

(3 Hours)

Total Marks : 80

- N.B. (1) Question no. 1 is compulsory.  
(2) Attempt any three questions out of remaining five questions.  
(3) Illustrate your answer with necessary sketch wherever necessary.  
(4) Figures to the right indicate full marks.

1. Attempt any FOUR of the following : (20)
- (a) Explain types of chips produced during machining process.
  - (b) Explain machinability.
  - (c) Distinguish between Additive Manufacturing (AM) and CNC machining.
  - (d) Compare milling fixture and drilling fixture.
  - (e) Explain scrap strip layout.
2. (a) Define tool life and explain factors affecting tool life. (10)  
(b) Write in detail about indexing devices. (6)  
(c) Explain in detail about powder bed fusion. (4)
3. (a) State the classification of AM(Additive Manufacturing) / RP (Rapid Prototyping) systems and explain any one in detail. (10)  
(b) List different types of dynamometers and explain strain gauge type dynamometer. (6)  
(c) Explain end milling cutters in detail. (4)
4. (a) Describe the mechanism of chip formation in detail. (10)  
(b) Explain the steps in designing bending dies. (6)  
(c) Explain the design principles for turning fixtures. (4)
5. (a) Give the classification of non traditional machining processes and explain water jet machining in detail. (10)  
(b) Estimate the blanking force to cut a blank of 20 mm wide and 30 mm long from a 2 mm thick metal strip. If the ultimate shearing strength of the material is 450 N/mm<sup>2</sup> also find the work done if the percentage penetration is 30% of the thickness. (6)  
(c) Differentiate between orthogonal and oblique cutting. (4)
6. Write short note on. (20)
- (a) Factors affecting surface finish
  - (b) 3D Systems Stereolithography Apparatus (SLA)
  - (c) Types of coolants
  - (d) Chemical machining
  - (e) Balancing of grinding wheels

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