6 a. Explain with a neat sketch the Direct Extrusion and Indirect Extrusion Processes. (06 Marks)
b. Write a note on extrusion equipment, die design and lubrication. (06 Marks)
c. An aluminium alloy is hot extruded at 400°C at 50 mm/sec from 150 mm diameter to 50 mm diameter. The flow stress at this temperature is given by $\bar{\sigma} = 200\left(\dot{\in}\right)^{0.15}$ MPa. If the billet is 380 mm long and the extrusion is done through square dies without lubrication. Determine the force required for the operation. Assume $\mu = 0.1$. (08 Marks)

7 a. Give the classification of dies in sheet metal and explain combination dies with neat sketch. (08 Marks)
b. Explain the following operations with neat sketches :
(i) Stretch forming.
(ii) Rubber forming. (06 Marks)
c. List the defects in sheet metal formed parts. (06 Marks)

8 a. Discuss the principle of "High Energy Rate Forming" methods and with a neat sketch explain the explosive forming. (08 Marks)
b. Explain different steps involved in powder metallurgy process with the help of flow diagram. (08 Marks)
c. List the applications of powder metallurgy components. (04 Marks)

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