Question Bank : cognitive systems

1. What are cognitive systems, and how do they differ from traditional artificial intelligence systems?[3]
2. Compare and contrast symbolic AI with connectionist approaches in modeling human cognition. [3]
3. How do cognitive architectures like SOAR and ACT-R contribute to our understanding of human cognition? [3]
4. Discuss the mind-body problem and its implications for the development of cognitive systems. [3]
5. What is the significance of representationalism in cognitive science, and how does it influence the design of cognitive systems? [4]
6. Explain the differences between declarative and procedural knowledge. How are these types of knowledge represented in cognitive systems? [4]
7. What are semantic networks, and how do they facilitate knowledge representation in cognitive systems? [4]
8. Describe the process of inductive learning in cognitive systems. How does it differ from deductive reasoning? [4]
9. What are the challenges associated with generalization in inductive learning, and how are these addressed in computational models? [4]
10. How is cognitive functioning computationally modeled in machines, and what are the key challenges in this area? [4]
11. What are the key considerations in designing cognitive systems for effective human-robot interaction? [4]
12. How do cognitive systems differ from traditional AI in terms of their goals and methodologies?[3]
13. What computational intelligence techniques are commonly used in cognitive systems, and how do they contribute to cognitive modeling? [2]
14. How does cognitive linguistics contribute to our understanding of language processing in cognitive systems?[2]
15. How does the prototype theory of categorization differ from the classical view of concepts? Provide examples to illustrate the differences.[3]
16. What role do exemplars play in the process of concept learning, and how does exemplar theory explain human categorization?[3]
17. What is the theory of mind, and why is it essential for understanding the behavior and mental states of others?[4]
18. How does the development of theory of mind in children influence their social interactions and relationships? [4]
19. How does Bayesian inference differ from traditional statistical inference, and why is it particularly useful in cognitive science? [4]
20. What are hierarchical Bayesian models, and how do they allow for more complex representations of cognitive processes? [4]
21. Describe relational probabilistic models and discuss how they combine relational structures with probabilistic reasoning. [4]
22. What are sampling algorithms, and why are they necessary for inference in complex probabilistic models? Give an example of how one such algorithm might be used in cognitive modeling. [4]
23. What is the minimum description length principle, and how does it help in controlling the complexity of models in cognitive science?[3]

24. Explain the concept of Bayesian Occam's Razor and its application in model selection within cognitive science.[3]
25. Describe relational probabilistic models and discuss how they combine relational structures with probabilistic reasoning. [3]