Lovely Professional University

(Theory of Metal Cutting)-Course No. MEC-914

Date: 19-02-2012 **Section-M2116**
Time allowed: 60min. Set-A
1st Sessional Maximum Mark-20

Q1. Explain continuous type of chips with built-up edge formation? Also explain the factors responsible for avoiding the formation of built-up edge? 3

Q2. Explain & calculate the forces on a chip using Merchant's circle diagram? 5

Q3. Prove that for the shear strain (γ): 3

$$\gamma = \frac{\cos \alpha}{\sin \emptyset \cos (\emptyset - \alpha)}$$

where α = Rake angle
$\emptyset$ = Shear angle

Q4. Determine:

(i) Shear force and Normal force at shear plane
(ii) Shear stress(τ_s)
(iii) Kinetic coefficient of friction(μ) &
(iv) Specific energy of metal removed, from the following data 5

Workpiece material C25 steel having chip thickness 0.38 mm, depth of cut 2 mm, cutting speed 160 rpm, feed 0.2 mm/rev., cutting force 150 N, feed force 75 N

Q5. a) Prove that for Theoretical shear strength (τ_0) = $\frac{G}{4}$, where G= Modulus of rigidity 2

b) Explain the Griffith's theory? 2