TME-301

Roll No. | | | | | | | | | | |

ODD SEMESTER EXAMINATION 2019-20

B. TECH III SEM (Old Syllabus)

Material Science

Time: 3 Hrs. Total Marks: 100

Total no. of printed pages: 1

Note: Attempt all questions.

Q1. Answer any four of the following: (4x5)

(a) what is the importance of material in engineering?

(b) What are the Miller indices? How are they determined?

(c) Show that the atomic packing factor of FCC crystal is 0.74.

(d) Draw sketch and explain unit cells of simple cubic, BCC crystal structure.

(e) Differentiate between edge dislocation and screw dislocation, illustrate with sketches.

(f) Briefly describe X-ray crystallography method.

Q2. Attempt any four part of the following: (4x5)

(a) Define creep. Explain its phases and mechanism

(b) What is NDT, write any two techniques used in industry.

(c) Explain with neat sketch, how is fatigue test performed in laboratory?

(d) Explain the term: percentage elongation and proof stress.

(e) Draw a neat labelled sketch of iron carbon equilibrium diagram.

(f) Differentiate ductile and brittle materials on the behalf of their properties.

Q3. Attempt any two parts of the following: (2x10)

(a) What is heat treatment? Why are the steels heat treated? Describe various heat treatment process.

(b) Explain Triple T (TTT) diagram with neat sketch for eutectoid steel.

(c) Discuss phase transformations in steel highlighting compositional and structural changes in the transformation of Austenite into Pearlite, Cementite, Bainite and Martensite.

Q4. Attempt any two parts of the following:

(a) Compare the properties of Diamagnetic and Ferromagnetic materials. Also write what are hard and soft magnetic materials. Explain with reference to hysteresis loop.

(b) Describe various type of semiconductors its devices and applications.

(c) What are conductors and explain their importance and application in various industries. Also differentiate between type 1 and type 2 superconductors.

Q5. Attempt any two parts of the following

(a) What are refractory materials? State their basic properties and uses. Also write what do you understand by glass wool and polyurethane.

(b) Write short notes on **any two** of the following:

- Smart materials and its applications