MEL781 – MACHINING PROCESSES & ANALYSIS
(I Semester 2006-07)

Major

Max.Marks:30
Time :2 Hrs.

Room NO: III 342 1-12-2006 (1to 3 p.m.)

Answer all the questions:

1 (a) What are the benefits of controlled contact cutting? (1)

(b) In an orthogonal cutting operation, the following data has been obtained:

Rake angle	$= 20^0$
Chip thickness ratio	= 0.4
Cutting Force	= 1600 N
Thrust Force	= 470 N
Uncut chip thickness	= 0.3 mm

Determine the natural contact length and shear plane angle if the contact is reduced to 50%. (4)

2. (a) Define chip flow angle. What is the significance of chip flow angle? (1)

(b) Distinguish between normal rake angle and effective rake angle in oblique cutting. (4)

3. For the orthogonal cutting of a particular work material, it is found that the length of the chip-tool contact is always equal to the chip thickness and that the mean shear stress at the chip-tool interface is equal to the mean shear stress on the shear plane. Show that, under these circumstances, the mean coefficient of friction on the tool face must be equal to or less than 4/3 and that it is equal to unity when the shear plane angle is equal to the rake angle. (5)

4 (a) What is machinability? Explain the machinability concept with various criteria of assessment. (3)

(b) Give Kronenberg's dimensional analysis for temperature measurement in metal cutting. (2)

5. (a) List out the parameters which influence material removal rate in Ultrasonic Machining and show the trends. (2)

(b) Give the effect of stand-off-distance and abrasive flow rate on the material removal rate in Abrasive Jet Machining. (2)

(c) Explain various steps of photochemical machining. (1)

6. Write short notes on the following:

(a) High speed machining (2)

(b) Ultra Precision Machining (1)

(c) Hard Turning (2)

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