

**GUJARAT TECHNOLOGICAL UNIVERSITY****ME - SEMESTER I - EXAMINATION – SUMMER 2017****Subject Code: 2712802****Date: 11/05/2017****Subject Name: Machining Science****Time: 2:30 pm - 5:00 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 plastic deformation by slip. **07**  
(b) Derive the formula for cutting forces using Merchant circle diagram method. **07**  
List the assumptions made by Merchant to get the various forces.
- Q.2** (a) With neat sketch explain different types of chips. **07**  
(b) Explain geometry of milling cutters with sketch. **07**
- OR**
- (b) Explain tool signature of single point tool as per ASA system. **07**
- Q.3** (a) Discuss concepts of rake angle measured in different planes for oblique turning operation. **07**  
(b) Define cutting tool life. State the factors which affect tool life. **07**
- OR**
- Q.3** (a) Derive an expression for shear angle using Lee & Shaffer's relationship. **07**  
(b) What is machinability? Explain factors affecting machinability. **07**
- Q.4** (a) Discuss economics of machining with respect to maximum production rate criterion. **07**  
(b) What is mechanics of grinding process? Explain honing and lapping operation. **07**
- OR**
- Q.4** (a) Derive an equation for optimization of cost based on maximization of production. **07**  
(b) Explain characteristics and specifications of grinding wheel. **07**
- Q.5** (a) List various methods to measure tool chip interface temperature and explain tool work thermocouple technique. **07**  
(b) Enlist the different types of dynamometer used for turning operation. Explain working principle of strain gauge dynamometer. **07**
- OR**
- Q.5** (a) List various methods to measure tool chip interface temperature and explain Infrared photographic technique. **07**  
(b) Discuss dynamometer requirements. **07**

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