

AQ - 2727

Fourth Semester M. E. (Production Tech. and Mgt.) Examination

PRODUCT DESIGN

Paper - 4 SPTM 3

P. Pages : 3

Time : Three Hours]

[Max. Marks : 80

- Note :** (1) Separate answer book must be used for each section in the subject Geology, Engineering material of civil branch and separate answer-book must be used for Section A & B in Pharmacy and Cosmetic Technology.
- (2) All question carry marks as indicated.
- (3) Answer **Three** questions from Section A and **Three** questions from Section B.
- (4) Due credit will be given to neatness and adequate dimensions.
- (5) Assume suitable data wherever necessary.
- (6) Diagrams should be given wherever necessary.
- (7) Illustrate your answer wherever necessary with the help of neat sketches.
- (8) Use of calculators is permitted.
- (9) Use pen of Blue/Black ink/refill only for writing the answer book.

SECTION A

1. (a) Describe the selective laser sintering method of rapid prototyping with the help of well labelled diagram. 7
- (b) Describe the steps involved in rapid prototyping process. 7
2. (a) Explain the fused deposition modelling process of rapid prototyping with the help of neat sketch. 7
- (b) Explain why rapid prototyping is called as a generative process. Support your answer with relevant sketches. 6
3. (a) Classify the various additive manufacturing processes on the basis of state of raw material stating mechanism of element creation in each process. 7
- (b) Explain the solid ground curing process with the help of neat sketch. 6

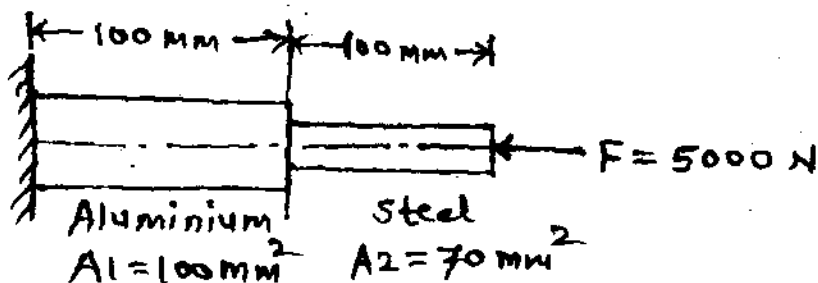
AQ - 2727

P.T.O.

4. (a) Explain the use of rapid prototyping for investment casting. Sketch the suitable diagrams. 7
- (b) Explain stereolithography process with the help of neat sketch. 6
5. (a) Explain the concept of virtual manufacturing. What are the specific advantages of virtual manufacturing ? 7
- (b) Explain various display commands used in solid modelling software. 6

SECTION B

6. (a) What is the principle of minimum potential energy ? Derive the equilibrium equation used in FEM ? 8
- (b) What shapes of elements are generally considered for modelling the structures in FEA. 5
7. (a) Prove that, strain as well as stress over element domain is always same. 8
- (b) What is concurrent engineering ? State its advantages over sequential engineering. 6
8. A stepped bimetallic bar made of aluminium ($E = 70 \times 10^3 \text{ N/mm}^2$) and steel ($E = 200 \times 10^3 \text{ N/mm}^2$) is subjected to the axial force of 5000 N. Determine nodal displacements and reaction force at support.



13

9. (a) Describe the impact on cost because of design changes in product development cycle. 7
- (b) Discuss the Taguchi's concept of product design. 6
10. (a) What do you mean by Axiomatic design ? Explain. 7
- (b) Discuss the QFD approach for product design. 6



