Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER I (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2712802 Date:19/05/2016

Subject Name: MACHINING SCIENCE

Time:02:30 pm to 05:00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain mechanism of chip formation with neat sketch. Also discuss role of rake angle in chip formation.	**07**
	(b)	Draw single point cutting tool geometry and describe effect of various tool angles in metal cutting.	**07**
Q.2	**(a)**	Explain use of Merchant circle diagram with suitable example.	**07**
	(b)	A seamless tube 32 mm outside diameter is turned on a lathe. Cutting velocity of the tool relative to the work piece is 10 m/min. Rake angle = 35^0 , Depth of cut = 0.125 mm, length of chip = 60 mm, horizontal cutting force of the tool on the workpiece = 200 N, vertical cutting force required to hold the tool against the workpiece = 80 N. Calculate: (a) Coefficient of friction, (b) Chip thickness ratio, (c) Shear plane angle.	**07**
		OR	
	(b)	What is a real measure of plastic deformation in metal cutting? Explain in detail.	**07**
Q.3	**(a)**	Discuss the impact of tool chip interface heat generation on machining performance.	**07**
	(b)	List various methods to measure tool chip interface temperature and explain any one method in detail.	**07**
		OR	
Q.3	**(a)**	Describe specifications of a grinding wheel and discuss selection criteria of grinding wheel to grind tool steel material.	**07**
	(b)	Compare Grinding, Lapping and Honing processes with respect to their benefits and limitations.	**07**
Q.4	**(a)**	Define surface finish and discuss its importance with suitable example.	**07**
	(b)	List various methods used to measure surface roughness and explain any one in detail.	**07**
		OR	
Q.4	**(a)**	Explain maximum production rate criteria with reference to economics of machining with suitable example.	**07**
	(b)	Why do costs tend to increase when better surface finish is required in a machined part? Explain with suitable example.	**07**
Q.5	**(a)**	Discuss the variables affecting tool life?	**07**
	(b)	Explain the following in brief: 1. Mechanism of tool wear, 2. Flank wear, 3. Crater wear, 4. Diffusion wear	**07**
		OR	
Q.5	**(a)**	List various tool life criteria and explain any one in detail.	**07**
	(b)	List various methods used to measure cutting force in machining operations and explain any one in detail.	**07**

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