

**B. Tech. 5th Semester (F) Scheme (AUE) Examination,  
December-2018**

**MATERIALS SCIENCE TECHNOLOGY**

**Paper-AUE-305-F**

*Time allowed : 3 hours]*

*[Maximum marks : 100*

*Note : Students have to attempt five questions in total with at least one question from each section and Question No. 1 is compulsory.*

1. (a) Explain the terms slip and twin.
  - (b) What is work hardening (strain hardening)?
  - (c) What is Bauschinger effect ?
  - (d) Define the hot and cold working.
  - (e) What is creep and fracture ?
  - (f) What is normalizing and spheroidizing ?
  - (g) What is equilibrium diagram ?
  - (h) Write down the mode of fracture.
  - (i) What is case hardening ?
  - (j) What is fretting ?
- 20

**Section-A**

2. (a) How does the interaction between the dislocations and vacancies affect the physical properties of a metal ?  
10
- (b) State the difference between elastic and plastic deformation. Explain each in detail.  
10

3. Explain Iron-carbon equilibrium diagram. Explain each constituent present in the iron-carbon equilibrium diagram. 20

### Section-B

4. (a) What is ductile and brittle fracture? Explain the stages in development of ductile fracture. 10  
 (b) Explain the fatigue test with the help of S-N curve. 10
5. (a) What is the effect of following variable on fatigue  
 (i) Size of sample  
 (ii) Temperature  
 (iii) Corrosion 10  
 (b) Explain the effect of metallurgical variables on Creep. 10

### Section-C

6. (a) What is composite? Classify various types of composite. 10  
 (b) Describe the criteria for selecting the materials of Cylinder block and Cylinder head. 10
7. Write short notes on:  
 (a) formability and weldability of steel 10  
 (b) materials for high temperature 10

### Section-D

8. (a) Write a brief essay on annealing of non-ferrous metals. 10  
 (b) Define the term hardenability. What factor affects hardenability? Describe a method for determining the hardenability of steel. 10
9. Explain the following: 20  
 (a) Carburizing  
 (b) Cyaniding  
 (c) Flame hardening