

## FACULTY OF ENGINEERING AND TECHNOLOGY

TE (Mechanical) Examination - DEC – 2014

## Metallurgy &amp; Materials (Revised)

[Time: THREE Hours]

[Max. Marks: 80]

“Please check whether you have got the right question paper.”

**N.B**

- 1) Solve any three questions from each section.
- 2) Figure to right indicates full marks.
- 3) Assume suitable data wherever required.
- 4) Draw figures wherever required.

## SECTION A

- |     |   |    |
|-----|---|----|
| Q.1 | a) Explain the concept of Miller Indices? with example.   | 07 |
|     | b) Applying Gibb's phase rule explain cooling curve for binary eutectic alloys.                     | 06 |
| Q.2 | a) With neat sketch explain the phenomenon of line defect.  | 07 |
|     | b) What is solid solution strengthening? Explain.   | 06 |
| Q.3 | a) State the importance of equilibrium diagram and explain method to construct equilibrium diagram. | 07 |
|     | b) Explain how the eutectic reaction occurs in Fe-C combination.                                    | 06 |
| Q.4 | a) What is hardenability ?explain how it is measured?   | 07 |
|     | b) Normalizing is preferred over annealing explain the statement.                                   | 06 |
| Q.5 | Write short note on any two   | 14 |
|     | a) Carburizing  |    |
|     | b) Hardening  |    |
|     | c) TTT diagram  |    |
|     | d) Bauschinger effect   |    |

## SECTION B

- |      |   |    |
|------|---|----|
| Q.6  | a) Classify steel and explain the SAE designation system for steel.                                       | 06 |
|      | b) Justify the none stainless steel and explain it type and application.                                  | 07 |
| Q.7  | a) What is weld decay? How do we avoid it?  | 06 |
|      | b) How malleable cast iron is produced? Explain different types of malleable cast iron.                   | 07 |
| Q.8  | a) What is bronze? Explain the properties and applications of aluminum bronzes.                           | 07 |
|      | b) What are glasses? What is the difference between glass transition temperature and melting temperature. | 06 |
| Q.9  | a) Classify composite material and explain carbon –carbon composites.                                     | 07 |
|      | b) What are the challenges in Nano-Technology? Explain.   | 06 |
| Q.10 | Write short note on any two   | 14 |
|      | a) Titanium and its alloys.   |    |
|      | b) Nodular cast iron.   |    |
|      | c) Tool steel.  |    |