QP Code : 1649

(3 Hours) [Total Marks : 100]

N.B. : (1) Question No. **1** is **compulsory**.
      (2) **All** questions carry **equal** marks.
      (3) Attempt any **four** questions out of remaining six questions.
      (4) **Figure** on the **right** hand side indicate **full** marks.
      (5) Assume **suitable data** if **necessary**.

1. (a) Explain the merits and demerits of LVDT.   20
   (b) Compare Accuracy and Precision.
   (c) Explain the working of gear tooth Vernier caliper.
   (d) Describe a Torque sensor with a neat sketch.
   (e) What are pneumatic comparators and their advantages over electricalcomparators ?

2. (a) Explain with a block diagram a generalized measurement system.   10
   (b) List different types of temperature sensors and describe thermocouple and RTD   10
      in details.

3. (a) List different types of vacuum gauges and explain with sketch any **one** in detail.   10
   (b) Explain CLA and RMS methods of measurement of surface roughness. Explain.   10
      Tomlinson surface meter in details.

4. (a) List different types of strain gauges and explain procedure for its mounting.   10
   (b) Describe the procedure for calibration of pressure sensor with a neat sketch.   10

5. (a) Explain in details different temperature compensation techniques with neat sketches.   10
   (b) Explain in details different types of errors in measurement system.   10

6. (a) List different types of angular velocity measuring devices and explain with sketch   10
      any **one** in detail.
   (b) The output power ofa rotating shaft is measured by a dynamometer. The relationship   10
      of output power P is given by equation $P = 2\pi \times 9.81 \times FLR/t \times 10^6$ kw
      Where   F = Force at the end of Arm = 4.58 ± 0.02 Kg
              L = length of torque arm = 397 ± 1.3 mm
              R = Number of revolution during time 't' = 1202 ± 1 revs
              t = time for test = 60 ± 0.5 sec
      The error is limited (i.e. absolute error and probable error). Calculate the magnitude
      of power and error in computed power.

7. Explain the following with neat sketch. (any **four**) :—   20
      (a) Dividing head   (d) Torque sensor
      (b) Nozzle Flapper transducer   (e) Wringing of slip gauges
      (c) line standards and end standards

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