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M.Tech I Semester Supplementary Examinations August 2016

MATERIALS TECHNOLOGY

(Machine Design)

(For students admitted in 2012, 2013, 2014 & 2015 only)

Time: 3 hours Max. Marks: 60

Answer any FIVE questions

All questions carry equal marks

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1 Explain slip mechanism of plastic deformation. What is critical resolved shear stress? Derive its expression for deformation by slip.

2 (a) What is super plasticity as applied to metals? To what extent this phenomenon related to micro structure.
(b) Differentiate between dispersion and particulate strengthening.

3 (a) Define creep. Draw classical creep curve. Explain each stage in detail.
(b) Discuss the development of creep resisting alloys.

4 (a) Define fatigue failure. Give examples of components prone to fatigue failure.
(b) Explain the mechanism of fatigue failure.

5 (a) Explain the selection and design in relation to anticipated service.
(b) Explain different ways of assessing materials for resistance to fracture.

6 (a) Explain the composition, microstructure, properties and applications of transformation induced plasticity steels.
(b) Brief about the various important Aluminides.

7 (a) Explain smart materials with suitable examples.
(b) What are nano-crystalline materials? Discuss various mechanical properties and applications of nano-crystalline materials.

8 What electrical and optical applications of polymers? Explain using examples.

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