B.E/B.Tech (Full Time) DEGREE END SEMESTER EXAMINATION NOV/DEC 2012

MATERIAL SCIENCE AND ENGINEERING BRANCH

FOURTH SEMESTER

ML9254 – POWDER METALLURGY

REGULATIONS 2008

Time: 3 hr Max. Marks: 100

PART – A (2 X 10 =20)

1. What is the importance of sampling in testing of metal powders?
2. What is the significance of surface area of particles?
3. Which process of synthesis yield powder of high purity and why?
4. What is the significance of sol-gel process of power synthesis?
5. What are the problems encountered if blending is not done prior to compaction?
6. What do you mean cold welding?
7. Give an example for activated sintering technique
8. What is the difference between liquid infiltration and liquid phase sintering?
9. What do you mean by "two phase materials concept" in powder metallurgy products?
10. Give an example of powder metallurgy product used in nuclear industry.

PART – B (5 X 16 =80)

11.(a) (i) Brief on the mechanism of powder production by ball milling and atomization. State the influence of processing parameters on powder characteristics. (12)

(ii) List the method of production for the following metals: Nickel, Titanium, Iron and Copper. (4)

12.(a) Describe a method of measuring particle size based on

(i) sedimentation (8)

(ii) adsorption (8)

(OR)

(b) (i) Brief on the influence of various powder characteristics in compaction, sintering and performance of the products.

13. (a) (i) How are the problems of friction during pressurized forming are overcome? (8)

(ii) Brief on the methods of pressureless compaction techniques with their application of products produced? (8)

(OR)

(OR)

	b.	i).	What are the prime differences between a Horizontal Turret lathe and Single Spindle Auto lathe?	(6)
		ii).	Describe the working principle of a Swiss type Automatic lathe.	(10)
13	a.	i).	How is return motion made faster in crank shaper?	(6)
		ii).	A slot of 12 mm wide and 4 mm deep is machined on steel bar of 120 mm long with 12 mm diameter end mill cutter. Assume the feed as 0.1mm/tooth and the cutting speed as 44 m/min. (a) Determine the machining time for milling the slot. (b) Sketch the Job setup indicating the cutting motions.	(5) (5)
			(OR)	
	b.	i).	Distinguish between Forming and Generating methods of gear production.	(6)
		ii).	Describe with illustrative sketch the principle of working of gear shaper.	(10)
14.	a.	i).	Explain why centreless grinding is popular in industry as compared to centre type grinder	(6)
		ii).	Describe the principal difference between honning and lapping process.	(10)
			(OR)	
	b.	i).	Sketch a pull broach and indicate the various nomenclature.	(6)
		ii).	Explain the difference bonding materials for grinding wheels	(10)
15	a.	i)	How does N/C machine differ from CNC machines?	(6)
		ii)	Describe the special features of machining centre	(10)
			(OR)	
	b	i).	What are the advantages N/C machining over traditional machining process?	(6)
		ii).	Describe with an example the uses of G and M code in N/C part programming.	(10)