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BME-018

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BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING)
B.Tech. (Aerospace Engineering) (BTMEVI)

Term-End Examination

December, 2011

BME-018 : ENGINEERING MATERIALS

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **any five** of the following questions. Use of calculator is **allowed**.*

1. (a) Describe two uses of each of low, medium and high carbon steels. 6

   (b) Which alloys are used as major bearing materials ? Which properties make them suitable for this application ? 8

2. (a) Silica and fireclay bricks have thermal conductivity that increases with temperature but magnesite and fused alumina have decreasing thermal conductivity. Explain. 8

   (b) Which alloys have ultra fine particles of ceramic material dispersed in it and what are its effect ? 6

3. (a) What is polymerisation ? Define degree of freedom of polymerisation. 7

(b) Differentiate between isostrain and isostress loading of a composite. State the conditions of stress and strain in the above two cases. 7

4. A copper specimen of 64 mm gauge length and 12.80 mm diameter was tested in tension. Following two diameters were recorded in the plastic range of deformation. 14

Load = 25.75 kN, d_1 = 12.176 mm

Load = 24.25 kN, d_2 = 8.581 mm

Calculate strength coefficient and strain hardening exponent.

5. (a) What is stress intensity factor of a crack and what are the parameters on which it depends ? 7

(b) Describe under what condition a machine part may have infinite life even if fatigue stressed ? 7

6. (a) Define wear. What are the factors influencing wear ? 6

(b) What are the functions of cutting fluids ? Why oil-water emulsions are used as cutting fluids ? 8

7. (a) What is strain hardening ? Is it used in practice ? 4x3.5=14

(b) Distinguish between metal and alloy.

(c) Define ceramic and refractoriness.

(d) What are different types of adhesive joints ?