Total No. of Questions—8] [Total No. of Printed Pages—4

Seat No.	

[4757]-1020

S.E. (Mechanical and Automobile) (Second Semester)

EXAMINATION, 2015

ENGINEERING METALLURGY

(2012 Pattern)

Time : Two Hours **Maximum Marks : 50**

N.B. :— (*i*) Answer any *four* questions. Q. No. **1** *or* Q. No. **2**, Q. No. **3** *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6** and Q. No. **7** *or* Q. No. **8**.

(*ii*) Neat diagrams must be drawn wherever necessary.

(*iii*) Use of electronic pocket calculator is allowed.

(*iv*) Figures to the right indicate full marks.

1. (*a*) Define the following : [4]

(*i*) Phase

(*ii*) Ledeburite

(*b*) What is "isomorphous" system ? Explain with *one* example of the same. [4]

(*c*) Draw Fe-Fe_3C phase diagram and write the critical temperatures on it. [4]

P.T.O.

Or

2. (*a*) What is stainless steel ? For surgical applications which group of stainless steel is used ? Explain in detail. [4]

(*b*) Draw a self-explanatory cooling curves for binary eutectic. [2]

(*c*) With a neat diagram explain working of metallurgical microscope. [4]

(*d*) What do you understand by AISI 1090 and Fe-230. [2]

3. (*a*) While selecting any material in corrosion, what are the different factors taken into consideration ? [6]

(*b*) Write a short note on Nitriding. [4]

(*c*) Explain strain hardening is one of best strengthening mechanism for pure metal. [3]

Or

4. (*a*) A large size gear needs to be hardened, suggest a suitable heat treatment for the same and justify your answer. [3]

(*b*) What is Crevice corrosion ? How it can be reduced ? [3]

(*c*) Explain in brief "Impressed current cathode protection". [3]

(*d*) Show the following heat treatment on TTT diagram : [4]

(*i*) Austempering

(*ii*) Conventional Hardening.

5. (*a*) In which cast iron, carbon is not present in the free form ? Explain the treatment ? Which converts cementite into free carbon-graphite. Draw the microstructure after heat treatment. [6]

(*b*) What is mottled cast iron ? Why the formation of this cast iron is avoided ? [4]

(*c*) Discuss advantages of gray cast iron over white cast iron. [3]

Or

6. (*a*) Write True or False and justify your answer : [6]

(*i*) Chilled cast iron can be used for manufacturing wheels of road rollers.

(*ii*) Gray cast iron is used for manufacturing bearings.

(*b*) Draw a microstructure of ferritic "gray cast iron". [2]

(*c*) What is Ni-Resist cast iron ? How does it differ from Nicrosilal ? [5]

7. (*a*) Give the composition of "Duralumin". What are its properties ? [4]

(*b*) What is "Naval Brass" ? What are its applications ? [4]

(*c*) How "Invar" differs from "Elinvar" ? Compare their compositions and give *one* application of each. [4]

Or

8. (*a*) What properties are required for bearing materials ? Give composition of any *one* non-Ferrous alloy used as bearing. [4]

(*b*) Give typical composition, properties, applications of the following (any *two*) : [6]

(*i*) Cap Brass

(*ii*) Statuary Bronze

(*iii*) Muntz metal

(*iv*) Leaded brass

(*c*) What is Zinc equivalence in brass ? [2]