

GUJARAT TECHNOLOGICAL UNIVERSITY**BE – SEMESTER – VIII EXAMINATION – WINTER 2016****Subject Code: 181903****Date: 21/10/2016****Subject Name: Production Technology****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)** (i) what is 'tool signature'? Illustrate with an example. **02**
(ii) Draw the tool geometry of a single point oblique cutting tool as represented in orthogonal system of planes. Show various angles on it. **05**
- (b)** (i) A bar 76 mm diam. is reduced to 71 mm diam. by means of a single point orthogonal cutting tool for which the cutting edge lies in plane containing the work axis of rotation. The mean length of cut chip = 73.9 mm & rake angle = 15° . feed = 0.2 mm/rev. Find chip thickness ratio t/t_c and value of shear plane angle ϕ . **03**
(ii) The following values relate to a cutting test under orthogonal cutting conditions:
Shear plane angle, $\phi = 18^\circ$ **04**
Tangential (cutting) force, $F_t = 1050$ N
Feed force $F_f = 427$ N
Rake angle, $\gamma = 15^\circ$
Determine, using Merchant's theory (analytical method):
Frictional force, F & Normal Force, N at chip-tool interface
Coefficient of friction, μ on chip-tool interface.
- Q.2 (a)** (i) Find the percentage change in cutting speed required to give 80% reduction in tool life (i.e. reduce tool life to $1/5^{\text{th}}$ of its former value) given Taylor's tool life equation: **04**
 $VM^{0.12} = \text{constant}$, where V = cutting speed in m/min & M = tool life in minutes.
(ii) state main functions & desirable properties of cutting fluids. **03**
- (b)** (i) What are crater wear and flank wear? Explain. **04**
(ii) Define Non-conventional machining. why do we need these processes? **03**
- (b) OR** **05**
(i) Explain briefly with a neat sketch set up of chip-tool thermo couple technique to measure chip-tool interface temperature on a lathe.
(ii) Draw self explanatory sketches showing the effect of setting of a single point cutting tool with reference to the work piece axis on lathe. **02**
- Q.3 (a)** Explain 3-2-1 location principle applied to **03**
(i) a rectangular block
(ii) a short cylinder with neat sketches. **04**
- (b)** (i) Explain construction and working of a channel jig or a turning fixture with a neat sketch. **05**
(ii) Why hydraulic or pneumatic clamps are superior to mechanical clamping? **02**
- OR**
Q.3 (a) (i) What are the methods of manufacturing internal threads? **03**
(ii) How does thread rolling differ from thread cutting? **02**

- (iii) Differentiate between gear shaving & gear burnishing. 02
- (b) (i) What are advantages & limitations of gear hobbing process? Compare gear shaping with gear hobbing. 04
- (ii) What are advantages of employing Jigs & Fixtures in mass production work? 03
- Q.4 (a)** What is the difference between a capstan & turret lathe? Describe in brief with the help of suitable sketch. 07
- (b) Explain plain indexing & compound indexing methods of manufacturing a spur gear on a milling machine. What are the limitations of the method? 07
- OR**
- Q.4 (a)** (i) How is wire EDM different from EDM? Explain 07
- (ii) Explain the effect of : abrasive flow rate, mixing ratio & tip distance of nozzle from work surface, on MRR in Abrasive Jet Machining with appropriate graphs.
- (b) (i) Explain working principle of LASER Beam Machining. State its important applications in practice. 07
- Q.5 (a)** Distinguish between a Jig & a Fixture. Explain different types of bushes, with neat sketches used in Jigs. 07
- (b) Explain the difference in working of Electrochemical machining & Electrochemical Grinding. State salient applications of each. 07
- OR**
- Q.5 (a)** (i) What is meant by sheet metal layout? List important considerations involved in deciding a layout. 07
- (ii) What is the significance of finding center of pressure for a sheet metal operation? Explain.
- (b) (i) Differentiate between Piercing & Blanking operations. 07
- (ii) Make a neat sketch of a die set & describe its various parts and accessories.
