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Total number of printed pages – 2

B. Tech
PCMT 4304

Sixth Semester Back Examination – 2015

MECHANICAL WORKING AND TESTING MATERIALS

BRANCH (S) : MM, MME

QUESTION CODE : M 186

Full Marks – 70

Time : 3 Hours

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



1. Write short notes on :

2×10

- State the relationship between crack extension force and stress intensity factor for plane stress and plane strain condition.
- What is rubber hydro-forming ?
- With decreasing strain rate whether the tendency of inter-granular fracture increases or decreases ?
- Distinguish between wire drawing and tube drawing process.
- What are the specific applications of spinning ?
- Why clearance is necessary in shearing operation ?
- How a collapsible tube of Aluminium is manufactured ?
- Explain the terms ingot, slab, bloom and billet.
- What is nil ductility temperature ?
- State the principle of ultrasonic method used for non destructive testing of materials.

2. What is creep ? Explain the different stages of a typical creep curve. Describe the different mechanisms of creep deformation. 10

P.T.O.

3. Determine the crack extension force for a single-edge notch specimen which is loaded axially. What is stress intensity factor ? How it is varies with the modes of fracture ? 10
4. (a) Differentiate between direct and indirect extrusion process. 5
(b) Explain the difference between tension and torsion test. 5
5. (a) How the forming limit diagram is helpful for controlling the failure in sheet-metal forming ? 5
(b) Explain the different types of tube drawing processes with sketches. 5
6. (a) Describe Vickers hardness method and enumerate the type of indentions that are made by this process. 5
(b) What is the significance of recrystallisation temperature ? Mention what are the specific advantages of cold working over hot working process ? 5
7. (a) Briefly describe the various rolling defects and their controlling methods. 5
(b) What is S-N curve ? What are the factors which affect fatigue life of a material ? 5
8. Write short notes any **two** of the following : 5×2
- (a) Goodman diagram
(b) Low cycle fatigue
(c) Transition temperature
(d) Scope and significance of non-destructive testing.

