

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2024 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	Μ	L	С
Q.1	a.	With a neat sketch, explain the nomenclature of single point cutting tool.	07	L2	CO1
	b.	Explain briefly mechanics of chip formation process.	06	L1	CO1
	c.	The following data refer to an orthogonal cutting process. Chip thickness	07	L3	CO1
		0.62 mm, feed 0.2 mm, rake angle 15°. Calculate chip reduction coefficient			
		and shear angle.			
		OR			
Q.2	a.	With a neat sketch, explain the main parts of a lathe.	07	L2	CO1
	b.	Briefly explain the major differences between capstan and turret lathe.	06	L1	CO1
	c.	Explain any five operations performed on a lathe.	07	L2	CO1
		Module – 2	×		
Q.3	a.	Explain with a neat sketch, up milling and down milling methods.	07	L2	CO2
	b.	Briefly explain the broad classification of milling machines.	06	L1	CO2
	c.	By applying the knowledge of indexing, discuss the different types of	07	L2	CO2
		indexing that are in practice.			
		OR			
Q.4	a.	With a neat sketch, explain the radial drilling machine.	07	L2	CO2
	b.	Apply the knowledge of mechanism, explain the quick return mechanism	06	L3	CO2
		that are used in shaping machine.			
	c.	With a neat sketch, explain the centerless grinding machine.	07	L2	CO3
		Module – 3			
Q.5	a.	With neat sketches, analyze the different heat zones that are present during	07	L2	CO3
		metal cutting process.			
	b.	Explain the factors that affect the heat generation in metal cutting process.	06	L2	CO3
	c.	Briefly explain the different wear mechanisms of cutting tools.	07	L2	CO3
		OR			
Q.6	a.	Briefly explain the different cutting tool materials that are used in practice.	07	L2	CO3
	b.	Analyze the life of tool which is used for rough turning which give a tool	06	L4	CO3
		life of 1 hrs at a cutting speed of 30 m/min. What will be the life of the tool			
		when it is used at the same cutting speed for finish turning? Take $n = 0.125$			
		for rough cut and $n = 0.1$ for finish cut.			
	c.	Briefly discuss the different types of cutting fluids.	07	L2	CO3
	1	Module – 4			
Q. 7	a.	Briefly discuss the major objective of metrology.	07	L2	CO4
	b.	Briefly discuss the following standards of measurement:	06	L2	CO4
		(i) Line standard (ii) End standard (iii) Wave length standard			~ ~ .
	c.	Three 100 mm end bars are measured on a level comparator by first	07	L3	CO4
1		wringing them together and comparing with a 300 mm bar. The 300 mm			
		bar has a known error of +40 μ m and the three bars together measures			
		64 μ m less than the 300 mm bar. Bar A is 18 μ m longer than bar B and			
		23 µm longer then bar C. Determine the actual length of each bar.			
		OR			
		1 of 2			

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Q.8 a. Briefly explain Inter changeability and selective assembly. 06 L2 0 b. Define fit. Explain the different types of fits designed for different 06 L2 0 a. Determine the tolerances on the hole and shaft for a precision running fit designated by 50 Hpg. Given: (i) 50 mm lies between 30.50 mm (ii) f(micros) = 0.45 (D)¹³ + 0.001 D (iii) Fundamental deviation for 'g' shaft =-2.5 D^{0.34} (v) IT7 = 16 (v) TT6 = 10i State the actual maximum and minimum sizes of the hole and shaft and minimum sizes of the hole and shaft and minimum thereas ketch, by lay and ring gauges. 07 12 c. With a neat sketch, explain the sigma comparator. 07 12 c. With a neat sketch, explain the Zeiss Uftra Optimeter. 06 12 (v) With a neat sketch, explain the Zeiss Uftra Optimeter. (vi) A an east sketch, explain the Verneir Bevel Protractor.	Q.8 a. Briefly explain liter changeability and selective assembly. 06 L2 C b. Define fit. Explain the different types of fits designed for different of the locances on the hole and shaft for a precision running fit of the locances on the hole and shaft for a precision running fit of the locances on the hole and shaft for a precision running fit of the locances on the hole and shaft for a precision running fit of the locance of the l	0.8						
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b. With a neat sketch, explain the Zeiss Ultra Optimeter. 07 L2 c. With a neat sketch, explain the Verneir Bevel Protractor. 06 L2	b. With a neat sketch, explain the Zeiss Ultra Optimeter. 07 12 0 c. With a neat sketch, explain the Veneir Bevel Protractor. 06 12 0	Q.10	a.	Discuss the different materials used for the construction of gauges.	07	L2	C	
c. With a neat sketch, explain the Verneir Bevel Protractor. 06 1.2 (c. With a neat sketch, explain the Verner Bevel Protractor. 06 L2 C		b.	With a neat sketch, explain the Zeiss Ultra Optimeter.	07	L2	C	
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