

Time: 3 hour

Max Marks:80

- Note: 1. Q1 is compulsory  
2. Solve any three from remaining

- Q1 Solve any Four out of Six 20**
- A. Classify forging processes. Compare hydraulic and Mechanical presses used in forging.
  - B. Classify metal spinning, write applications, and explain any one type of it.
  - C. Differentiate Hot and Cold working.
  - D. Explain various defects in deep drawing with their causes and remedy
  - E. Explain explosive forming process with advantages, limitations, and applications
  - F. Classify extrusion. Write advantages and limitations of hydrostatic extrusion.
- Q2 20**
- A. A cylindrical workpiece is subjected to cold upset forging operation. The starting piece is 75 mm in height and 50 mm in diameter. It is reduced in the operation to a height of 36 mm. The work material has a flow curve defined by  $K_f = 1 + (0.4\mu D/h)$ , where  $K_f$ = forging shape factor,  $K=350$  MPa and  $n=0.17$ . assume a coefficient of friction of 0.1. Determine the force as the process begins, at the intermediate height of 62 mm and at the final height of 36 mm.
  - B. Explain the effect of temperature and strain rate on metal forming.
- Q3 10 10**
- A. In a single pass rolling operation, a 20 mm thick plate with plate width of 100 mm, is reduced to 18 mm. The roller radius is 250 mm and rotational speed is 10 rpm. The average flow stress for the plate material is 300 MPa. Calculate the power required for the rolling operation in kW.
  - B. Classify rolling processes. Write advantages and limitations of it.
- Q4 10 10**
- A. In a wire drawing operation, the initial wire diameter is 7 mm and final wire diameter is 6.3 mm. the half die angle  $\alpha=10^\circ$ . Find the drawing stress considering  $\mu=0.1$  and  $k=20$  N/mm<sup>2</sup>. Also calculate the maximum reduction possible.
  - B. Explain tube drawing process.
- Q5 10**
- A. Explain seamless tube extrusion process
  - B. Differentiate direct and indirect extrusion process.
- Q6 10 10**
- A. Explain V and edge bending process.
  - B. Explain various rolling defects with causes and remedies.
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