Total No. of Questions : 8]

SEAT No. :

PB2504

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B.E. (Artificial Intelligence & Data Science)

COMPUTATIONAL INTELLIGENCE

(2019 Pattern) (Semester-VIII) (417530)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Figures to the right indicates full marks.***

Q1) a) What are the key performance measures used to evaluate the effectiveness of evolutionary algorithms? **[6]**

b) What is swarm intelligence, and how does it differ from traditional optimization techniques? **[6]**

c) Define Genetic programming and its application in symbolic regression? **[6]**

OR

Q2) a) Discuss the importance of selection in evolutionary algorithms and its impact on the convergence of the algorithm? **[6]**

b) Explain the concept of population in evolutionary computing and its significance in the optimization processes? **[6]**

c) Compare and contrast genetic algorithms, evolution strategies, evolutionary programming. **[6]**

Q3) a) Explain the concept of an individual in the context of genetic algorithms and its role in the optimization process? **[6]**

b) Explain the concept of Messy Genetic Algorithm? **[6]**

c) Write the principles of the Holland Classifier system and its application? **[5]**

OR

Q4) a) Describe the process of selection in genetic algorithms, including the different selection strategies used? **[6]**

b) What condition determines when a genetic algorithm stops iterating and returns the best solution found? **[6]**

c) Explain the concept of initialization in genetic algorithms and its role in creating the initial population? **[5]**

P.T.O.

Q5) a) Compare and contrast Word2Vec and GloVe in terms of how they generate word embeddings? **[9]**

b) Explain the architecture of a Seq2Seq model and its role in neural machine translation? **[9]**

OR

Q6) a) How does BERT (Bidirectional Encoder Representations from Transformers) work, and what are its advantages over traditional language models? **[9]**

b) Describe the TF-IDF (Term Frequency-Inverse Document Frequency) weighting scheme and its significance in text representation? **[9]**

Q7) a) Explain the concept of Artificial Immune Models and their significance in computational intelligence? **[9]**

b) Describe the principles of Network Theory Model and its application in understanding immune system behaviour? **[8]**

OR

Q8) a) Discuss the role of antigen-presenting cells in immune activation and its representation in the Dendritic Cell Model? **[9]**

b) Discuss the limitations and challenges of applying Artificial Immune System models in real-world applications? **[8]**