| Printed pages: 1 | ME 301 |
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| (The paper code and roll No. to be filled in your answer book) | |
| Roll No. | |

**B TECH**
**(SEM III) THEORY EXAMINATION 2016-17**
**MATERIAL SCIENCE**

**Time allowed: 2 Hrs** **Max Marks: 50**

**Q1) Explain the following**: **(2 X 7 = 14)**

a) Bravais Lattice
b) Stacking Faults
c) Fatigue
d) Gibbs Phase rule
e) Troosite
f) Phosphor bronze
g) Miller Indices

**Q2) Attempt any three questions.** **(4 X 3 = 12)**

a) Derive **a** to **r** relationship for SC, BCC and FCC crystal structures.
b) What are engineering materials? Give detailed classification of engineering materials.
c) Iron has an atomic radius of 0.124nm and a BCC structure, with an atomic weight of 55.85g/mol. Calculate the density of iron.
d) Mark the plane with miller indices (1 1 0) on a unit cell with parameters (a, a, a).

**Q3) Attempt any three questions.** **(4 X 3 = 12)**

a) Differentiate between edge and screw dislocation with suitable diagram.
b) What do you understand by solid solution? What is the type of solid solution of nickel and copper?
c) How do you define the property of hardness? Which hardness test is most acceptable by the industry and why?
d) What is creep? Draw a typical creep curve and explain the different stages of creep.

**Q4) Attempt any three questions.** **(4 X 3 = 12)**

a) Name the different method of heat treatment. Explain the process of austempering and martempering.
b) Explain Iron- Carbon equilibrium diagram and list the advantage and limitations of the diagram.
c) What is etching? Why is it necessary before microscopic studies? Name different etching agents.
d) What is NDT? Explain with the help of suitable diagram Ultrasonic Testing.