Program/Sem:	T.Y.B.Sc IT – Sem - V	**Course:**	**Artificial Intelligence and Applications**
Program Code:	1S00255	**Course Code:**	**USIT504**

Duration: 2 ½ Hour 0 7 NOV 2025 **Max. Marks:** 75

Instructions:

1. **All** questions are **compulsory**.
2. Make **suitable assumptions** wherever necessary and **state the assumptions** made.
3. Answers to the **same question** must be **written together**.
4. Numbers to the **right** indicate **marks**.
5. Draw **neat labeled diagrams** wherever **necessary**.
6. Use of **Non-programmable** calculators is **allowed**

Q. 1 Attempt ANY THREE from the following: **[15]**

a) Define Artificial Intelligence. What are the different components that intelligence is composed of?

b) What is the Turing Test? How the Turing Test Works?

c) Define Artificial Intelligence. List and explain at least 4 major real-world applications of AI in different domains.

d) Describe the following key properties of an environment with respect to an intelligent agent.

1) Discrete / Continuous 2) Observable / Partially Observable

3) Static / Dynamic 4) Single-Agent / Multi-Agent

5) Deterministic / Non-Deterministic

e) Explain what is Intelligent Agent and its Rules.

f) What is Ideal Rational Agent? Rationality of an agent depends on what explain in detail.

Q. 2 Attempt ANY THREE from the following: **[15]**

a) Explain the phases of problem solving in Artificial Intelligence.

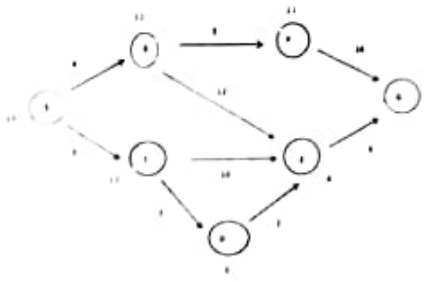
b) What is the Hill Climbing algorithm? What are the types ?

c) What is Uninformed/Blind search strategies ?Explain BFS and DFS.

d) Explain Searching with partial observation with example of wampus world .

e) Write a short note on Travelling salesman problem with example using hamilton graph.

f) *Using A Search Algorithm**, trace the path from node S to G with proper evaluation of f(n) = g(n) + h(n).



Q. 3 Attempt ANY THREE from the following: **[15]**

a) Explain the Min-Max algorithm with the help of a suitable example.

b) List and explain the different types of games in Artificial Intelligence.

c) What is a Zero-Sum Game? Explain the concept with an example.

d) Draw and describe the architecture of a Knowledge-Based Agent.

e) Explain the Semantic Network Representation with an appropriate example.

f) Describe the Wumpus World environment and explain it using the PEAS (Performance, Environment, Actuators, Sensors) representation.

Q. 4 Attempt ANY THREE from the following: **[15]**

a) Explain the concepts of Forward Chaining and Backward Chaining with suitable examples.

b) **State and explain Bayes' Theorem.** Provide an example illustrating its use in probabilistic reasoning.

c) Define Quantifiers in First-Order Logic and explain their significance with examples.

d) Explain the process of knowledge-engineering.

e) What are Artificial Neural Networks (ANNs)? Explain any three real-world applications of ANNs in Artificial Intelligence.

f) Explain the term: i) atomic sentence ii) complex sentence

Q. 5 Attempt ANY THREE from the following: **[15]**

a) Explain the concept of a Basic Planning Graph with the "Eat-Cake and Have-Cake" example.

b) Write a short note on Hierarchical Planning and explain it with an example of "Attack City."

c) Differentiate between Bounded and Unbounded Indeterminacy. Explain various methods for handling indeterminacy in AI systems.

d) Define Generative AI. Describe the types of Generative AI models with suitable examples.

e) Write a short note on Truth Maintenance System.

f) What are events? Explain its importance.

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