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**4th Sem./ Automobile Mechanical / Mech (T & D)**  
**Subject : Materials & Metallurgy**

Time : 3 Hrs. M.M. : 60

**SECTION-A**

**Note: Multiple type Questions. All Questions are compulsory.** (6x1=6)

- Q.1 In F.C.C. structure, the numbers of atoms in a unit cell are  
a) 1                    b) 2  
c) 4                    d) 6
- Q.2 The ability of a material to resist fracture due to high impact load is :  
a) Toughness            b) Hardness  
c) Brittleness            d) Malleability
- Q.3 The type of space lattice found in  $\gamma$  - iron is  
a) F.C.C.                b) B.C.C.  
c) H.C.P.                d) None of the above
- Q.4 The purest form of iron is  
a) Pig Iron                b) Cast Iron  
c) Steel                    d) Wrought Iron

- Q.5 Pearlite is a combination of  
a) Ferrite & Iron graphite  
b) Ferrite & Austenite  
c) Ferrite & Cementite  
d) None of the above

- Q.6 Thermocole is  
a) Odourless  
b) Highly resistant to moisture  
c) Chemically Stable  
d) All of the above

**SECTION-B**

**Note: Objective/Completion type questions. All questions are compulsory.** (6x1=6)

- Q.7 State lever rule.
- Q.8 Define non-ferrous metals.
- Q.9 The line above which the alloy is liquid is called \_\_\_\_\_.
- Q.10 \_\_\_\_\_ Carbon steel contains carbon 0.3% to 0.8%.

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Q.11 TTT curve stands for what?

Q.12 Insulating materials are also termed as \_\_\_\_\_.

### SECTION-C

**Note: Short answer type Question. Attempt any eight questions out of ten Questions. (8x4=32)**

Q.13 What are semi-conducting materials? What are its different types? Explain.

Q.14 Derive an expression for the atomic radius of body centered cubic structure.

Q.15 What are line defects? What are its types? Explain.

Q.16 Explain dendritic solidification of pure metal.

Q.17 What are different allotropic forms of iron? Explain.

Q.18 Explain the effects of following elements on steel:

a) Chromium      b) Tungsten

c) Molybdenum    d) Nickel

Q.19 What is pyrometer? What are its different types? Explain any one of them.

Q.20 What is heat treatment? What are its purposes?

Q.21 Explain T.T.T. diagram.

Q.22 Explain different types of ceramics.

### SECTION-D

**Note: Long answer questions. Attempt any two question out of three Questions. (2x8=16)**

Q.23 What is heat treatment furnace? What are its different types? Explain any two.

Q.24 Derive an expression for the atomic packing factor of face centred cubic structure.

Q.25 Explain the various types of cast iron with uses & properties.