[3E1209]

B.Tech. III Sem. (Main) Examination, April / May - 2022
Automobile Engineering
3AE4-06 Materials Science and Engineering
AE, ME

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt all ten questions From Part A, All five Questions from **Part B and three** questions out of five questions from Part C

Schematic diagram must be shown wherever necessary. Any **data missing May** suitably be assumed and stated clearly. Units of quantities used/**calculated must** be stated clearly.

Use of following supporting material is permitted during **examination** (As mentioned in form No. 205)

PART - A (Word limit 25)

1. What is Re-Crystallization?

2. Define Miller Indices.

3. What is eutectic point? Explain characteristic of it.

4. What is Elastic deformation?

5. What is martensitic transformation?

6. Define Carburising.

7. What is solid solution?

8. What are Nano materials?

9. Discuss the general effects of tempering the steel.

10. Discuss mechanical properties of materials   (10×2=20)

PART - B (Word limit 100)

1. Explain with neat sketches, the various types of crystal imperfections

2. What is phase transformation in the Iron carbon diagram

3. Explain Nitriding process of heat treatment of Steps

4. Explain the effects of addition of Si, Cr, Mo, V and W alloying elements on the properties of steel.

5. Explain Rockwell hardness testing method with sketch.   (5×4=20)

4. Explain Nitriding process of heat treatment of Steps

5. Explain the effects of addition of Si, Cr, Mo, V and W alloying elements on the properties of steel.

6. Explain Rockwell hardness testing method with sketch. (5×4=20)

PART - C (Any three)

1. Draw neat labelled Iron carbon equilibrium diagram. Explain invariant reactions occur in this diagram.

2. What are properties and engineering applications of PMMA, ABS, PVC, PA and PTFE?

3. What do you understand by tempering of steel? What properties can be acquired by steel after tempering process? Classify various tempering processes.

4. Draw a neat sketch of the TTT diagram for a eutectoid steel and label the regions.

5. Differentiate hardness and hardenability. Explain the following transformation.

    i) Austenite to Bainite.

    ii) Austenite to parlite. (3×10=30)