Register Number: ……

B.E. DEGREE EXAMINATIONS: NOV/DEC 2010

Third Semester

MECHATRONICS ENGINEERING

MCT102: Engineering Materials and Metallurgy

Time: Three Hours **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. Cast iron produced by adding magnesium to molten cast iron is
   a)Chilled b)Grey c)Malleable d)Nodular
2. Alloy steel as compared carbon steel is more
   a)Tough b)Strong c)Fatigue resistance d) All of the above
3. Heat treatment process used for casting is
   a)Normalizing b)Annealing c)Tempering d)Hardening
4. Nitriding is a process for
   a)Normalizing b)Annealing c)Case hardening d)Tempering
5. Lower critical point for all steels is
   a)600°C b)723°C c)900°C d)9140°C
6. Brass is called
   a)Aluminum alloy b)Copper alloy c)Magnesium alloy d) All of the above
7. Thermo setting materials are produced by
   a)Compression moulding b)Injection moulding
   c)Extrusion process d)None of the above
8. Combination of two covalent bond is called
   a)Polymer b)Steel c)Ceramics d)Composite
9. Slow plastic deformation of metals under a constant stress is known as
   a)Creep b)Fatigue c)Endurance d)Plastic deformation

10. The defect causing slip by which most metals deform plastically is known as

a)Strain hardening b)Dislocation c)Fracture d)None of the above

PART B (10 x 2 = 20 Marks)

11. What are the limitations of iron carbon diagram?
12. How the subsituational solid solutions are formed?
13. Name any two uses of carbonitriding process.
14. List out various types of thermo chemical hardening process.
15. Define non ferrous metals.
16. List out various types of stainless steels.
17. What is PEEK?
18. Provide any two comparision between thermo plastics and thermo setting plastics.
19. Why are impact specimens notched?
20. What is the difference between brittle fracture and ductile fracture.

PART C (5 x 14 = 70 Marks)

21. a)	(i) Describe the composition, properties and applications of Grey cast iron.	(7)
	(ii) How are solid solutions classified? Give two examples for each.	(7)
	(OR)	
b)	Draw the Fe-Fe3C Equilibrium diagram and discuss the different phases and reactions that place in it.	
22. a)	Draw the T.T.T diagram for 0.8 percentage carbon and describe its isothermal transformations.	
	(OR)	

b)	Explain various types of thermo chemical surface hardening process.	
23. a)	What is an alloy steel? How they are classified? Explain them.	
	(OR)	
b)	Summarise the effect of the following elements as alloying addition to steel: (i)Manganese (ii)Silicon (iii)Chromium (iv)Molybdenum	
24. a)	(i) Discuss the properties and applications of ceramic materials in industries.	(7)
	(ii) Compare commodity polymers and engineering polymers.	(7)
	(OR)	
b)	With schematic diagrams illustrate the processing of fiber reinforced composites.	
25. a)	Write down the procedure for preparing charpy and izod specimen for impact testing and also explain how testing is performed.	
	(OR)	
b)	(i)Explain the mechanism of plastic deformation of metals by slip.	(7)
	(ii)With the help of neat sketches explain the difference between brittle and ductile fracture **********	(7)