## GUJARAT TECHNOLOGICAL UNIVERSITY BE- IV<sup>th</sup> SEMESTER-EXAMINATION – MAY/IUNE- 2012

Subject code: 141901 Date: 25/0			)5/2012	
Subject Name: Mechanical measurement and metrology Time: 10:30 am – 01:00 pm Total Ma				
Instr	ucti	ons:		
1. 2. 3.	Atte Mal Figu	empt all questions. se suitable assumptions wherever necessary. ares to the right indicate full marks.		
Q.1	(a)	What are the various possible sources of errors in measurements? What do you understand by systematic errors and random errors?	07	
	<b>(b</b> )	Differentiate between "Precision" and "Accuracy" with suitable example.	04	
	(c)	What are the advantages of wavelength standard?	03	
Q.2	(a)	What do you understand by line and end measurement? Discuss their relative characteristics.	07	
	<b>(b</b> )	Describe construction, working principle and application of Vernier Micrometer with neat sketch.	07	
	(b)	<b>OR</b> What are the precautions to be taken while using a micrometer? State the possible sources of error in micrometers.	07	
Q.3	(a)	Draw a neat sketch to illustrate the use of sine bar for measurement of taper plug gauge and explain it briefly	07	
	<b>(b</b> )	Name the various methods used for measurement of tooth thickness and explain any one of them.	07	
		OR		
Q.3	(a)	Explain with a sketch the three wire method of measuring the effective diameter of a screw thread.	07	
	(b)	What is the best size wire? Derive the expression for the same in terms of pitch and angle of the thread.	07	
Q.4	(a)	Explain the terms "Primary texture" and "Secondary texture".	04	
	(b) (c)	State the factors affecting surface texture. Name the various alignment tests to be performed on Milling Machine	03 07	
	(-)	and describe any three in detail.		
0.4	(-)	OR What is a 'Daltier offect'?	02	
Q.4	(a) (b)	A bimetal strip is constructed of strips of nickel chrome iron alloy and invar bonded together at 25°C. The strips are 50 mm long and each material has a thickness of 1 mm. Calculate the radius of curvature produced when the strip is subjected to a temperature of 200°C Assume the following data: $\alpha_1 = -1.7 * 10^{-6} / °C$ $E_1 = -1.5 * 10^{-6} \text{ kgf/cm}^2$	03	
		$\alpha_2 = 12.5 * 10^{-6} / ^{\circ}C$ $E_2 = 2.2 * 10^{-6} \text{ kgf/cm}^2$		

	thermometer, stating its advantages and disadvantages.	07
Q.5	<ul> <li>Explain the following terms in mechanical measurement.</li> <li>(i) Threshold</li> <li>(ii) Overshoot</li> <li>(iii) Range</li> <li>(iv) Span</li> </ul>	04
	<ul> <li>(iv) Span</li> <li>Explain any one method used for force measurement.</li> <li>Describe strain gauge. Define gauge factor of strain gauge. What are Rosette gauges explain with advantages, limitations &amp; application?</li> </ul>	03 07
Q.5	<ul> <li>Describe with sketch the construction, working and application of bellow gauge and diaphragm gauge used for pressure measurement.</li> <li>Explain with neat sketch ring balance manometer with comment on its field of application.</li> </ul>	07 07
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