

M.E. Fourth Semester (Production Tech. Mgt.) (P.T.) (CGS)  
**13547 : Elective - Product Design : 4 SPTM 3**

P. Pages : 2

Time : Three Hours



**AW – 3434Add**

Max. Marks : 80

- Notes :
1. Answer **three** question from Section A and **three** question from Section B.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Illustrate your answer necessary with the help of neat sketches.
  5. Use of pen Blue/Black ink/refill only for writing the answer book.

**SECTION – A**

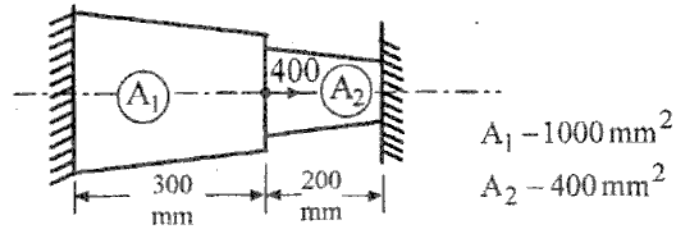
1. a) Classify various additive manufacturing processes on the basis of form of raw material. State mechanism of element creation in each process. 7  
b) Explain how rapid prototyping assists in the preparation of engineering models and mock – ups. 6
2. a) Explain the application areas of Rapid Prototyping with suitable examples. 6  
b) Explain the steps involved in selective Laser Sintering (SLS) process of RP with neat sketch. 7
3. a) Discuss the process parameters associated with RP process with their importance. 6  
b) What is post processing in RP? Explain in brief types of post processing required in various PR processes state for any four processes. 8
4. a) Explain various display commands used in solid modelling software? 6  
b) Describe BIS (Beam Interface Solidification) process of Rapid Prototyping with neat sketch. 7
5. a) Explain the commands for generation of 3D model of a Taper Roller Bearing. 7  
b) Explain with specific advantages, concept of virtual manufacturing. 6

**SECTION – B**

6. a) Explain Design for manufacturing (DFM) concept in manufacturing of parts. 7  
b) Describe the concept of QFD in total Quality Management. 6
7. a) Explain basic steps involved in solving problems using finite elemental Analysis method (FEM). 7  
b) Using required expression, describe the principle of minimum potential energy. 7
8. a) Prove that strain as well as stress over the element domain is always same. 7

- b) What are the problems of sequential engineering? State the drawbacks of short product cycle. 6

9. A stepped bimetallic bar made of Brass and Steel is subjected to an axial load of 400 kN. Using finite element Analysis method, determine : (Refer Figure No. 1) 13
- i) The nodal displacement
  - ii) The reaction forces at supports
  - iii) The stress in each material.



For

Steel,  $E_S = 200 \times 10^3 \text{ N/mm}^2$

Brass,  $E_B = 80 \times 10^3 \text{ N/mm}^2$

Figure No. 1.

10. a) Describe design related tasks performed by the components of Computer Integrated Manufacturing (CIM). 7
- b) What is Modular Design? State advantages of reverse engineering. 6

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