Day	: Tuesday	Time :	10.00 AM TO 01.00 PM
Date	: 28/05/2019	Max. Marks :	60

S-2019-2629

N. B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagram **WHEREVER** necessary
4) Assume suitable date if necessary.

Q. 1 **a)** Describe the atomic packing factors and calculate for Cu and Fe. **(05)**

b) Draw the planes and directions if miler indices are (101), (112), (001), [110], [100]. **(05)**

OR

a) What is recrystallization? Explain the factors that to affects this process. Describe the properties changes during cold working and annealing. **(05)**

b) Show the atomic arrangement and Find the number of atoms/mm^2 on (100) ,(1 0 1)planes of lead (F C C) if lattice parameter is = 3.89^{0}A. **(05)**

Q. 2 **a)** The tensile test of specimen initial diameter 8 mm and gauge length 60 mm tested with following data:
Maximum load = 3220 kg
Yield load = 2170 kg
Final length of after fracture= 63.5 mm
Diameter at fracture = 6.8 mm.
Calculate UTS, US, % Elongation and % reduction in area also draw the stress strain curve (Not on the graph paper) **(05)**

b) What is Eddy current test? What are its advantages and give its applications. **(05)**

OR

a) Describe in detail about Ultra sonic test. **(05)**

b) What are transition temperature curves? Discuss the various methods of increasing creep life of a component. **(05)**

Q. 3 **a)** What is Gibb's phase rule? Is it different than lever rule? Give the applications of both rules with suitable example. **(05)**

b) Explain with neat sketches the cooling of any one hypoeutectic from liquid state to the room temperature in partial Eutectic system. **(05)**

OR

P. T. O.

a) What is micro segregation? Is it desirable? If no explain the methods of eliminating. **(05)**

b) Construct a phase diagram for the system A and B from the following data: **(05)**
M. P. of A = 880^0C, M.P. of B = 600^0C
Eutectic point = 540^0C at 25 % B
Maximum solubility of A in B at 540^0C = 12 %
Maximum solubility of B in A at 540^0C = 15 %
And solubility decreases with temperature to 2 % in each other.
Label the phase diagram.
Calculate the phases at 20 % B and show the cooling of this alloy diagrammatically from high temperature to room temperature.

Q. 4 a) List out the characteristics of metal powders. Explain any one method to measure it. **(05)**

b) Describe the manufacturing of self lubricating bearing in details. **(05)**

OR

a) What are carbonyl processes of metal powder manufacturing? Explain their characteristics. **(05)**

b) List the advantages and application of powder metallurgy technique. **(05)**

Q. 5 a) How the composite materials are classified? List the characteristics of reinforced material required. **(05)**

b) Write a short note on Advanced ceramic materials. **(05)**

OR

a) Explain the processing of ceramic in details. **(05)**

b) List out few reinforced materials used in metal matrix composite. Give its characteristics. **(05)**

Q. 6 a) Explain the methods of corrosion preventions by various coating processes. **(05)**

b) Describe the dry corrosion. Give its types and explain any one detail. **(05)**

OR

a) What do you know about hydrogen embrittlement of steels? **(05)**

b) Explain the PVD and CVD techniques as corrosion prevention methods. **(05)**

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