Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-IV Remedial Examination Nov/ Dec. 2010

Subject code: 141901

Subject Name: Mechanical Measurement & Metrology

Date: 03 /12 /2010 **Time: 03.00 pm – 05.30 pm**

Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Describe the following types of errors and state how they can be taken care of. (i) Environmental error (ii) Error due to vibration.	**03**
	(b)	State and explain five basic elements of measuring system.	**04**
	(c)	State the principal of vernier instrument and explain briefly construction and use of vernier caliper with a neat sketch.	**07**
Q.2	**(a)**	Explain how angle of a work piece is measure with the help of angle dekkor and angle gauge.	**03**
	(b)	What is clinometer? Describe how it can be used for measuring and setting of angle and illustrate your answer with neat sketch	**04**
	(c)	State the possible source of error in micrometer. Name any four types of micrometer and state their specific uses.	**07**
		OR	
	(c)	Explain the construction and use of the following with neat sketch. (i) Vernier bevel protector and (ii) Sine bar.	**07**
Q.3	**(a)**	Calculate the angle of taper and minimum diameter of internal taper from the following readings. Diameter of bigger ball = 10.25 mm. Diameter of smaller ball = 6.07 mm. Height of bigger ball form datum = 30.13 mm. Height of smaller ball from datum = 10.08 mm.	**03**
	(b)	Explain with neat sketch three wire method of measuring effective diameter of screw thread.	**04**
	(c)	Describe in brief the construction and working of SIGMA Mechanical comparator.	**07**
		OR	
Q.3	**(a)**	Calculate the chord length and its distance below the tooth tip for a gear of module 4 and 20 degree pressure angle.	**03**
	(b)	List the various elements to be checked for the accuracy of gear and describe any two.	**04**
	(c)	Explain pneumatic comparator and state the advantages and disadvantages.	**07**
Q.4	**(a)**	Explain the following terms used in surface finish. (i) Roughness (ii) Waviness (iii) Effective profile (iv) Centreline of profile and (v) Lay	**03**
	(b)	Explain Parkinson gear tester with a neat sketch.	**04**
	(c)	Name the various alignment tests to be performed on Lathe and describe any three in detail.	**07**
		OR	
Q.4	**(a)**	What are the desirable characteristics of a manometric fluid	**03**
	(b)	Explain briefly the following two gauges. Bourdon tube pressure gauge and diaphragm pressure gauge.	**04**
	(c)	Describe the principle and operation of piezoelectric transducer. Identify the input and output of the system.	**07**

Q.5 **(a)** What are thermisters? What are their advantages? **03**

(b) With the help of a neat sketch explain the construction and working of the following. (i) Tomlinson's surface meter (ii) Profilometer. **04**

(c) Explain the construction and working of a resistance thermometer and thermocouple with a neat sketch. **07**

OR

Q.5 **(a)** A Mcleod gauge has volume of bulb of measuring capillary equal to 110×10^{-6} m^3 and measuring capillary diameter of 1.1 mm. Calculate **03**

(i) The pressure indicated when the reading of the measuring capillary is 28 mm in case approximate formula is used.

(ii) What is the error if exact formula is used for pressure measurement?

(b) Compare the advantages of thermocouple and thermisters. **04**

(c) Explain in briefly the following with neat sketch **07**

(i) Prony brake dynamometer and (ii) Rope brake dynamometer.

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