VIT Reg. No. :

Final Assessment Test (FAT) - APRIL/MAY 2023

Programme	B.Tech	Semester	Winter Semester 2022-23
Course Title	METAL FORMING AND MACHINING	Course Code	BMEE304L
Faculty Name	Prof. Giridharan A	Slot	F2+TF2
		Class Nbr	CH2022235001709
Time	3 Hours	Max. Marks	100

PART-A (10 X 10 Marks)
Answer any 10 questions

01. A cylindrical workpiece is subjected to a cold upset forging operation. The starting piece is 75mm in height and 50mm in diameter. It is reduced in the operation to a height of 36mm. The work material has a flow curve defined by K=350 Mpa and n=0.17. Assume a coefficient of friction of 0.1. Determine the force as the process begins, at intermediate heights of 62 mm, 49 mm, and at the final height of 36 mm. Assume initial strain as 0.002.

02. A billet 75mm long and 25 mm in diameter is to be extruded in a direct extrusion operation with extrusion ratio 4.0. The extrudate has a round cross section. The die angle (half angle) 90°. The work metal has a strength coefficient 415 MPa, and strain-hardening exponent 0.18. Use the Johnson formula with a = 0.8 and b = 1.5 to estimate extrusion strain. Determine the pressure applied to the end of the billet as the ram moves forward.

03. Discuss in detail the mechanism used to manufacture cup shaped component. Give proper schematic to explain each stages of deformation.

04. Use one illustration to differentiate punching and blanking process. Also elaborate on the significance of clearance in sheet metal forming processes.

05. Choose any five milling cutter used in industry. Discuss in detail its features and applications.

06. a. In a metal cutting process, illustrate schematically the relationship between shear angle and chip thickness.

b. During orthogonal cutting a bar of 90 mm diameter is reduced to 87.6 mm. If the mean length of cut chip is 88.2 mm and rake angle is 15°, calculate cutting ratio and shear angle

07. The following data relate to the orthogonal cutting of a component: Feed force 900 N, cutting force 1800 N, chip thickness ratio 0.26, tool rake angle 12°. Determine compression force, shear force and coefficient of friction of the chip on the tool face?

08. During straight turning of a 24 mm diameter steel bar at 300 rpm (revolutions per minute) with an HSS tool, a tool life of 9 min was obtained. When the same bar was turned at 250 rpm, the tool life increased to 48.5 min. What will be the tool life at a speed of 280 rpm?

09. Elaborate on a method to measure temperature developed at tool-workpiece interface.

10. Using proper schematic explain the process mechanics of electrical discharge machining process?

11. Discuss in detail the mechanism of laser beam machining and give its applications.

12. Elaborate on how a material behaves during a metal forming process?

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