

B.TECH SEM – V (2007 COURSE) (PRODUCTION ENGG.) :

SUMMER - 2018

SUBJECT : ENGINEERING METALLURGY

Day : **Monday**

S-2018-2684

Time : **10.00 AM TO 01.00 PM**

Date : **21/05/2018**

Max. Marks : 80

N. B. :

- 1) **Q. No. 1 and Q. No. 5 are COMPULSORY.** Out of remaining attempt **ANY TWO** questions from Section – I and Section – II.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in the **SEPARATE** answer books.
- 4) Draw neat and labeled diagram **WHEREVER** necessary.
- 5) Assume suitable data, if necessary.

SECTION - I

- Q. 1** Write true or false and justify your answer in short(**ANY FOUR**): **(14)**
- a) Sub-zero heat treatment not given the low carbon steel.
 - b) Plain carbon steels can be effectively nitride.
 - c) Martensite transformation is occurs due to diffusion of carbon.
 - d) If steel contains high amount of 'S' then it is not desirable to use at high temperature applications.
 - e) By observing microstructure of steel it is possible to determine which heat treatment was given to them.
 - f) Wrought Iron is similar to composite materials.
- Q. 2**
- a) Draw the microstructure of steels AISI 1020 and AISI 1060. Give any two applications of each steel. **(05)**
 - b) Write the difference between optical microscopes with Electron Microscope. **(04)**
 - c) Explain the role of macroscopic examination test in steel industries. **(04)**
- Q. 3**
- a) Represent Normalizing, Matertmperting and Ausforming on T.T.T. diagram state clearly wht is the transformation product of each treatment. **(05)**
 - b) What is the hardability? How it is measured? Explain in details. **(04)**
 - c) Explain in short the following with respect to heat treatment: **(04)**
 - i) Curie and critical temperature
 - ii) Quench cracks
 - iii) Cryogenic heat treatment
 - iv) Secondary Hardening
- Q. 4**
- a) Differentiate between flame hardening and induction hardening. **(05)**
 - b) What are different types of heat treatment furnaces? Draw and explain any one H. T. furnace used for normalizing. **(04)**
 - c) Write short note on Nitriding as surface hardening heat treatment. **(04)**

P. T. O.

SECTION - II

- Q. 5** Solve **ANY THREE** of the following: **(14)**
- a) Effect of alloying elements on cast Iron.
 - b) Limitations of plain carbon steels and advantages of Alloy steels.
 - c) Production of Nodular Cast Irons and its uses.
 - d) Short information about Ni alloys.
 - e) Types and applications of Bearing materials.
- Q. 6** a) Give the chemical composition and applications of the following materials: **(05)**
(**ANY FIVE**) :
- i) Gliding Metals
 - ii) Invar
 - iii) Muntz Metals
 - iv) Naval Brass
 - v) Duralumin
 - vi) Brazing Brass
- b) What are advantages and limitation of α brasses over $\alpha + \beta$ brasses? **(04)**
- c) What is LM series? Explain LM6. **(04)**
- Q. 7** a) Draw the microstructure of following. Give the chemical composition and application of each: **(05)**
- i) White Cast Iron
 - ii) Pearlitic Ductile Cast Iron
 - iii) Ferritic Malleable C. I.
- b) What is effect of cooling rate on cast iron phases? **(04)**
- c) Write short note on Heat treatment of Cast Iron. **(04)**
- Q. 8** a) Write the differences between Austenitic and Martensitic stainless steels. **(05)**
- b) What is precipitation hardening? Explain in brief. **(04)**
- c) Describe T1 grade tool steel with its heat treatment. **(04)**

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