Code: 9A14502 **R09**

B.Tech III Year I Semester (R09) Supplementary Examinations June 2017

MACHINE TOOLS & METROLOGY

(Mechatronics)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

1 (a) Derive an expression to calculate the coefficient of friction between tool chip interfaces.

(b) During an orthogonal machining operation on mild steel, the results obtained are: Uncut chip thickness = 0.25 mm, chip thickness = 0.75 mm, width of the cut = 2.5 mm, rake angle = 0^o, horizontal cutting force = 400 N. Compute the coefficient of friction between the tool and chip interface. Determine the ultimate shear stress of the work material.

2 (a) Describe the types of machining operations that can be performed on a lathe.

(b) What are the main applications of cutting fluids?

3 (a) Compare gear shaping and gear hobbing. Give the process and product requirements.

(b) Describe the various boring machines used in the industry.

4 (a) Highlight the significance of cylindrical grinding. How do work speeds affect finish in cylindrical grinding?

(b) What type of imperfections left in machining operation can be corrected by honing and what conditions cannot be corrected by honing? What materials can be honed? What is the disadvantage of honing?

5 (a) Explain the importance of line and end standards in linear measurement.

(b) Describe the procedure for determining the angle of taper and the diameters of a taper and the diameters of a taper ring gauge using spheres and depth micrometer.

6 (a) Discuss various methods available for finding the pitch of the internal screw.

(b) Discuss in detail about the advantages and use of optical flats in flatness measurement.

7 (a) Sketch and explain the working principle of laser interferometer.

(b) What is the procedure involved in the testing of machine tools using laser interferometer?

8 (a) Explain the principle of co-ordinate measuring machine.

(b) Write a note on machine vision. Give its applications in mechanical measurements.

*****