can be learned

4. Which statement best describes an intelligent agent?
 - A. A system that stores information in a database
 - B. A machine that operates without receiving input
 - C. A computer program that performs calculations only
 - D. An entity that perceives its environment through sensors and acts upon it through actuators

5. Which of the following is an example of an actuator in a robotic vacuum cleaner?
 - A. Camera
 - B. Dirt sensor
 - C. Microphone
 - D. Suction motor

6. Which uninformed search algorithm expands nodes level by level?
 - A. A* Search
 - B. Depth First Search (DFS)
 - C. Uniform Cost Search (UCS)
 - D. Breadth First Search (BFS)

7. Which of the following best describes Generative AI?
 - A. AI that replaces all human workers
 - B. AI that stores large amounts of data
 - C. AI that only performs mathematical calculations
 - D. AI that creates new content such as text and images

8. What does the letter "A" represent in the PEAS framework?
 - A. Action
 - B. Agent
 - C. Actuator
 - D. Algorithm

9. A self-driving car may be considered to operate in a partially visible environment because:
 - A. it only operates indoors
 - B. it does not require sensors
 - C. all road conditions are known in advance
 - D. some information may be hidden or unavailable to its sensors

10. Which search algorithm combines actual path cost and heuristic value?
 - A. A* Search
 - B. Greedy Best-First Search
 - C. Depth First Search (DFS)
 - D. Breadth First Search (BFS)

11. Which principle is most important for responsible AI?
- A. Ignoring user privacy
 - B. Maximizing profits only
 - C. Reducing transparency
 - D. Fairness and accountability
12. Which event is widely recognized as the official beginning of Artificial Intelligence as a research field?
- A. Creation of Deep Blue
 - B. Dartmouth Conference
 - C. Development of ELIZA
 - D. Publication of the Turing Test
13. Which characteristic distinguishes a Goal-Based Agent from a Simple Reflex Agent?
- A. It operates without sensors
 - B. It only works in virtual environments
 - C. It cannot make decisions independently
 - D. It considers future consequences when selecting actions
14. According to the concept of rationality, a rational agent should:
- A. imitate human thinking exactly
 - B. always achieve a perfect outcome
 - C. avoid making decisions independently
 - D. maximize expected performance based on available information
15. An email spam filter becomes more accurate as it processes additional emails over time. Which type of agent is demonstrated in this scenario?
- A. Reflex Agent
 - B. Learning Agent
 - C. Goal-Based Agent
 - D. Deterministic Agent

16. An online retailer recommends products based on a customer's previous purchases and browsing history. Which AI capability is primarily being used?
- A. Image Processing
 - B. Robotics Navigation
 - C. Knowledge Representation
 - D. Prediction and Recommendation
17. Which statement best differentiates AI systems from conventional computer programs?
- A. AI systems do not require user input
 - B. AI systems are developed without algorithms
 - C. AI systems can improve performance by learning from data
 - D. AI systems require electricity whereas conventional programs do not
18. A logistics company wants to find the cheapest delivery route where transportation costs differ between roads. Which search algorithm should be used?
- A. Greedy Best-First Search
 - B. Depth First Search (DFS)
 - C. Breath First Search (BFS)
 - D. Uniform Cost Search (UCS)
19. Which type of environment provides the agent with complete information about its current state?
- A. Social environment
 - B. Dynamic environment
 - C. Fully visible environment
 - D. Partially visible environment
20. Which of the following is an example of human-AI collaboration?
- A. AI completely replacing doctors
 - B. Humans relying solely on intuition
 - C. Doctors using AI to assist diagnosis
 - D. AI operating without human involvement

21. The Turing Test was proposed to evaluate whether:
- A. an algorithm can learn without supervision
 - B. a neural network can process data efficiently
 - C. a computer can solve mathematical equations
 - D. a machine can exhibit intelligent behavior comparable to a human
22. Which discipline provides the mathematical foundations required for AI algorithms to learn from data?
- A. Statistics
 - B. Linguistics
 - C. Sociology
 - D. Economics
23. What is the primary purpose of a heuristic function?
- A. To calculate branching factor
 - B. To store previously visited states
 - C. To evaluate memory consumption
 - D. To estimate how close a state is to the goal
24. A warehouse robot receives data from sensors, analyses the information, and moves products to designated locations. Which sequence correctly represents the operation of the agent?
- A. Action → Perception → Processing
 - B. Perception → Processing → Action
 - C. Processing → Action → Perception
 - D. Action → Processing → Perception
25. An AI hiring system unfairly favors certain candidates due to biased training data. This is an example of:
- A. Ethics
 - B. Privacy
 - C. Hardware failure
 - D. Networking issue

26. A facial recognition system used to unlock a smartphone is an example of:
- A. Robotics
 - B. Expert Systems
 - C. Computer Vision
 - D. Natural Language Processing
27. Which statement best describes a problem-solving agent?
- A. An agent that operates without a goal
 - B. An agent that reacts only to immediate stimuli
 - C. An agent that stores information in a database
 - D. An agent that searches for a sequence of actions to achieve a goal
28. Which of the following is **NOT** a component of problem formulation?
- A. Goal Test
 - B. Initial State
 - C. Transition Model
 - D. Heuristic Function
29. Which statement best describes the difference between uninformed and informed search?
- A. Informed search does not use a goal state
 - B. Uninformed search uses heuristic information
 - C. Uninformed search always finds the optimal solution
 - D. Informed search uses domain knowledge to guide exploration
30. Which of the following correctly represents the relationship among AI, Machine Learning, and Deep Learning?
- A. Deep Learning $\subset$ Machine Learning $\subset$ Artificial Intelligence
 - B. Artificial Intelligence $\subset$ Machine Learning $\subset$ Deep Learning
 - C. Machine Learning $\subset$ Deep Learning $\subset$ Artificial Intelligence
 - D. Artificial Intelligence $\subset$ Deep Learning $\subset$ Machine Learning

(TOTAL: 30 MARKS)

PART B: STRUCTURED QUESTIONS

Instruction: Answer ALL questions.

QUESTION 1

- a. Define Artificial Intelligence (AI).
(2 marks)
 - b. Apply **TWO (2)** characteristics to explain how Human Intelligence differs from Artificial Intelligence.
(4 marks)
 - c. Explain **TWO (2)** real-world applications of AI.
(4 marks)
 - d. A supermarket plans to implement an AI-based system that analyses customer purchase history and recommends products that customers are likely to buy.
 - i. Identify the type of AI used in this scenario.
(1 mark)
 - ii. Describe how the system can benefit both customers and the supermarket.
(4 marks)
- (Total: 15 marks)

QUESTION 2

A logistics company plans to deploy an autonomous delivery robot to transport parcels within a university campus. The robot uses cameras and sensors to detect obstacles, plans routes to delivery locations, and continuously improves its navigation performance based on previous delivery experiences.

Based on the situation above, answer the following:

- a. Explain the interaction between the agent and its environment by identifying sensors, actuators, and percepts used by the delivery robot.
(8 marks)
- b. Determine the most suitable type of intelligent agent for this system.
(2 marks)

- c. Explain how the intelligent agent identified in (b) is suitable for this system. (4 marks)
- d. Describe the importance of performance measures in helping a robot make decisions. (6 marks)
- (Total: 20 marks)

QUESTION 3

Review the following scenario based on Figure 1 before answering the questions.

A food delivery robot is required to deliver an order from the Restaurant (S) to the Student Hostel (H). The weighted graph represents the travel cost between locations. The heuristic values $h(n)$ is provided in Table 1 for use where applicable.

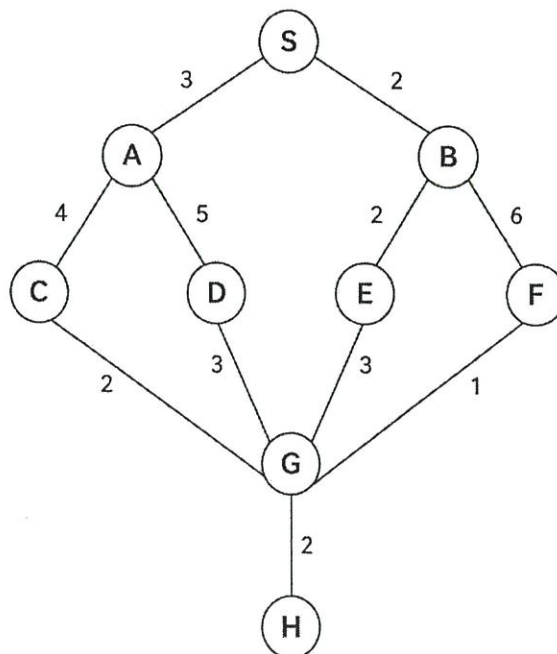


Figure 1: Route Map of Food Delivery Robot

Table 1: Heuristic Values

Node	Heuristic Value $h(n)$
S	7
A	6
B	4
C	5
D	4
E	2
F	1
G	1
H	0

- Describe **ONE (1)** advantage of Breadth-First Search (BFS) and **ONE (1)** advantage of Depth-First Search (DFS) for solving route-finding problems.
(4 marks)
- Explain **TWO (2)** roles of a heuristic function in search algorithms.
(4 marks)
- Apply the Uniform Cost Search (UCS) algorithm to identify the least-cost route from the Restaurant to the Student Hostel. Compute total path cost.
(4 marks)
- Determine the optimal solution path using the A* Search algorithm and explain why A* selected this path.
(8 marks)

(Total: 20 marks)

QUESTION 4

Given the following scenario:

A university implements an AI-powered learning platform. The system analyzes students' quiz results and learning progress to recommend personalized learning materials and exercises based on individual needs.

- Identify **TWO (2)** features of Generative AI demonstrated in the educational system described above.
(2 marks)
- Discuss **TWO (2)** potential benefits of implementing this AI technology in higher education.
(6 marks)

- c. Explain **TWO (2)** ethical issues that may arise from the use of Generative AI in the university.
(4 marks)
- d. Describe **ONE (1)** future AI trend or technology that may further transform the education domain.
(3 marks)

(Total : 15 marks)

(TOTAL: 70 MARKS)
(TOTAL: 100 MARKS)

END OF QUESTION PAPER

