



UH-6269

B. E. - II (Sem. - III) Examination

May/June - 2012

Mechanical Measurements

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

नीचे दृशावेव निशानीवाणी विगतो उत्तरवाडी पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. E - II (Sem. - III)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="Mechanical Measurements"/>	<input type="text"/>
Subject Code No. : <input type="text" value="6"/> <input type="text" value="2"/> <input type="text" value="6"/> <input type="text" value="9"/>	<input type="text"/>
Section No. (1, 2,.....) : <input type="text" value="Nil"/>	<input type="text"/>
	Student's Signature

- (2) Attempt all questions.
(3) Assume suitable data if required.
(4) Figures to the right indicate full marks for the question.

- 1 (a) Answer the following questions : 10
- (i) Distinguish between digital and analog signals.
(ii) Distinguish between threshold and resolution.
(iii) Define range and span.
(iv) Explain dead time and dead zone related to dynamic characteristics.
(v) Define standard deviation and probable error.
- (b) Explain Bourdon tube pressure gauge. 5
(c) Explain U tube double column manometer. 5
- 2 (a) (i) Explain pitot tube and derive equation of velocity for the same. 5
(ii) Ionization gauge for vacuum pressure measurement. 5
(b) Explain optical pyrometer. 5

OR

- 2 (a) Explain vane type anemometer. 5
(b) Radiation pyrometer. 5
(c) Laws of thermocouple. 5

- 3 Attempt any **three** : 15
- (i) Bellow gauge.
 - (ii) Flow nozzle.
 - (iii) Liquid in glass thermometers.
 - (iv) Hot wire anemometer.
- 4 (a) Answer the following : 10
- (i) The gauge factor of a resistance guage depends upon
 - (a) The guage material
 - (b) The configuration of gauge wire
 - (c) The mechanical loading
 - (d) All of the above.
 - (ii) In a Saybolt viscometer, the viscosity can be measured by measuring the time to fill a flask with liquid volume equal to
 - (a) 50 ml
 - (b) 200 ml
 - (c) 60 ml
 - (d) 10 ml
 - (iii) Following is a grid material for electrical resistance strain guage
 - (a) Copper
 - (b) Nichrome
 - (c) Cobalt
 - (d) Iron
 - (iv) The stroboscopic method of speed measurement has the advantage that
 - (a) The method is simple
 - (b) Multiples of angular speed can be measured
 - (c) Physical contact between the instrument and rotating shaft is not required
 - (d) A stationary image can be observed
 - (v) Piezoelectric type of load cells can be used for measurement of
 - (a) Dynamic forces only
 - (b) Dynamic forces and static forces provided that load cell has small time constant
 - (c) Dynamic forces and static forces provided that load cell has large time constant
 - (d) None of the above
 - (vi) Proving ring is used to measure
 - (a) Force
 - (b) Vibration
 - (c) Velocity
 - (d) None of the above
 - (vii) While measuring pure torsion, the strain gauges are bonded to the shaft
 - (a) In the direction of applied torque
 - (b) Longitudinally along the axis of shaft
 - (c) Transversely to the shaft axis
 - (d) At 45^0 to the axis of rotation.

- (viii) Which of the following units are employed where it is not possible to have a physical contact with the system whose temp. is to be measured.
- Thermocouples
 - Resistance thermometer
 - Radiation pyrometers
 - Any of these.
- (ix) Stroboscope can measure frequency of object having
- Rotary motion
 - Reciprocating motion
 - Linear motion
 - Both (a) and (b)
- (x) Rotameter is used to measure
- Rotational speed of shaft
 - Kinetic energy of bodies in motion
 - Flow of liquids
 - Twist produced in shaft due to torque.
- (b) Write short notes : 10
- Stroboscope
 - Gas Sampling Technique.
- 5 (a) Derive necessary expression for determination of gauge factor of strain gauge. 5
- (b) Explain rope brake dynamometer with neat sketch. 5
- OR**
- (b) A strain gauge is bonded to a beam 0.1m long having cross-sectional area of 4 cm^2 The Young's Modulus for steel = 207 GN/m^2 , Strain gauge has an unstrained resistance of 240Ω & gauge factor = 2.2 when load is applied, resistance of gauge changes by 0.013Ω . Calculate change in length of beam and amount of force. 5
- (c) Explain construction and working of a Ballast Circuit. 5
- OR**
- (c) Explain piezoelectric accelerometer. 5
- 6 Attempt any **three** : 15
- Prony brake dynamometer.
 - Measurement of CO_2 .
 - Tachometer.
 - Thermal conductivity measurement.
 - Orsat apparatus.