

C. U. SHAH UNIVERSITY

Winter Examination-2019

Subject Name : Material Technology

Subject Code : 4TE03MTE1

Branch: B.Tech (Mechanical)

Semester : 3

Date : 26/11/2019

Time : 02:30 To 05:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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Q-1 Attempt the following questions:

- a) Which one of following is not technological property of metals and alloys? 1
(a) Machinability (b) Castability
(c) Weldability (d) Appearance
- b) Select the correct equation of Gibb phase rule 1
(a) $P + F = C + 1$ (b) $P + F = C + 2$
(c) $P + C = F + 1$ (d) $P + F = C - 1$
- c) Eutectic Mixture of austenite and cementite is known as 1
(a) Pearlite (b) Ferrite
(c) Ledeburite (d) Bainite
- d) The percentage of carbon in cast iron varies from 1
(a) 0.1 to 0.5 (b) 0.5 to 1
(c) 1 to 1.7 (d) 1.7 to 4.5
- e) The heat treatment process used for softening hardened steel is. 1
(a) Carburizing (b) Normalizing
(c) Annealing (d) Tempering
- f) The full name of TTT diagram is 1
a) Time Transformation Temperature b) Time Temperature Transformation
c) Time Turning Temperature d) Temperature Time Transformation
- g) Magnetic particle test is not used for 1
(a) Mild steel (b) Staines less steels
(c) Hard steels (d) Copper
- h) Cooling diagram is drawn using what variables from the following? 1
(a) Temperature – Time (b) Temperature - Transformation
(c) Time - Transformation (d) Transformation – Composition
- i) Which of the following impurity in cast iron makes it hard and brittle? 1
(a) Silicon (b) Sulphur
(c) Manganese (d) Phosphorus
- j) Normalising of steel is done to 1
(a) Refine the grain structure



- (b) Remove strains caused by cold working
(c) Remove dislocations caused in the internal structure due to hot working
(d) All of the above
- k)** Lower critical point for all steels is 1
(a) 600 C (b) 723 C
(c) 900 C (d) 1400 C
- l)** Atom at the center of BCC structure is 1
(a) 1 (b) 2
(c) 4 (d) 6
- m)** The hardest known material is 1
(a) Ceramic (b) High Speed Steel
(c) Diamond (d) cemented carbide
- n)** Pearlite is a combination of 1
(a) Ferrite and Cementite (b) Cementite and gamma iron
(c) Ferrite and austenite (d) Ferrite and iron graphite

Attempt any four questions from Q-2 to Q-8

- Q-2 Attempt all questions**
- a)** Write a short note on dislocation theories. 07
b) Draw a neat and labeled sketch of Iron Carbon equilibrium diagram and explain the solidification of 0.4 % carbon steel. 07
- Q-3 Attempt all questions**
- a)** What is the theory of tempering? Discuss the stages of tempering process. 07
b) Explain the effect of following elements on steel. 07
(i) Carbon and (ii) Silicon
- Q-4 Attempt all questions**
- a)** Give the characteristics of White Cast Iron. 07
b) What do you mean by the term Gun metal? Give important features and application of the same. 07
- Q-5 Attempt all questions**
- a)** Explain in detail, the ultrasonic testing method with its benefits and limitations. 07
b) Explain with neat sketch and effect of different cooling rates using TTT diagram. 07
- Q-6 Attempt all questions**
- a)** Write a short note on Cd – Bi equilibrium diagram. 07
b) What are the limitations of Grossmann method? Discuss the Jominy end quench test. 07
- Q-7 Attempt all questions**
- a)** Classifications of Plain Carbon Steels with applications and limitations. 07
b) Explain any two mechanical process utilized for metal powder production. 07



Q-8

Attempt all questions

- a) List the purposes of Heat Treatment. Differentiate between Annealing and Normalizing processes. **07**
- b) Discuss with neat sketch the Presintering and Sintering processes. **07**

