when an orifice of 60mm is used in the same pipe. The discharge coefficient of orifice is 0.6.

5. a) Explain working of liquid-in-gas thermometer.

   b) What is RTD, thermistors and pyrometers?

   c) Give compression between thermistors and metal resistors.

   d) Explain working of following with neat sketch:

      i) Semiconductor and sensors

      ii) Dewpoint measurement device

      iii) Humidity measurement device.

OR

Explain with a neat diagram the construction and working of pyromometer.

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Total No. of Questions : 5] *[Total No. of Printed Pages : 4*

EI - 405

B.E. IV Semester

Examination, December 2015

Mechanical Measurements

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each questions are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

1. a) What is strain gauge and differential transformer?

   b) Define potentiometer and induction potentiometer.

   c) Differentiate between the sensor and transducer. Define digital displacement transducer, active and passive transducer.

   d) Write short note on followings:

      i) Photoelastic

      ii) Holographic technique

      iii) Types of Tachometer

OR

The following data relate to strain gauge: load cell arranged with four identical strain gauge.

Diameter of steel cylinder = 60 mm

Nominal resistance of each gauge = 120 Ω

Gauge factor = 2

Supply voltage(V) = 6V

Modulus of elasticity for steel = 200GN/m^2

Poission ratio = 0.3

Calculate the sensitivity of the load cell.

a) What is Gyroscopic force transducer?

b) How torque can be measured with the help of measuring tool?

c) Define with neat sketch basic principle of dynamometer.

d) The following data were recorded with rope brake dynamometer in a laboratory experiment.

Diameter of the brake wheel = 1.44m

Diameter of the rope = 15mm

Speed of the engine = 240rpm

Dead load on the brake = 720N

Spring balance reading = 180N

Calculate the brake power of the engine.

OR

Write short note on:

i) Hydraulic dynamometer

ii) Eddy current dynamometer

iii) Belt transmission dynamometer

a) What are the methods of measurement of pressure and sound?

b) Define Bourdon tube, Bellow and diaphragms.

c) What is Piezoelectric resistance and electric resistance?

d) Explain the measurement gauges for low pressure measurement, with neat diagram, construction and working.

OR

A Mc lead gauge has volume of bulb and measuring capillary equal to 110×10^{-6}m^3 and measuring capillary diameter of 1.1mm.

i) Calculate the pressure indicated when the reading of the measuring capillary is 28mm.

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

4. a) What is pitot tube?

b) Write about flow measurement.

c) What are different factors which influence the choice of method used for flow measurement.

d) Explain followings:

i) Purge method

ii) Buoyancy method

iii) Visual level indicator

iv) Flow visualization

OR

A venturi tube of throat diametric 60mm has a discharge coefficient of 0.97 and with a flow rate of 1.2 m^3/sec. The pressure differential is 15.5 N/m^2. Determine the flow rate