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(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0403 Roll No.

# B.Tech

## (SEM VII) ODD SEMESTER THEORY EXAMINATION 2009-10
## ENGINEERING MARERIALS

*Time : 3 Hours]* *[Total Marks : 100*

**Note :** *Attempt all **five** questions, there are choices within. Marks are indicated therein. Assume suitably any missing data / information, if any.*

1 Write short notes on any **four** of the following : **4×5=20**

(a) Types of carbon steels, its properties and applications.

(b) Types of alloy steels, its properties and applications.

(c) Types of cast irons, its properties and applications.

(d) Cryogenic (low temperature) application steels.

(e) Creep resisting steel.

(f) Forms and availability of steels (products).

2 Answer any **two** of the following : **2×10=20**

(a) What do you understand by heat-treatment and explain the following (i) Annealing (ii) Normalizing (iii) Quenching.

(b) Draw TTT diagram and show on it the above mentioned three heat treatment processes. Mention why is tempering done after quenching, and also show the two types of tempering on the diagram.

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(c) In two hour carburizing process, desired carburizing is achieved to a depth of 1 mm. How much time will be required to achieve the carburizing upto a depth of 3 mm; at the same temperature for similar material and specimen ?

3 Answer any **two** of the following : **2×10=20**

(a) Explain why Brass is soft if Zn $\leq$ 37%, else it is hard brass. Enlist the types of brasses and its applications

(b) Enlist various types of Bronzes and its applications.

(c) Enlist the types of aluminium - alloys and its applications. Specially, describe the heat-treatment process and age-hardening in reference to the popular Duralumin.

4 Answer any **two** of the following : **2×10=20**

(a) Explain briefly why :

(i) Steel-reinforcement is done in Reinforced - Cement Concrete (RCC) building.

(ii) Though normally for bulk materials, the strength, being material property, does not depend on size; but ultra-thin fibres usually have very high strength.

(b) Enlist the types of composite materials, its properties and applications.

(c) Explain the 'rule of mixtures' in regard to various properties of composite materials.

 

5. Write short notes on any **four** of the following : $4 \times 5 = 20$

(a) Natural and synthetic rubbers

(b) Vulcanization of rubber

(c) Types of plastics and its applications

(d) Plastic processing such as injection moulding and extrusion

(e) Types of ceramics and its applications

(f) Smart materials and its applications.