

Roll No.

OLE-3207
B. Tech. 5th Semester (ME)
Examination – April, 2021

COMPUTER AIDED DESIGN & MANUFACTURING

Paper : PCC-ME-301-G

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is *compulsory* and of short answers type. Each question carries equal marks (15 marks). Students have to attempt 5 questions in total at least *one* question from each Section.

1. (a) Explain photo polymerization process in additive manufacturing.
- (b) Write down the translation and reflection matrices used for 2D & 3D transformation.
- (c) Write the properties of Hermite cubic spline.
- (d) Write down the Euler's formula for validation of the open polyhedral and closed polyhedral.

- (e) Explain software issues for additive manufacturing.
- (f) Explain the assembly of matrices of elements in the finite element method.

$$2.5 \times 6 = 15$$

SECTION – A

- 2. (a) Explain the different steps involved in the design process with suitable example. 7.5
- (b) Why additive manufacturing is also known as rapid prototyping ? Explain the differences between additive manufacturing and subtractive manufacturing. 7.5
- 3. (a) How do you classify the additive manufacturing ? Explain in detail. 7.5
- (b) What are the applications of additive manufacturing in biomedical, automotive and healthcare industry ? Explain in detail. 7.5

SECTION – B

- 4. (a) A unit cube is having one of its corners at the origin. It is first translated by 2 units in the x-direction and 3-units in y-direction, then its scaled by 3 units. Find out the coordinates of transformed cube. 7.5

- (b) Derive the parametric equation for cubic Bezier and cubic B-spline surface whose boundary curves and cross boundary derivatives are given. 7.5
5. (a) What are the salient features of half space boundary representation Solid modeling approach? 7.5
- (b) Explain in brief the basic elements of a CSG model. Discuss the main building operation of CSG schemes with examples. 7.5

SECTION – C

6. Consider the bar shown in fig 1. An axial load $P = 220 \times 10^3 \text{ N}$ is applied as shown. 15
- (a) Determine the nodal displacements
- (b) Determine the stress in each material.

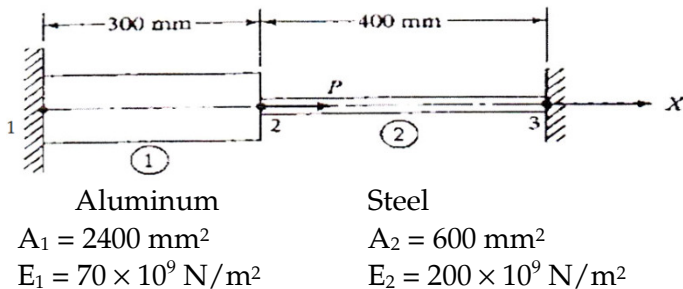


Fig. 1

7. Explain the principle of powder bed fusion in additive manufacturing with neat sketch. 15

SECTION – D

8. (a) What is meant by process planning ? How does the computer aided process planning differ from the traditional process planning ? 7.5
- (b) Differentiate between retrieval type and generative type CAPP systems. List down the merits and de-merits of each type. What are the different types of flow ? Explain in detail. 7.5
9. (a) What are the functions performed by material handling and storage system in FMS ? 7.5
- (b) What is a flexible manufacturing cell ? With a neat sketch, explain flexible cell. 7.5
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