Q.14 Differentiate between Annealing and Normalizing.

Q.15 Explain effect of Cr and C on hardenability of steel.

Q.16 Differentiate between the case hardening and surface hardening.

Q.17 Explain salt bath furnaces.

Q.18 List out defects in heat-treated parts. Explain any one with causes and remedies.

## SECTION-D

**Note:** Long answer type questions. Attempt any one questions out of two questions. (1x10=10)

Q.19 Define hardenability. Explain hardenability measurement by Jominy End Quench test.

Q.20 Discuss construction of TTT diagram and draw TTT diagram for Hypo, Hyper and Eutectoid steel.



No. of Printed Pages : 4 202022
Roll No. .....

**2nd Year / Advance Diploma in Tool & Die Making**

**Subject:- Heat Treatment**

Time : 3Hrs. M.M. : 50

## SECTION-A

**Note:** Multiple choice questions. All questions are compulsory (5x1=5)

Q.1 The purpose of heat treatment is

a) Change the mechanical property of steel

b) To change the internal structure of steel

c) To change the appearance of the component

d) The change the chemical property of steel

Q.2 When the steel is normalised, its

a) yield point increases

b) ductility decreases

c) ultimate tensile strength increases

d) all of these

Q.3 The external surface of the part made of steel can be hardened by

a) Tempering b) Normalising

c) Case hardening d) Hardening

Q.4 The process in which carbon and nitrogen both are absorbed by the metal surface to get it hardened is known

a) Carburizing b) Cyaniding

c) flame hardening d) induction hardening

Q.5 In spheroidising process, the steel is

a) heated below the lower critical temperature and then cooled slowly

b) heated upto the lower critical temperature and then cooled in still air

c) heated slightly above the lower critical temperature and then cooled slowly to a temperature of 600°c

d) none of the above



## SECTION-B

**Note:** Objective/Completion type questions. All questions are compulsory. (5x1=5)

Q.6 _____ is the hardest constituent of steel.

Q.7 In normalizing cooling is done _____.

Q.8 Mild steel can be converted to high carbon steel by _____.

Q.9 _____ is process of case hardening in which the outer layer is made hard by increasing amount of carbon.

Q.10 18-4-1 stainless steel contains _____.

## SECTION-C

**Note:** Short answer type questions. Attempt any six questions out of eight questions. (6x5=30)

Q.11 Define heat treatment and write its objectives.

Q.12 Explain different allotropic forms of iron.

Q.13 Explain time temperature transformation (TTT) diagram for Eutectoid steel.