Sub Code: MST-301 **ROLL NO.**

Model Question Paper

COURSE: M.TECH. **BRANCH**: MANUFACTURING SCIENCE AND ENGINEERING

SEMESTER: 1 . **SUBJECT**: METAL FORMING TECHNIQUE

Duration: 3:00 hrs **Max marks: 100**

Note: Attempt all questions.

1. **Attempt any four parts of the following.** **5x4 = 20**
   A. Explain in details the Theory of Plastic Deformation..
   B. Discuss the different variable that affects the deep drawing Process?
   C. Explain the application of FEM in metal forming technique?
   D. What are the different yield criteria in plastic deformation?
   E. Explain what are the various powder metallurgical techniques .Also discuss about surface treatment Process
   F. Explain in Brief Mohr circle representation of state of stress?

2. Attempt any two parts of the following. **10x2=20**

A Discuss the various parameters that affects the Process of Tube Drawing?

B. Discuss the true stress and strain curve for Ductile and Brittle materials?

C. Determine the maximum forging load of a metallic component25mm*25mm*150mm. The yield stress in simple tension is 7Mpa. The component is pressed between flat dies to a size 6mm*100mm*150mm. The coefficient of friction μ=020. Consider the mixed friction case

. **3. Attempt any two parts of the following.** **10x2=20**

A. Derive an expression of work done in deforming a metal in extruding a bar of Length L and section A. Assume any required Parameter.

B. How are rubbers identified? Explain vulcanization fabrication and forming techniques.

C. Explain upper and lower bound solution methods and what are the fem applications in metal forming analysis?

4. Attempt any two parts of the following. **10x2=20**

A. Discuss the graphically the effect of lubrication on deformation in extrusion process.

B. Explain the basic steps of powder metallurgy process. Explain in brief about "Sintering". Why sintering is done in a controlled manner?

C. Evaluate the effect of friction in metal forming process and influence of temperature?

5. Attempt any two parts of the following. **10x2=20**

A. Write a short note on:

(i) Rubber pad forming

(ii) Laser beam forming.

B. Determine the maximum force required for extruding a cylindrical aluminum billet of 25mm diameter and 50mm length to a final diameter of 5mm.[σy for Al =170N/mm2] Calculate power loss in friction

C. What are the various process variables which control the rolling process?