

Material Removal Processes (MCL 136)
Minor II Exam

Time 1 hr

F.M. 20

All answers must be brief and to the point. Assume any relevant data wherever required. All parts of a question must be answered together.

5x2=10

1. Answer in brief the followings:
 - a. Distinguish between oblique and orthogonal cutting processes?
 - b. With neat sketches explain any two mechanisms of self chip breaking during machining?
 - c. With neat sketch explain controlled contact cutting effect?
 - d. What are the various axial thrust force components in drilling and how can they be minimized?
 - e. Mention any four purposes of measurement of cutting forces during machining.

2. During orthogonal turning of a ductile alloy by a tool of $\gamma_0 = 0^\circ$, it was found that $P_Z = 800$ N, and chip reduction coefficient, $\zeta = 2.5$. Evaluate, using Merchant's Circle Diagram (MCD), the values of friction force, F , normal to the friction component, N and coefficient of friction, μ as well as shear force, P_s for the above machining process.

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3. What is tool work thermocouple technique for measuring of cutting temperature during turning process? How such tool work thermocouple can be calibrated?

2+1=3

4. Differentiate between a strain gauge based dynamometer and a piezoelectric dynamometer.

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5. Mention any two detrimental effect of cutting temperature on tool and any one beneficial effect of high temperature during machining process.

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