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Question Paper Code: U5109

M.E. DEGREE EXAMINATION, NOV 2025
Professional Elective
CAD/CAM
21PCD509 ADDITIVE MANUFACTURING
(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 20 = 100 Marks)

1. (a) Compare the Difference between Rapid Tooling and Rapid Manufacturing. Discuss how Additive Manufacturing has revolutionized these two areas, providing examples of their industrial applications CO1-Ana (20)

Or

(b) Discover the concept of Bio Printing in Additive Manufacturing. Discuss how AM is being used for tissue engineering, organ fabrication, and its potential implications for the medical field. CO1-Ana (20)

2. (a) Apply the principles of lattice structures in Additive Manufacturing. Discuss how they contribute to weight reduction, strength optimization, and material efficiency. Provide examples of their applications in various industries. CO3-App (20)

Or

(b) Apply the principles of generative design in the context of Additive Manufacturing. How does generative design enable the creation of highly optimized and innovative structures? Compare it with traditional design methodologies. CO3-App (20)

3. (a) Explain the working principle of Digital Light Processing (DLP) in Additive Manufacturing. Discuss how the light projection system works in comparison to SLA, focusing on how it creates layers, the materials used, and the types of parts produced. CO2-U (20)

Or

- (b) Explain the key advantages of Digital Light Processing (DLP) over other photo polymerization techniques, such as SLA? Discuss aspects like build speed, part quality, and material options, providing relevant industrial examples. CO2-U (20)
4. (a) Describe the Laser Engineered Net Shaping (LENS) process and outline its main advantages, limitations, and applications. Illustrate your answer with a suitable industrial case study. CO5-U (20)
- Or
- (b) Explain the sequence of operations involved in the Material Extrusion process. Discuss how process parameters such as temperature and extrusion rate influence the final product quality. CO5-U (20)
5. (a) Analyze the process flow of Shape Deposition Manufacturing (SDM). Identify and discuss the factors that influence process accuracy, surface finish, and cost efficiency in industrial production. CO6-Ana (20)
- Or
- (b) Investigate the working principle of Ballistic Particle Manufacturing (BPM). Analyze the economic and logistical challenges involved in scaling up BPM technology for large-scale industrial applications. CO6-Ana (20)