INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal-500043, Hyderabad

B.Tech VII SEMESTER END EXAMINATIONS (REGULAR) - DECEMBER 2023
Regulation: UG-20
COGNITIVE SCIENCES

Time: 3 Hours   CSE(AI&ML)   Max Marks: 70

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) What makes cognitive science an inherently interdisciplinary field? Describe the relationship between human-computer interaction (HCI) and cognitive science.

    [BL: Understand| CO: 1|Marks: 7]

    (b) Interpret the concept of cognitive modeling and how computers are used to simulate cognitive processes. Provide examples of successful cognitive models and their impact on our understanding of human cognition. [BL: Understand| CO: 1|Marks: 7]

MODULE – II

2. (a) Describe the ethical issues raised by data-driven educational technologies and personalised methods of learning. [BL: Understand| CO: 2|Marks: 7]

    (b) Explain the role of Bayesian Networks in decision-making within cognitive systems. What challenges might arise when integrating Bayesian Networks into cognitive systems, and how can they be addressed? [BL: Understand| CO: 2|Marks: 7]

MODULE – III

3. (a) Outline the significance of Bayesian modeling in cognitive science. How do cognitive models simulate problem-solving strategies in various domains? [BL: Understand| CO: 3|Marks: 7]

    (b) Mention ethical dilemmas that might arise when conducting research in cognitive modeling. How can researchers critically evaluate and address these ethical challenges?

    [BL: Understand| CO: 3|Marks: 7]

4. (a) Write about cognitive modeling. How does cognitive modeling contribute to the development of artificial intelligence and human-computer interaction? [BL: Understand| CO: 4|Marks: 7]

    (b) List key challenges in validating cognitive models. Discuss the processes of model validation and verification in cognitive modeling. [BL: Understand| CO: 4|Marks: 7]

MODULE – IV

5. (a) How does deductive reasoning differ from inductive reasoning? Discuss the impact of visual spatial reasoning on learning and academic performance. [BL: Understand| CO: 5|Marks: 7]

(b) Elaborate the significance of abductive reasoning in the field of diagnostic medicine.

[BL: Understand| CO: 5|Marks: 7]

6. (a) Why is fuzzy logic useful in some applications? Outline the strategies for mitigating the impact of cognitive biases on reasoning. [BL: Understand| CO: 5|Marks: 7]

(b) Explain how inductive reasoning is used to formulate scientific hypotheses and theories.

[BL: Understand| CO: 5|Marks: 7]

MODULE – V

7. (a) Describe any notable challenges or limitations associated with the modeling paradigm, and how have you overcome them in your modeling projects? [BL: Understand| CO: 6|Marks: 7]

(b) Discuss the key components of a successful modeling paradigm, and how do they interact with each other [BL: Understand| CO: 6|Marks: 7]

8. (a) Summarize the steps involved in the modeling process from problem formulation to model deployment in a general modeling paradigm context. [BL: Understand| CO: 6|Marks: 7]

(b) Outline the ethical considerations that should be taken into account when creating and using models, especially in fields like AI and machine learning. [BL: Understand| CO: 6|Marks: 7]

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