

GUJARAT TECHNOLOGICAL UNIVERSITY**PDDC - SEMESTER-VII • EXAMINATION – SUMMER • 2014****Subject Code: X 71902****Date: 30-05-2014****Subject Name: Production Technology****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)** Explain the significance of chip thickness ratio and the shear plane angle in orthogonal cutting operation. **07**
 In an orthogonal cutting operation, the rake angle = 8° , chip thickness before the cut = 0.2 mm and the width of cut = 4.0 mm. The cutting velocity = 150 m/min and the chip thickness ratio = 0.4. The cutting force and feed force measured using dynamometer are 700 N and 450 N, respectively. Determine:
 (i) chip thickness after the cut (ii) shear angle
 (iii) friction angle (iv) Chip velocity
 (v) shear velocity
- (b)** In a turning operation on stainless steel with hardness of 200 HB, the cutting speed = 180 m/min, feed = 0.25 mm/rev, and depth of cut = 4.0 mm. How much power will the lathe draw in performing this operation if the specific power for the turning operation is 2.2 J/mm^3 and the mechanical efficiency = 90%? Also calculate the cutting force. **04**
- (c)** Write the objectives of using cutting fluids. **03**
 What are different types of cutting fluids?
- Q.2 (a)** State some basic reasons for developing nontraditional machining processes. **04**
 Give a classification of the nontraditional machining processes based on the mechanism of metal removal. Write the energy transfer media in each case.
- (b)** State the advantages of using jigs and fixtures. **03**
- (c)** Explain the following tool wear mechanisms: **07**
 (i) Abrasion wear (ii) Adhesion wear (iii) Diffusion wear
OR
- (c)** Discuss different types of chips formed during cutting process along with their characteristics. **07**
 Why discontinuous chips are preferred over continuous chips?
- Q.3 (a)** What are functions of dielectric fluid used in EDM? **05**
 State the basic requirement of dielectric fluid used in EDM.
 What are the dielectric fluids commonly used in EDM?
- (b)** Evaluate the following tool materials: **05**
 (i) High speed steel (ii) Cemented carbide (iii) Ceramics
- (c)** Explain the purpose of the following elements of a die: **04**
 (i) Bolster plate (ii) Pilot (iii) Stripper (iv) Pressure plate
OR
- Q.3 (a)** With the help of graphs, evaluate the effect of the following process parameters on the material removal rate in Ultrasonic Machining. **05**
 (i) Abrasive grit size (ii) Frequency of vibration
 (iii) Amplitude of vibration
- (b)** Sketch a single point cutting tool with positive rake and show on it various tool elements and tool angles. Give the function of each tool element. **05**
- (c)** Explain the following sheet metal operations: **04**
 (i) Blanking (ii) Piercing (iii) Perforating (iv) Notching

Q.4	(a) What is a transfer machine? Explain (i) in-line and (ii) rotary indexing type transfer machines.	05
	(b) Explain various gear finishing processes.	05
	(c) Explain the following locating elements used in jigs and fixtures: (i) V locators (ii) Concentric locators	04
OR		
Q.4	(a) Write the Taylor's tool life equation and plot the graph. Let $n = 0.5$ and $C = 600$ in the Taylor's tool life equation. What is the percent change in tool life (i) if the cutting speed reduced by 50% and (ii) if the cutting speed increased by 100%?	05
	(b) Explain "Gear Hobbing" process in detail.	05
	(c) Explain the following locating elements used in jigs and fixtures: (i) Radial locators (ii) Conical locators	04
Q.5	(a) A steel blank 50 mm square having a 20 mm diameter hole in the centre is to be blanked from 1.5 mm thick sheet. Calculate: (i) the maximum punch force necessary to shear the blank in one operation if the ultimate shear strength of the material is 390 N/mm^2 . (ii) the work done if the shearing operation is complete with 25% penetration of the punch. (iii) the amount of shear which must be ground upon the tool, if the maximum punch force is to be reduced to 50 kN.	05
	(b) Explain the following types of multi spindle automats: (i) Progressive action (ii) Parallel action.	05
	(c) Explain the following clamping elements: (i) Strap clamps (ii) Wedge clamp	04
OR		
Q.5	(a) With the help of suitable sketches and examples, write the differences between a compound die and a progressive die.	05
	(b) State the differences between Single spindle and Multispindle automats.	05
	(c) Explain the following clamping elements: (i) Edge clamp (ii) Heel clamp	04
