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BME-010

B.Tech. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING)

00860

Term-End Examination

June, 2016

BME-010 : TOOL ENGINEERING AND MANAGEMENT

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. Assume any suitable data, if missing. Use of scientific calculator is permitted.*

1. (a) Draw a Merchant's circle diagram and derive an expression to show the relationships among the different forces acting on the cutting tool and different parameters involved in metal cutting. 7

(b) Following data was obtained during machining of mild steel with single point HSS tool : Rake angle of tool = 10°, uncut chip thickness = 0·3 mm, width of cut = 2 mm, shear plane angle = 36°, shear strength of mild steel = 450 MPa. Using Merchant's analysis, find out the coefficient of friction between the chip and tool. Also calculate the shear forces in cutting. 7

2. (a) Write the difference between a jig and a fixture with figure. What are the main advantages of using jigs and fixtures in mass production ? 7

(b) Explain the uses and operation of the following types of 'Quick acting clamps' : 7

(i) A cam operated clamp

(ii) C-clamp

3. (a) Discuss the elastic-plastic deformation mechanism of shear and break as the punch proceeds to push into the material. Support your explanation with neat sketches. 7

(b) Explain the operation of progressive and compound dies. 7

4. (a) Explain the working principle of stripping plate machine used in foundry, with a neat sketch. 7

(b) What are the various causes of accidents ? Discuss the handling of tools and materials in industry. 7

5. (a) Explain the different scribing layout tools with figure. 7

(b) What are the basic elements of machine tools ? Which common forces should be considered in the design of machine tool structures ? 7

6. (a) Discuss the Automatic Tool-Changing mechanism on Turning Centre with a neat sketch. 7

(b) Explain the significance of set-up planning in Product design. 7

7. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Single-point Cutting Tool Nomenclature

(b) Turning Fixture

(c) Methods of Mounting Slender Punches

(d) Containers used in Foundry

(e) Tool Handling System

(f) Cutting Tool Materials