

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E Sem-I Regular Examination January / February 2011****Subject code: 712802N****Subject Name: Machining Science****Date: 01 /02 /2011****Time: 02.30 pm – 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) 1. Explain plastic deformation by the method of slip. **05**
 2. What is Bauehinger effect? **02**
 (b) 1. State different types of chips & its importance in study of metal Cutting **02**
 2. Explain the tool geometry in twist drill. **03**
 3. Define orthogonal cutting & show the geometrical conditions for which it occurs? Why are these conditions used in experimental work on cutting? **02**
- Q.2** (a) 1. Explain conversion from ASA to ORS. **03**
 2. What are the assumptions made by Merchant for getting various forces in metal cutting? **02**
 3. Why does classical laws of friction doesn't hold true in metal cutting? **02**
 (b) 1. Explain Mohr's circle diagram for shear angle measurement. **03**
 2. Explain the force analysis in oblique cutting. **04**
- OR**
- (b) Derive an expression for shear angle using Lee & Shaffer's relationship **07**
- Q.3** (a) What are the methods for measuring cutting forces & explain any one. **07**
 (b) Explain model of diffusion wear. **07**
- OR**
- Q.3** (a) Show the region of heat generation & explain infrared photographic technique for temperature measurement **07**
 (b) 1. Define the following: **05**
 (i) Roughness (ii) Waviness (iii) Lay (iv) RMS (v) Sampling length
 2. Why is it important to measure chip tool interface temperature? **02**
- Q.4** (a) Define machinability? State factors affecting machinability. **07**
 (b) Derive equation of optimum cost based on minimum production cost. **07**
- OR**
- Q.4** (a) Explain dressing & truing of grinding wheel. **07**
 (b) Explain the theory of cutting action of grinding wheel & define the characteristics by which the nature of action of grinding wheel is assessed **07**
- Q.5** (a) 1. Explain experimental method of determining average chip tool interface temperature. **04**
 2. What is self sharpening action in grinding? **03**
 (b) State & explain the variables affecting tool life. **07**
- OR**
- Q.5** (a) How does stress, strain, & strain rate affect in metal cutting? **07**
 (b) Explain tool specification in ASA system with its significance. **07**
