PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech. Winter 2018 - 19 Examination

Semester: 1   Date: 13/12/2018
Subject Code: 203208134   Time: 10:30am to 1:00pm
Subject Name: Material Technology   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) "The substitutional solid solutions are more common than the interstitial solid solutions" justify the comment. **(05)**

B) List the mechanical properties required for functioning of Automobile crank shaft used for transmission of power. **(05)**

C) Define following mechanical properties: **(05)**
Malleability, Toughness, Creep, Ductility and Brittleness.

Q.2 Answer the following questions. (Attempt any three) (Each five mark) **(15)**

A) Why an alloy of a given pure metal will have more strength than the pure metal itself?

B) Describe the microstructure development process in eutectoid steel when it is cooled from austenitic temperature range to room temperature.

C) Discuss the importance of smart materials in the area of defense and structural engineering.

D) Narrate the material properties required for cylindrical liner of Internal Combustion Engine. Justify your answer.

Q.3 A) Describe plastic deformation process by the mechanism of slip. Also compare this mechanism with the analogy of caterpillar motion. **(07)**

B) Explain any one method of manufacturing a composite material. **(08)**

OR

B) Explain shape memory alloys. How do they "remember" their parent shape? **(08)**

Q.4 A) Explain in detail the following stages of annealing heat treatment: **(07)**
a. Recovery   **b.** Recrystallization   **c.** Grain growth

OR

A) Structure, properties and applications of engineering polymers. **(07)**

B) Draw TTT diagram. On it show the following heat treatment processes: **(08)**
- 100% Martensite
- 50% Coarse perlite – 50% Martensite.
- 50% Pearlite – 50% Bainite