

Reg. No. :

Question Paper Code : 10879

M.E./M.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Second Semester

Manufacturing Engineering

MF 4203 – THEORY OF METAL FORMING

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List out the applications of FEM in metal forming analysis.
2. Define Von-mises yield criteria.
3. What are extrusion defects?
4. What are the disadvantages of forging processes?
5. Define hydro forming process.
6. What are the formability tests for sheet metal?
7. Distinguish between orbital forming and isothermal forming.
8. State the advantages and disadvantages of high-speed extrusion.
9. What is gliding velocity?
10. What is duplex and triplex steel rolling?

PART B — (5 × 13 = 65 marks)

11. (a) Write the steps involved in drawing a Mohr's circle. And also write the assumption in plasticity.

Or

- (b) With neat sketch geometrically represent Tresca and Von-mises yield criteria and distortion energy.

12. (a) Derive the expression for forging force of a rectangular plate under plane strain condition.

Or

- (b) With the help of a neat sketch explain the deformation zone in rolling. Also discuss about rolling defects.
13. (a) Discuss with neat sketch water hammer forming process principles, process parameters, advantages, limitations and applications.

Or

- (b) Explain with neat sketch the principles, process parameters, advantages, limitations and applications of superplastic forming techniques.
14. (a) Compare principles, advantages, limitations and applications between powder perform forging and powder rolling.

Or

- (b) Discuss with neat sketch of principles, advantages, limitations and applications
- (i) Rubber pad forming (7)
- (ii) Laser beam forming (6)
15. (a) (i) Explain friction between metallic layers with neat sketch (7)
- (ii) Discuss about thin aluminium alloy cladding. (6)

Or

- (b) Analyse thermos-mechanical regimes of Ti and Al alloy during deformation.

PART C — (1 × 15 = 15 marks)

16. (a) (i) State the general characteristics of sheet metal forming processes. (8)
- (ii) Write down the difference between blanking and fine blanking. (7)

Or

- (b) (i) Differentiate various methods of tube drawing in terms of characteristics, advantages and disadvantages and applications. (8)
- (ii) Discuss the various parameters that affect the process of tube drawing. (7)