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Total No. of Pages : 02

Total No. of Questions : 08

M.Tech. (PE) (Sem.–1)

# METAL FORMING

Subject Code : PE-503

M.Code : 39004

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1. a) State and explain the yield criteria. What do you mean by 'yield of isotropic plastic material'? Explain with example. 10

   b) Draw and explain the criteria for selection of stress-strain curves for cold and hot working. Give suitable examples for both the cases in support of your answer. 10

2. a) What is plastic incompressibility? Explain briefly. Explain the plastic deformation flow rule. How it is obey the Poisson's ratio? Answer with justification. 12

   b) Explain the detail procedure of examination of metal forming processes with suitable example. 8

3. a) Deduce an expression for evaluation of working load corresponding to the maximum deformation in tube drawing. How will you analyze the maximum deformation of wire drawing? Explain. 13

   b) How forming variables are affecting the process of wire drawing. Explain briefly. 7

4. a) Explain the procedure for prediction of working load for plain strain forging of strip under the condition of sticking of material with die. Give a simple sketch of forging of strip in support of your answer. What do you mean by 'plain strain forging of disc under mixed condition'? Explain briefly. 7+6

   b) What is extrusion? Explain lateral extrusion process with a simple sketch. 7

5. a) State and explain the principle of lubrication in metal forming processes. Explain the film lubrication process with the help of a simple block diagram. 6+6

   b) Write the name of the lubricants used for cold drawing and justify why these lubricants are used for cold drawing? Write the applications of solid lubricants 6+2

6. a) Explain the theory of deep drawing process. List out the various defects in deep drawing of metal, explain the causes of defects and their remedial actions. Give sketches of all defects in support of your answer. 13

b) How will you predict the radial stress during deep drawing of a circular blank? Explain. 7

7. a) How will you classify the rolling mills and analyze the rolling process? Explain briefly. 8

b) Explain the procedure for prediction of roll separating forces for flat strip rolling. 6

c) What do you mean by 'Torque on the Roll'? How will you predict the torque on the roll? Explain. 6

8. Write detail notes on the following with reference to the metal forming; give example in support of the answer.

a) Tresca maximum shear strain energy criterion. 8

b) Boundary and extreme pressure lubricants. 6

c) Various factors which affect the rolling forces. 6

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.