B.TECH. SEM -V PRODUCTION 2014 COURSE (CBCS) : WINTER - 2017

SUBJECT: ENGINEERING METALLURGY

Day : **Thursday** Time : **02.30 PM TO 05.30 PM**

Date : **18/01/2018** **W-2017-2165** Max. Marks : **60**

N. B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable calculator is **ALLOWED**.
4) Assume suitable data, if necessary.

Q. 1 **a)** Draw the microstructure and label the various phases for the following: **(05)**

- **i)** Plain 'C' steel of 0.2 % C (normalized)
- **ii)** Plain 'C' steel of 0.2 % C (Annealing)
- **iii)** AISI – 1040 steel (Annealing)
- **iv)** AISI – 1080 – at 600 X magnification

b) What is spark test examination? What information is obtained by this test? **(05)**

OR

a) Write the three reactions occurs in Fe-Fe_3C diagram. Calculate the phases. **(05)**

b) What are the etching reagents of ferrous and non-ferrous alloy? Explain the mechanism of etching. **(05)**

Q. 2 **a)** Define cast irons and steels. What is carbon equivalent in cast irons? How it is calculated? **(05)**

b) Write a short note on Alloy Cast Iron. **(05)**

OR

a) Explain effect of alloys on cast irons **(05)**

- **i)** Effect of Silicon addition
- **ii)** Problem with Silicon addition
- **iii)** The modification treatment given to these alloys(cooling rate)

b) Give the chemical composition and applications of : **(05)**

- **i)** Silal
- **ii)** Ni Hard C.I.
- **iii)** Ferritic nodular cast irons
- **iv)** Gray C I

Q. 3 **a)** Describe the type of tool steels? What are tools used for high temperature and low temperature operations? **(05)**

b) State and explain the following: **(05)**

- **i)** H C H C
- **ii)** H S L A
- **iii)** T I Grade tool steel
- **IV)** O H N S
- **V)** Maraging Steel

P. T. O.

OR

Q. 3 **a)** Describe the effect of various alloying elements on alloy steels **(05)**

b) Compare between the following: **(05)**

Martensitic stainless steel v/s Ferritic Stainless steel

Q. 4 **a)** Explain the suitable heat treatment if we requires write with materials details: **(05)**

i) Soft and ductile steel strip

ii) If hard and wear resistance nuts and bolts

iii) High strength high toughness axel

iv) High toughness wear resistance gear

b) Write short note on secondary hardening. **(05)**

OR

a) What do you know about retained Austenite ? How it is minimized ? **(05)**

b) Describe Martempering and Ausforming heat treatment in details. **(05)**

Q. 5 **a)** Suggest suitable materials with chemical composition for following component. Is any H.T. required for it? Describe them: **(05)**

i) Gears in automobile engines

ii) Leaf spring for truck

iii) Fan Blade

b) Write information about exothermic and endothermic atmosphere used in H.T. **(05)**

OR

a) Give the brief idea about Induction hardening and flame hardening. **(05)**

b) What is pack carburizing? Give its applications. **(05)**

Q. 6 **a)** Suggest suitable non-ferrous material for the following: **(05)**
(Give composition of it)

i) Imitation Jewelry

ii) Condenser tubes

iii) Cartridge cases

iv) Brazing rods

v) Door lock

b) Describe the steps involved in age hardening alloy. Give the examples of such alloy. **(05)**

OR

a) What are the requirements of bearing? Give the compositions of bearing materials. **(05)**

b) Draw the Cu-Zn equilibrium diagrams. Give the different types of brasses and its applications **(05)**

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