GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)
Ph.D. (First Semester) Examinations, December – 2024
23SPPEME1012 – AI and Machine Learning in Composite Materials Processing
(Mechanical Engineering)

Time: 3 hrs   Maximum: 70 Marks

The figures in the right hand margin indicate marks.

Answer *ANY FIVE* Questions.   **(14 x 5 = 70 Marks)**   **Marks**

1.a.	Explain how AI and machine learning can improve the manufacturing process of fibre-reinforced composites.	8
b.	Explain the ways machine learning models can predict the performance and failure of fibre-reinforced composites.	6
2.	What data is required for training machine learning models in fibre-reinforced composite processing, and how can it be collected?	14
3.a.	How can AI and machine learning techniques optimize the processing of composite materials to enhance performance and reduce waste?.	7
b.	What machine learning algorithms are most effective for modeling the complex behaviors of composite materials during manufacturing?.	7
4.	How can AI and machine learning enhance the accuracy and efficiency of data acquisition in composite materials processing?	14
5.a.	How do AI and machine learning techniques analyze complex datasets from composite materials to optimize processing parameters?.	7
b.	How can data-driven AI models predict defects and material performance in real-time during composite material processing?.	7
6.a.	What role does machine learning play in predicting and mitigating defects during CNC machining of composite materials?	7
b.	In what ways can AI and ML models enable real-time monitoring and adaptive control of CNC machines when processing composite materials?	7
7.	What role will AI and machine learning play in automating composite manufacturing processes, and how can it address current limitations in production efficiency?	14
8.a.	How can AI-driven predictive models improve the design and optimization of composite materials for specific applications?	7
b.	How can AI and ML techniques enhance sustainability and reduce material waste in the CNC machining of composite materials?	7

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