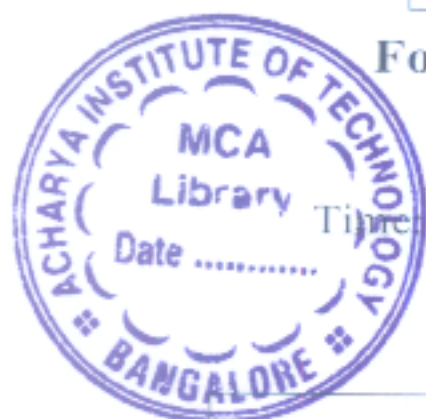


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Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025

Machining Science and Metrology

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks, L: Bloom's level, C: Course outcomes.

Module – 1				M	L	C
Q.1	a.	Differentiate between orthogonal and oblique cutting process.		6	L1	CO1
	b.	Using Merchant circle diagram derive the relation for chip thickness ratio and shear angle.		8	L2	CO1
	c.	Explain different types of cutting materials.		6	L3	CO1
OR						
Q.2	a.	List the difference between Capstan and Turret lathe.		6	L1	CO1
	b.	Explain with a neat sketch part of a lathe.		8	L2	CO1
	c.	Explain the following operation i) Taper turning ii) Threading iii) Knurling		6	L2	CO1
Module – 2						
Q.3	a.	Explain any three milling operations.		6	L2	CO2
	b.	With neat sketch, explain radial drilling machine.		8	L2	CO2
	c.	What is Indexing and discuss the need of indexing.		6	L2	CO2
OR						
Q.4	a.	Differentiate between shaping and planing operation.		6	L1	CO2
	b.	Explain centerless grinding machine with a neat diagram.		8	L2	CO2
	c.	Explain the driving mechanism of a shaper.		6	L2	CO2
Module – 3						
Q.5	a.	With a neat sketch, explain the temperature distribution in metal cutting.		6	L2	CO3
	b.	Explain the Tool-work thermocouple technique used for measurement of cutting temperature.		8	L2	CO3
	c.	Discuss the parameters which influences the tool life.		6	L2	CO3

OR				
Q.6	a.	Explain the basic requirements of cutting tool materials.	6	L2 CO3
	b.	A 60 mm diameter steel bar was turned at 300 rpm and the tool failed after 8 minutes of cutting. Then the speed was reduced to 240 rpm and the tool lasted for 50 minutes. Using Talyor's tool life equation, determine the cutting speed required to obtain a tool life of 20 minutes.	8	L3 CO3
	c.	List the properties of cutting fluids and explain the functions of cutting fluids.	6	L2 CO3
Module – 4				
Q.7	a.	Explain the objectives of metrology.	6	L2 CO3
	b.	What is slip gauge? Explain the wringing phenomenon.	8	L3 CO3
	c.	Write a short note on line and end standard.	6	L2 CO3
OR				
Q.8	a.	With a neat sketch, explain International prototype meter.	6	L2 CO4
	b.	What is a Fit? Explain different types of Fits and their designation.	8	L2 CO4
	c.	Discuss shaft based and hole – based system of fit.	6	L2 CO4
Module – 5				
Q.9	a.	What are GO and NOGO gauges? Explain how Taylor's principle is used in designing them.	6	L2 CO5
	b.	Explain Solex pneumatic comparator.	8	L2 CO5
	c.	With a neat sketch, explain snap gauges.	6	L2 CO5
OR				
Q.10	a.	Write a short note on wear allowances on gauges.	6	L2 CO5
	b.	With a neat sketch, explain the Johansson Mikrokator type comparator.	8	L2 CO5
	c.	Explain the principle and working of a sine bar.	6	L2 CO5
