B.E. (Mechanical Engineering / Power Engineering (New)) Third Semester (C.B.S.)

Engineering Metallurgy

P. Pages : 2 **NRJ/KW/17/4371/4396**

Time : Three Hours * 0 5 2 8 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Diagrams and chemical equations should be given whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Define Engineering materials. Give the detailed classification of Engineering material with their practical applications. **8**

b) Define various mechanical properties of engineering materials. **5**

OR

2. a) Explain the various types of imperfections (defects) found in crystals. **7**

b) Name the various crystal structures in metals. Calculate the packing efficiency of F.C.C. structure with the help of neat sketch. **6**

3. a) Draw and explain Binary phase diagram for two elements A and B which are completely soluble in each other in solid state. **7**

b) What is nucleation? Differentiate between homogeneous and heterogeneous nucleation. **7**

OR

4. a) Draw a neat Iron-Iron carbide equilibrium diagram. Show all the temperature, composition and various phases present in it. **8**

b) Write and explain three invariant reactions occurring in Iron-Iron carbide diagram. **6**

5. a) Define heat Treatment. What are various heat treatment process? Explain any one in brief. **7**

b) Define case Hardening. Explain the process of carburizing in brief. **6**

OR

6. a) Draw and Explain TTT diagram for 0.8%C eutectoid steel and show following processes on it. **8**

i) Austempering. ii) Martempering.
iii) Patenting.

	b)	What is Retained Austenite? How is it Eliminated? Explain.	**5**
7.	a)	Differentiate between ferritic and Austenite stabilizer.	**6**
	b)	Explain the effect of Alloying element on the properties of steel. (Any four elements.)	**7**

OR

8.	a)	Define stainless steels and classify them in brief with applications.	**7**
	b)	Write short notes on (**any two).**	**6**
		a) Hadfield manganese steel.	
		b) Red Hardness.	
		c) Maraging steel.	
9.	a)	Distinguish between white cast iron and gray cast Iron.	**6**
	b)	Draw and explain Cu-Zn diagram in brief.	**7**

OR

10.	a)	Explain how white cast iron is converted into malleable cast iron? State its application.	**6**
	b)	Describe **any two** of following.	**7**
		a) Muntz metal.	
		b) Cartridge Brass.	
		c) Al-Si Alloy.	
11.	a)	Define powder metallurgy. Explain various steps involved in manufacturing products by using powder metallurgy.	**8**
	b)	What is NDT? Explain ultrasonic method of flaw detection.	**6**

OR

12.	a)	Explain Rockwell hardness test for determination of hardness.	**7**
	b)	State advantages and limitations of powder metallurgy.	**7**

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