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Question Paper Code : 53444

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fifth Semester

Electronics and Instrumentation Engineering

EI 1301/070300018 – INDUSTRIAL INSTRUMENTATION – I

(Common to Instrumentation and Control Engineering)

(Regulations 2004/2007)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Why are dummy gauges used ? In what way they affect the output of a strain gauge bridge ?
2. What is the function of Rosettes ?
3. Define gauge factor.
4. What is LVDT ?
5. Name the pressure gauges used to measure Vacuum pressure.
6. Write the expression for pressure in friction gauge.
7. Give different types of filled in system thermometer.
8. What are the metals used for constructing resistance thermometer and write their temperature ranges ?
9. State thermoelectric laws.
10. List two desirable characteristics for thermocouple material.

PART – B (5 × 16 = 80 Marks)

11. (a) Explain the following methods of measurement of torque :
- (i) Digital methods (8)
 - (ii) Magnetostrictive methods. (8)
- OR**
- (b) (i) Explain the construction and working of drag cup type tachogenerator. (8)
- (ii) Describe the functioning of a stroboscope. (8)
12. (a) How is seismic instrument used as an accelerometer and vibrometer ? Explain in detail.
- OR**
- (b) Explain the construction and working of the following :
- (i) Ultrasonic densitometer. (8)
 - (ii) Saybolt viscometer. (8)
13. (a) (i) How a dead weight tester is used to calibrate pressure measuring devices ? (8)
- (ii) Explain the bellows arrangement used to measure differential pressure. (8)
- OR**
- (b) Explain the operation of pirani-gauge and thermocouple type conductivity gauge. List their merits and limitations. (16)
14. (a) (i) Discuss the errors and compensation in filled system thermometers. (10)
- (ii) A liquid filled thermometer has a bulb volume 8 times that of the capillary plus bourdon tube. Estimate the error due to increase in ambient temperature of 16 °C from the temperature at calibration. (6)
- OR**
- (b) Design a signal conditioning circuit for RTD to obtain (4-20) mA current output for input temperature ranges from 40 to 100°C. (16)
15. (a) With neat sketches describe the construction and principle of operation of selective and two colour ratio pyrometers used for measurement of high temperature. (16)
- OR**
- (b) (i) Mention the laws of thermocouple. (4)
- (ii) Explain the following :
- (1) Thermowell (4)
 - (2) Thermopile (4)
 - (3) Dynamic Response of thermocouple (4)