

**B. TECH.**  
**(SEM IV) THEORY EXAMINATION 2018-19**  
**MANUFACTURING SCIENCE AND TECHNOLOGY-I**

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections.

**SECTION A**

1. **Attempt all questions in brief.** **2 x 10 = 20**
- Define the term manufacturing. Also classify the manufacturing system.
  - Differentiate hand forging and machine forging.
  - Define the term extrusion and extrusion ratio.
  - Define leading and lagging zone in rolling process.
  - Define perforating and nibbling process.
  - Differentiate between sprue and runner.
  - Distinguish between jig and fixtures.
  - Explain the term stand of distance related to explosive forming.
  - Explain parting sand and loam sand.
  - Define the term thermoplastics.

**SECTION B**

2. **Attempt any three of the following:** **10 x 3 = 30**
- Briefly describe Tresca's and Von Mises yield criteria. Compare the two and show that the relationship between shear yield stress  $K$  and tensile yield stress  $\sigma_y$  for these criteria given by  $K = \frac{\sigma_y}{2}$  and  $K = \frac{\sigma_y}{\sqrt{3}}$ .
  - A metal strip is to be rolled from an initial thickness of 3.5 mm to a final rolled thickness of 2.5 mm in a single pass rolling mill having rolls of 250 mm diameter. The strip is 450mm wide. The average coeff. of friction in the roll gap is 0.08. Taking plain strain flow stress of 140 MPa for the metal and assuming negligible spreading, estimate the roll separating force.
  - 150 mm diameter and 82 mm deep cup shaped component with 10 mm wide flange on the periphery are to be manufactured out of aluminum sheet of thickness 1 mm. The ultimate strength of the sheet in tension is 120N/mm<sup>2</sup>. Determine the blank size and blank holding pressure. The corner radius both at rim and at the bottom is equal to 6mm.
  - Explain the various types of pattern and pattern allowances.
  - What do you understand by advanced forming methods? Also explain with help of neat sketch explosive forming with their application and limitations.

**SECTION C**

3. **Attempt any one part of the following:** **10 x 1 = 10**
- What is the significance of recrystallization temperature in metal working? Also write down the difference between hot working and cold working.
  - A metal component 25m\*25mm\*150 mm long having a yield stress of 7MPa in the tension, is to be compressed between flat dies to a size 6mm\*100mm\*150mm. If  $\mu=0.2$ , calculate the maximum forging load.
4. **Attempt any one part of the following:** **10 x 1 = 10**
- Derive the expression for the extrusion pressure.
  - A circular wire is drawn through a die having 8° semi cone angle. Considering only the conical portion of the die, determine the maximum possible reduction in area of cross section if co-efficient of friction is 0.08. The material is not work hardened. Also find optimum die angle.

5. **Attempt any *one* part of the following:** **10 x 1 = 10**
- a) With the help of neat sketch explain working of press. Also classify press.
  - c) Explain the causes and remedies for the defects formed during metal forming process.
6. **Attempt any *one* part of the following:** **10 x 1 = 10**
- a) Explain the various properties of moulding sand, also explain different types of moulding sand.
  - b) Explain with neat sketch explain die casting. Also write down their merits and demerits.
7. **Attempt any *one* part of the following:** **10 x 1 = 10**
- a) What is the Plastics. How plastics are classified. Explain how plastic products are welded.
  - b) Differentiate between jigs and fixtures. Also explain various locating devices with neat sketch.

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