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

Engineering Metallurgy

Paper - I

P. Pages : 2 **KNT/KW/16/7231/7256**

Time : Three Hours * 0 9 2 6 * 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. Write down the classification of Engineering materials in brief with practical applications. **8**

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

OR

2. a) What is mean by Crystal Imperfections. Explain surface and volume imperfections. **7**

b) Differentiate between metal and non-metal. **6**

3. a) Explain solidification process of pure metal. What is the effect of grain size on properties of metal? **7**

b) What is solid solution. Explain Hume Rothery Rule for substitutional solid solution. **7**

OR

4. a) Draw a neat sketch of $Fe - Fe_3C$ Diagram. Show all details on it. **8**

b) Explain the three invariant Reactions occurs in Iron - carbide equilibrium diagram and prove it. **6**

5. a) Define Heat treatment. Explain the process of Annealing in detail with its industrial applications. **7**

b) What is hardenability? Explain Jominy End Quench test to determine the hardenability of steel. **6**

OR

6. a) What information is made available by T.T.T. - curve. Which lacks in the iron - iron carbide equilibrium diagram. **7**

b) Explain flame hardening & induction hardening process with neat sketches. **6**

7.	a)	Explain the classification of plain carbon steel with its applications.	**7**
	b)	Differentiate between ferritic and Austenite Stabilizer.	**6**

OR

8.		Write short notes on **any three.**	**13**
	a)	Tool steel	
	b)	Stainless steel	
	c)	Hadfield manganese steel	
	d)	Maraging steel.	
9.	a)	Explain the classification of cast iron with its applications.	**7**
	b)	Differentiate between white cast iron and Gray cast iron.	**6**

OR

10.	a)	Draw and explain (Cu - 50% Zn equilibrium) diagram in brief.	**7**
	b)	Write note on following.	**6**
	i)	Al - Si Alloy	
	ii)	Muntz Metal	
	iii)	Cartridge Brass	
11.	a)	What is NDT. Explain Dic penetrant test to detect flaws in metal with industrial applications.	**7**
	b)	Explain in detail how hardness measures by Rockwell hardness tester with application.	**7**

OR

12.	a)	What is powder metallurgy? Discuss its advantages and applications.	**7**
	b)	Explain the production of cemented carbide tool by powder metallurgy technique.	**7**

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