Name: **Enrolment No:**	

UPES

End Semester Examination, December 2024

Course: Smart Manufacturing **Semester : VII**

Program: B.Tech- Mechanical Engineering **Time : 03 hrs.**

Course Code: MECH4048 **Max. Marks: 100**

Instructions: 1. Make a neat and clean sketch/diagram if needed**.**
2. Be specific and precise in your answers.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Discuss the need for modernizing conventional manufacturing to smart manufacturing for global manufacturers.	**4**	**CO1**
Q 2	Explain the concept of smart design/fabrication and its role in modern manufacturing.	**4**	**CO2**
Q 3	Describe the additive manufacturing cycle chain with the help of schematic.	**4**	**CO1**
Q 4	Explain how smart systems contribute to deskilling operations in a smart factory environment.	**4**	**CO2**
Q 5	Define and explain sustainable resource management with reference to Smart Manufacturing.	**4**	**CO1**
SECTION B **(4Qx10M= 40 Marks)**			
Q 6	Discuss the 'Digital Twin' in detail along with its advantages and challenges.	**10**	**CO1**
Q 7	Write short notes on the following: (a) Requirement of standards for smart manufacturing. (b) Standards for additive manufacturing.	**10**	**CO2**
Q 8	Discuss the importance of predictive maintenance in smart manufacturing along with examples.	**10**	**CO1**
Q 9	Evaluate the impact of smart technologies on improving information capture and traceability in manufacturing. **OR** Define assisted and augmented production systems and explain its applications in various aspects of manufacturing.	**10**	**CO3**

P.T.O.

SECTION-C (2Qx20M=40 Marks)			
Q 10	Analyze the role of robotics and automation in smart manufacturing. Explain the following terms in context of robot: 1. Manipulator 2. Actuators 3. Joints **OR** Define robot coordinate systems. Explain the various robot coordinate systems in detail with the help of schematics.	**20**	**CO3**
Q 11	(a) Describe the role of online monitoring and intelligent control systems in manufacturing and supply chain processes. (b) Explain the importance of integrating smart energy management systems in manufacturing processes with examples.	**20**	**CO2**