S.E. (SEM. IV) (CBSGS) (MECHANICAL ENGG.)
MATERIALS TECHNOLOGY

6th June 2016
3.00 pm to 6.00 pm

QP CODE : 555600

(3 Hours) [Total Marks : 80

N. B. 1) Question No. 1 is compulsory.
2) Attempt any three questions from remaining five questions.
3) Figures at right indicate marks.
4) Draw neat well labeled sketches.

Q. 1 Write note on any four:- (5x4=20)
a) Thermal fatigue of metal
b) Andrade's analysis of classical creep curve
c) Effect of Alloy on Eutectoid temperature and composition
d) Critical resolved shear stress
e) Dislocation Interaction

Q. 2 **A)** What do you mean by Nano-materials? Explain their properties and practical applications. (10)

B) What is Fatigue? Explain fatigue testing in detail. (10)

Q. 3 **A)** Draw $Fe-Fe_3C$ Diagram and Explain cooling of 0.9 % C alloy in the $Fe-Fe_3C$ Diagram. (10)

B) What is the difference between case hardening and surface hardening? Explain pack carburizing. (10)

Q. 4 **A)** Draw and explain construction of Time Temperature Transformation (TTT) diagrams of 0.8 % C alloy. (10)

B) Derive an expression for Griffith theory of brittle fracture. Explain Orowan's Modification. (10)

Q. 5 **A)** What is plastic deformation? Distinguish between slip and twin mechanism of plastic deformation. (10)

B) Classify crystal Imperfections. Distinguish between Edge and Screw dislocation. (10)

Q. 6 Write short note on any four (5x4=20)
a) Composite materials
b) Ausforming
c) Yield point phenomenon
d) Hardenability test
e) Normalizing