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| **DEPARTMENT** | **:** | **Artificial Intelligence and Data Science** |  |
| **COURSE CODE** | **:** | **22OCS04** |  |
| **COURSE NAME** | **:** | **COGNITIVE COMPUTING** |  |

**QUESTION BANK**

**2 MARKS**

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|  | Define cognitive computing. |
|  | What is IBM Watson? |
|  | Mention two key components of cognitive computing architecture. |
|  | Describe the Turing Test in the context of cognitive systems? |
|  | Name a popular application of reinforcement learning. |
|  | How is cognitive computing used in the finance sector? |
|  | Define artificial intelligence (AI). |
|  | Describe the role of the loss function in neural networks? |
|  | Define text classification |
|  | Differentiate between cognitive computing and AI. |
|  | What is Q-learning in reinforcement learning? |
|  | What is a perceptron? |
|  | What is BERT in language modeling? |
|  | What is the difference between n-gram models and neural language models? |
|  | What is a conversational interface? |
|  | Name two methods used for detecting emotions in facial expressions. |
|  | How tokenization in natural language processing is implemented? |
|  | How can cognitive computing affect employment? |
|  | How does sentiment analysis play in emotion detection? |
|  | How is overfitting used in neural networks? |
|  | Differentiate between semantic segmentation and instance segmentation. |
|  | How might cognitive computing evolve in healthcare? |
|  | How is stemming working in NLP? |
|  | How is explainable AI (XAI) relevant to the future of cognitive computing? |
|  | Differentiate between semantic segmentation and instance segmentation. |
|  | Write short notes on Object recognition and tracking. |
|  | Write the future trend in cognitive computing. |
|  | Why is data privacy an important ethical issue in cognitive computing? |
|  | Define face recognition. |
|  | Name two other cognitive computing platforms besides IBM Watson. |

**13 MARKS**

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|  | Describe the architecture of a cognitive computing system and explain its core components. |
|  | Discuss the role of machine learning in cognitive computing |
|  | Explain the characteristics that make cognitive computing systems distinct. How do these systems handle uncertainty and complexity in decision-making? |
|  | How does natural language processing (NLP) contribute to cognitive computing systems? |
|  | Describe neural networks and their role in deep learning. Discuss how deep learning has advanced AI applications. |
|  | Describe the application of cognitive computing in retail and education |
|  | What are the challenges in building cognitive computing systems? |
|  | Describe the components of a Reinforcement learning system and explain how it differs from supervised learning. |
|  | Compare and contrast supervised, unsupervised, and reinforcement learning |
|  | Describe in detail the Q-learning algorithm in reinforcement learning |
|  | Explain the text classification and sentiment analysis in NLP. |
|  | Discuss different types of activation functions used in neural networks |
|  | Explain the architecture and working of traditional n-gram language models. |
|  | Discuss the architecture and working of chatbots in NLP. Explain the difference between rule-based and AI-based chatbots with examples. |
|  | What are the challenges and limitations of training deep neural networks? |
|  | Describe the process of object recognition and tracking in computer vision. |
|  | Discuss different types of chatbots and their applications. |
|  | Discuss the techniques used for feature extraction in image processing. |
|  | Discuss BERT (Bidirectional Encoder Representations from Transformers) and its contributions to NLP. |
|  | Give your valuable suggestions about Integrated Gradients and xRAI with example. |
|  | Explain the role of Natural Language Processing (NLP) in chatbots and conversational interfaces. |
|  | Identify and discuss the ethical considerations and challenges associated with cognitive computing. |
|  | Discuss the architecture, training process, and the various applications of autoencoders in real-world tasks |
|  | How LIME and KernelSHAP working for images and give an example. |
|  | Discuss how emerging technologies will shape the landscape of cognitive applications. |
|  | Describe about Manufacturing and Industry 4.0 using IBM Watson framework. |
|  | Explain how a trained pose estimation model can be used to determine the activities or actions of subjects in images. Discuss the architecture, key techniques, and applications of such models in real-world scenarios |
|  | What are the major challenges faced in bringing data mining research to market? Illustrate one data mining research issue that, in your view, may have a strong impact on the market and on society. Discuss how to approach such a research issue |
|  | Analyze the challenges and limitations of machine learning, particularly focusing on neural networks and deep learning. |
|  | Give the detailed working procedure for IBM Watson for Oncology |
|  | Discuss the challenges and ethical considerations in chatbot development |
|  | Give your valuable suggestion regarding the Google Cloud AI in retail. |
|  | Analyze the impact of cognitive computing on business processes and decision-making. How does it enhance operational efficiency and drive innovation? |
|  | Suppose that your local bank has a data mining system. The bank has been studying your debit card usage patterns. Noticing that you make many transactions at home renovation stores, the bank decides to contact you, offering information regarding their special loans for home improvements. (a) Discuss how this may conflict with your right to privacy. (b) Describe another situation in which you feel that data mining can infringe on your privacy. (c) Describe a privacy-preserving data mining method that may allow the bank to perform customer pattern analysis without infringing on its customers’ right to privacy. |
|  | Compare and contrast associative classification and discriminative frequent pattern–based classification. Why is classification based on frequent patterns able to achieve higher classification accuracy in many cases than a classic decision tree method? |
|  | Explain the architecture of the Transformer model and its impact on NLP. |