

GUJARAT TECHNOLOGICAL UNIVERSITY**ME- SEMESTER II- EXAMINATION – SUMMER 2015****Subject Code: 2721108****Date: 26/05/2015****Subject Name: Experimental Techniques and Instrumentations in Automobile Engineering****Time: 2:30 PM – 5:00 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)** Differentiate between accuracy and precision in measurements with examples. **07**
Discuss briefly on the errors associated in the definitions of the above terms.
- (b)** Define: 1) Sensitivity, 2) Reproducibility, 3) Drift, 4) Static error, 5) Dead Zone, **07**
6) Hysteresis and 7) Threshold.

- Q.2 (a)** Differentiate between Primary, Secondary and Tertiary types of measurements. Cite **07**
suitable examples for each case.
- (b)** Describe the difference between deflection and null type of instruments giving **07**
suitable examples. Discuss about their accuracy, sensitivity and suitability for
dynamic measurements.

OR

- (b)** The Nusselt number based on the diameter of a tube for a fluid is expressed by the **07**
expression: $Nu = 0.023 Re^{0.8} Pr^{0.4}$ where, Re is Reynolds number defined as
 $Re = Vd/\nu$ and Pr is the Prandtl number. In an experiment, the following readings
were obtained for velocity (m/s) $V = 14 \pm 0.5\%$, diameter (m), $d = 0.05 \pm 1\%$, kinematic
viscosity of oil (m^2/s), $\nu = 15.4 \times 10^{-6} \pm 5\%$ and Prandtl number, $Pr = 2.18 \pm 10\%$.
Compute the Nusselt number and the uncertainty.

- Q.3 (a)** Discuss in brief active and passive transducers. **07**
- (b)** Derive an expression for gauge factor of a resistance strain gauge. **07**

OR

- Q.3 (a)** Discuss Brake actuation warning system. **07**
- (b)** Discuss in brief on FFT analyzer. **07**

- Q.4 (a)** Draw the block diagram of a general purpose CRO and explain the functions of the **07**
following controls,
(i) Intensity (ii) Focus (iii) Horizontal and vertical positioning (iv) Synchronization
- (b)** Describe the working of universal time counter with help of a block diagram. **07**

OR

- Q.4 (a)** Explain data acquisition systems with appropriate example. **07**
- (b)** Write a brief note on I.S Code for Engine testing and an Instrumentation used for **07**
performance testing of engine.

- Q.5 (a)** Discuss in details engine over heat warning system. **07**
- (b)** Write a brief note on I.S Code for Engine testing. **07**

OR

- Q.5 (a)** Discuss in brief electronic instruments and dash board illumination used for **07**
automotive vehicles.
- (b)** Write a short note on (i) Endurance Tests, (ii) crash tests of automotive vehicles. **07**
