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Total Number of Pages: 02

B.Tech
PCMT4304

6th Semester Regular / Back Examination 2015-16
MECHANICAL WORKING AND TESTING OF MATERIALS

BRANCH: METTA,MME

Time: 3 Hours

Max Marks: 70

Q.CODE:W203

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

- a) How does fracture stress and mode of fracture vary with specimen thickness?
- b) Explain why minor load is applied prior to the application of major load in Rockwell hardness testing method.
- c) What are the different types of indentations frequently observed with a pyramid indenter?
- d) What is limiting drawing ratio (LDR)?
- e) Define Meyer's law.
- f) What is zipper crack?
- g) Explain angle of bite.
- h) What is rubber hydro-forming?
- i) Explain the terms ingot, slab, bloom and billet.
- j) What is nil ductility temperature?

Q2 a) What is the significance of recrystallisation temperature? Mention what are the specific advantages of cold working over hot working process? **(5)**

b) Determine the engineering strain, true strain, and reduction for (a) a bar which is doubled in length; (b) a bar which is halved in length. **(5)**

Q3 a) Using simplified theory of rolling, express the geometrical relationships of roll diameter, coefficient of friction and sheet thickness for solid and cylindrical bars. **(5)**

b) Calculate the rolling load if steel sheet is hot rolled 30% from 40 mm-thick slab using a 900 mm-diameter roll. The slab is 760 mm wide. Assume $\mu = 0.30$. The plain strain flow stress is 140 MPa at entrance and 200 MPa at the exit from the roll gap due to the increasing velocity. **(5)**

Q4 Explain the testing procedure and method to determine K_{Ic} the plain-strain fracture toughness. **(10)**

- Q5 a) Discuss the different types of forming processes. (5)
b) What is S-N curve? What are the factors which affect fatigue life of a material? (5)
- Q6 a) How the forming limit diagram is helpful for controlling the failure in sheet-metal forming? (5)
b) Differentiate between direct and indirect extrusion process. (5)
- Q7 a) Express and explain the mathematical equations of Brinell Hardness testing with preferable sketches. (5)
b) Differentiate the Charpy impact test and Izod impact test. (5)
- Q8 Write short notes on any two: (5 x 2)
a) Coffin-Manson relation.
b) Scope and significance of non-destructive testing
c) Transition temperature
d) Production of seamless pipes and tubes.