Enrollment No: _____   Exam Seat No:_____

C.U.SHAH UNIVERSITY
Summer Examination-2017

Subject Name: Automotive Measurement

Subject Code: 4TE03AMR1   **Branch: B.Tech (Automobile)**

Semester: 3   **Date: 29/03/2017**   **Time: 10:30 To 1:30**   **Marks: 70**

Instructions:
- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

Q-1   **Attempt the following questions:**   **(14)**

a) Which of the following is not a type of direct measuring instrument?   **01**
   a. Micrometer
   b. Vernier caliper
   c. Divider
   d. All of the above

b) Match the following Group 1 items (Grades) with Group 2 items (application) and select   **01**
   the correct option

Group 1	Group 2
1. Grade I	A. high precision task
2. Grade II	B. comparators
3. Grade 00	C. inspection department
4. Calibration grade	D. production

   a. 1-A, 2-C, 3-D, 4-B
   b. 1-C, 2-D, 3-A, 4-B
   c. 1-B, 2-A, 3-C, 4-D
   d. 1-D, 2-B, 3-A, 4-C

c) Calculate the taper angle, if 8 mm and 12 mm are the diameters of A and B balls   **01**
   respectively. Ball A is at a height of 25 mm from the horizontal ground surface and B at 15
   mm.
   a. 14.47°
   b. 28.95°
   c. 7.23°
   d. None of the above

d) Which of the following can be used as thermal detector   **01**
   a. Thermistor
   b. Pyrometer
   c. Thermocouple
   d. Any of the above

e) The reliability of an instrument mean   **01**
   a. The life of the instrument
   b. The degree of repeatability within specified limits
   c. The time interval between two responses of the instrument
   d. None of these

f) A strain gauge should have a high value of gauge factor   **01**
   a. To reduce hysteresis effects
   b. To give a linear relation between applied strains and resistance change
   c. To increase sensitivity
   d. To reduce or eliminate the effect of variation in ambient temperature

g) The 'Wringing' is due to   **01**
   a. Atmospheric pressure
   b. Molecular attraction
   c. both 'a' and 'b'
   d. None of the above

h) The following is an internationally recognized and accepted unit system   **01**
   a. MKS
   b. FPS
   c. SI
   d. All of the above

i) The use of a dead weight tester is to   **01**
   a. Calibrate pressure measuring instruments
   b. Produce high pressure
   c. Measure the load accurately
   d. Test the magnitude of given weight

j) The smallest change in measured variable to which instrument will respond is   **01**
   a. Resolution
   b. Accuracy
   c. Precision
   d. Sensitivity

k) For a thermistor, its resistance   **01**
   a. Does not change with change in temperature
   b. Increases with decrease in temperature
   c. Decreases with decrease in temperature
   d. None of these

l) 'Dead zone' of an instrument is   **01**
   a. The largest change of input quantity for which there is no output of instrument
   b. Time required by instrument system to begin to respond to a change in measured
   c. The unmeasured quantity which is more than the maximum range of the instrument
   d. None of these

m) The least count of a Vernier caliper used in industries is generally   **01**
   a. 0.001 mm
   b. 1 mm
   c. 0.02 mm
   d. None of the above

n) In which of the following aspects Vernier calliper is superior to micrometer?   **01**
   a. It is easier and quicker to use

b. It is more accurate
c. It can be used to make both inside and outside measurements over a range of sizes
d. All of these

Attempt any four questions from Q-2 to Q-8

Q-2		**Attempt all questions**	**(14)**
	a)	Differentiate following terms:	**06**
		i. Threshold and resolution	
		ii. Hysteresis and dead Zone?	
	b)	Explain with neat sketch how sine bar is used to measure.	**08**
		i. Angle of component of small size	
		ii. Angle of component of large size.	
Q-3		**Attempt all questions**	**(14)**
	a)	State the difference between Sensors & Transducer	**05**
	b)	Explain Pitot static tube	**05**
	c)	Define the terms.	**04**
		1. Absolute pressure 2. Gauge pressure	
		3. Total Pressure 4. Atmospheric pressure	
Q-4		**Attempt all questions**	**(14)**
	a)	Explain working principle of Bourdon tube pressure gauge with neat sketch	**07**
	b)	Define Pyrometer & Explain Total radiation pyrometer with neat sketch	**07**
Q-5		**Attempt all questions**	**(14)**
	a)	State the various methods for Hardness test & Explain Rockwell Hardness test in detail.	**07**
	b)	Draw neat sketch Dial Type Vernier caliper & Explain how to calculate least count of standard Vernier caliper	**07**
Q-6		**Attempt all questions**	**(14)**
	a)	Explain the working principle of Dead weight pressure gauge tester with neat sketch	**07**
	b)	State the various causes of vibration in detail	**04**
	c)	State the desirable properties of liquid used in glass thermometer	**03**
Q-7		**Attempt all questions**	**(14)**
	a)	Explain the working principle of Vernier clinometer with neat sketch and State its application in industries	**08**
	b)	Build the following dimension using M-87 Slip gauge set.	**06**
		1. 49.3825 mm 2. 87.3215 mm 3. 29.758 mm	

M-87 set of slip gauges:

Range (mm)	Steps (mm)	No. of pieces
1.001 to 1.009	0.001	9
1.01 to 1.49	0.01	49
0.5 to 9.5	0.5	19
10 to 90	10	9
1.0005	---	1
	Total	87

Q-8   **Attempt all questions**   (14)

a) Describe with sketch the construction and working of an RTD. Give advantage and   07
disadvantage of RTD.

b) State the difference between Line standard & End standard   04

c) State the difference between Precision & Accuracy   03