

B.Tech. / B.E. Mechanical Engineering (Model Curriculum) Semester-III
ME205 / PCC-ME205 - Material Engineering

P. Pages : 2

Time : Four Hours



GUG/W/23/14059

Max. Marks : 80

- Notes :
1. All questions carry equal marks.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Diagrams and Chemical equation should be given wherever necessary.
 5. Illustrate your answers wherever necessary with the help of neat sketches.
 6. Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.

1. a) Draw a miller indices for following 'Directions': 8
- a) $\langle 111 \rangle$ b) $\langle 1\bar{1}0 \rangle$
c) $\langle 001 \rangle$ d) $\langle 210 \rangle$

- b) What do you mean by "Bravais lattices"? Explain crystal structure of cubic unit cell. 8

OR

2. a) Draw a miller indices for following 'planes': 8
- a) (111) b) (101)
c) (001) d) (100)

- b) What is 'atomic packing factor' in unit cell? How it is expressed? Explain it with suitable example. 8

3. a) What is 'Hook's law'? Explain Resilience, toughness, ductility and malleability in brief. 8
- b) Classify the 'Engineering Materials' in detail with suitable example. 8

OR

4. a) What do you mean by 'destructive and non-destructive testing'? Enlist different types of hardness test and explain any one in brief. 8

- b) Define 'Red hardness'. Explain the importance of high temperature alloys (creep resistant alloys) in power plant and nuclear application. 8

5. a) What do you mean 'Phase diagrams'. Draw a conceptual phase diagram for following: 8
- i) Isomorphous system
ii) Partial eutectic system
iii) Fully eutectic system

- b) State Gibb's phase rule and lever rule. Justify, why 'pure metal solidifies at constant temperature while alloys over a range' with the help of Gibb's phase rule. 8

OR

