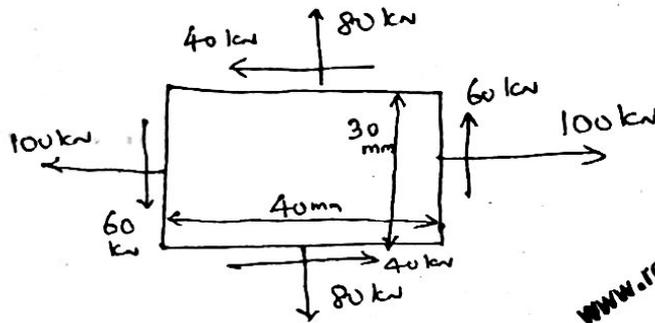


PART B — (5 × 13 = 65 marks)

11. (a) The state of stress at a point in a strained material is as shown in figure. Determine : (13)

- (i) The direction of principal planes.
 - (ii) The magnitude of principal stresses and
 - (iii) The magnitude of the maximum shear stress and its direction.
- Indicate all the above planes by a sketch.



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Or

- (b) (i) How geometrically represent Tresca and Von-mises yield criteria? Sketch it. (6)
 - (ii) Explain slip line field theory also write the assumption in plasticity. (7)
12. (a) (i) State the condition for biting of strip by rolls. (5)
- (ii) Derive the expression for forging force of a rectangular plate under plane strain condition. (8)

Or

- (b) (i) With the help of a neat sketch explain the deformation zone in rolling. Also discuss about rolling defects. (6)
- (ii) With a neat sketch explain various methods of producing tubes using extrusion process. State its advantages. (7)

13. (a) (i) How presses can be classified in sheet metal working? (4)
- (ii) A cylindrical specimen of 150 mm diameter and 100 mm length is upset in open die forging to a height of 50 mm at room temperature. Assume coefficient friction as 0.2, material constant as 1030 MPa and strain hardening coefficient as 0.17. Estimate ;
- (1) Flow stress needed to induce deformation.
- (2) The average pressure at the end of the stroke. (9)

Or

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- (b) (i) What are the formability tests for sheet metal? State the importance of formability limit diagram with neat sketch. (6)
- (ii) Explain with a sketch the roll arrangements of four-high rolling mill. (7)
14. (a) (i) Compare and Contrast on the characteristics of Hot iso-static pressing and Cold iso-static pressing. (7)
- (ii) Enumerate the features of power metallurgy in metal forming process. (6)

Or

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- (b) (i) With a neat schematic, explain the LASER beam forming process. (7)
- (ii) With the aid of neat sketch, Explain Orbital forging process, stating its applications. (6)
15. (a) (i) Discuss with suitable illustration the influence of temperature and friction in metal working. (6)
- (ii) Describe with illustrate sketch anyone method of high - energy - rate forming. (7)

Or

- (b) (i) Derive a relationship for a theoretical maximum reduction per pass in rod drawing for strain hardening material. (6)
- (ii) Sketch and explain a simple die for angle bending indicating how the bending load be evaluated. (7)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Explain the procedure to find the extrusion force in the plane extrusion of a rectangular blank. (8)
- (ii) Determine the rolling pressure distribution in strip rolling process with neat sketch. (7)

Or

- (b) (i) Explain the working principle of Electro-Hydraulic forming process With neat sketch. Write its advantages, applications and limitations. (8)
- (ii) Sketch and explain a simple die for angle bending indicating how the bending load be evaluated. (7)

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