Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem Examination May-2024

ME3EL25 Additive Manufacturing

Programme: B.Tech. Branch/Specialisation: ME

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. Choose the correct sequence to generate prototype- **1**

(a) 3D CAD data - CAD solid model - STL file - RP prototype

(b) CAD solid model - 3D CAD data - RP prototype - STL file

(c) STL file - 3D CAD data - CAD solid model - RP prototype

(d) 3D CAD data - STL file - CAD solid model - RP prototype

ii. Process of converting STL file model into layers is called _____ in RP. **1**

(a) Chopping (b) Slicing (c) Cutting (d) Trimming

iii. Laminated Object Manufacturing (LOM) is developed by- **1**

(a) Stratasys (b) CAM-LEM

(c) Kira corporation (d) Cubic technologies

iv. Full form of FDM is- **1**

(a) Fixed Development Modelling

(b) Fusion Development Modelling

(c) Fused Deposition Modelling

(d) Focused Deposition Modelling

v. Which of the following is used as base material in Selective laser sintering (SLS)? **1**

(a) Photopolymer (b) Thermoplastics, metal powders

(c) Titanium alloys (d) Various materials

vi. Which of the following is not Powder-Based RP system? **1**

(a) Selective laser sintering

(b) Solid objective ultraviolet laser printer

(c) Electron beam melting

(d) Direct metal deposition

vii. Which of the following RP system is not developed by 3D systems? **1**
(a) Selective laser sintering
(b) Multi jet modelling system
(c) Paper lamination technology
(d) Stereolithography apparatus

viii. Which material gives finest surface finish in RP? **1**
(a) ABS (b) PLA (c) Nylon (d) INF

ix. For processes that need support structures, part orientations should be optimized such that it would require _____ support. **1**
(a) Minimum (b) Maximum (c) Optimum (d) Zero

x. Which of the following are problems with the current rapid prototyping and additive manufacturing technologies? **1**
(a) Limited material variety
(b) Inability to convert a solid part into layers
(c) Poor machinability to the starting material
(d) The inability of the designer to design the part

Q.2 i. What is the need for additive manufacturing? **2**
ii. Differentiate between direct and indirect tooling. **3**
iii. Explain the impact of additive manufacturing on product development. **5**
OR iv. Explain about STL file problems in detail with examples. **5**

Q.3 i. What is the importance of stereo lithography process? **2**
ii. What are the various LOM materials and their typical applications? **8**
OR iii. How FDM used in rapid prototyping? What are the applications of FDM models? **8**

Q.4 i. How SLS differs from 3D printing? **3**
ii. Describe Direct Metal Laser Sintering (DMLS) process giving its schematic. **7**
OR iii. What are the materials used in the Powder based AM System? Explain application areas. **7**

Q.5 i. Explain the principle of DED system. **4**
ii. Describe the working principle of Wire Arc Additive Manufacturing (WAAM) with neat sketch. **6**
OR iii. Differentiate between DED and Powder Bed AM process. **6**

Q.6 Attempt any two:
i. Explain different types of defects during the AM process. **5**
ii. Discuss about various in-situ and ex-situ techniques. **5**
iii. Describe different types of post processing techniques. **5**

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Marking Scheme
Additive Manufacturing (T) - ME3EL25 (T)

Q.1	i)	Choose the correct sequence to generate prototype. (A) 3D CAD data - CAD solid model - STL file - RP prototype	**1**
	ii)	Process of converting STL file model in to layers is called_____in RP. (B) slicing	**1**
	iii)	Laminated Object Manufacturing (LOM) is developed by (D) Cubic Technologies	**1**
	iv)	Full form of FDM is (C) Fused Deposition Modelling	**1**
	v)	Which of the following is used as base material in Selective laser sintering (SLS)? (B) Thermoplastics, Metal powders	**1**
	vi)	Which of the following is not Powder-Based RP system (B) Solid Objective Ultraviolet Laser Printer	**1**
	vii)	Which of the following RP system is not developed by 3D systems? (C) Paper Lamination Technology	**1**
	viii)	Which material gives finest surface finish in RP? (B) PLA	**1**
	ix)	For processes that need support structures, part orientations should be optimized such that it would require _____ support. (A) Minimum	**1**
	x)	Which of the following are problems with the current rapid prototyping and additive manufacturing technologies? (A) Limited material variety	**1**
Q.2	i.	Need	**2**
	ii.	Any three different	**3**
	iii.	As per explanation	**5**
OR	iv.	As per explanation	**5**
Q.3	i.	Importance	**2**
	ii.	Lom material 4 Marks Applications 4 Mark	**8**
OR	iii.	Uses of FOM 4 Marks	
		Applications 4 Marks	
Q.4	i.	SLS different	**3**
	ii.	DMLS	**7**
OR	iii.	As per explanation	**7**
Q.5	i.	Principle of DED	**4**
	ii.	As per explanation	**6**
OR	iii.	As per explanation	**6**
Q.6			
	i.	5 defects one each	**5**
	ii.	As per explanation	**5**
	iii.	As per explanation	**5**

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