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08MAU151

First Semester M.Tech. Degree Examination, May/June 2010
Automotive Materials

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. Enumerate on the classification and temper designations of wrought aluminium alloys. **(10 Marks)**

b. Enumerate on the salient characteristics of magnesium alloys. **(05 Marks)**

c. Give an account of casting processes for the production of aluminium castings. **(05 Marks)**

2 a. Given an account of different tests under realistic conditions, conducted on automobiles. **(10 Marks)**

b. Enumerate on the accelerated life cycle testing, conducted on automobiles. **(10 Marks)**

3 a. Enumerate on the desirable characteristics of reinforcement materials of composites. **(10 Marks)**

b. Give an account of production of pre – pegs for laminated composites. **(10 Marks)**

4 a. With a neat sketch, explain the bag moulding techniques for the production of laminated composites. **(10 Marks)**

b. With a neat sketch, explain the injection moulding technique for the production of thermoplast based polymer matrix composites. **(10 Marks)**

5 a. Enumerate on boron fibers used for the production of metal matrix composites. **(10 Marks)**

b. Give an account of applications of metal matrix composites. **(10 Marks)**

6 a. Derive an expression of elastic modulus of composites in the longitudinal direction in terms of volume fraction and elastic modulus of matrix and reinforcement materials. State the assumptions in the derivation. **(10 Marks)**

b. Give an account of 'rule of mixtures'. State its relevance in composite materials. **(10 Marks)**

7 a. State the generalized Hook's law for anisotropic materials. **(10 Marks)**

b. Write down the reduced stiffness matrix for an unidirectional lamina. State the assumptions made in arriving at the reduced stiffness matrix. **(10 Marks)**

8 a. Write the expression for the [A], [B] and [D] matrices of a laminate. **(10 Marks)**

b. With a flow chart, explain the strength theory of a laminate. **(10 Marks)**