

6E6063

Roll No. _____

Total No of Pages: 3

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B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electronic Instrumentation and Control Engineering
6EI3A Industrial Measurements

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks (Main & Back): 26

Instructions to Candidates:- rtuonline.com

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

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UNIT-I

Q.1 (a) Describe the theory and working of thermocouples. Discuss the different types of compensations used and methods of measurement of their output voltage. [5+7=12]

(b) What is an x-y recorder? How do you distinguish it from a x-t or a y-t recorder? [4]

OR

Q.1 (a) Explain 2-wire and 3-wire RTD scheme for temperature measurement. [8]

(b) Describe the basic components of a magnetic tape recorder for instrumentation applications using direct recording techniques. [8]

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UNIT-II

- Q.2 (a) What is meant by thermal conductivity gauges? Explain the working of Pirani vacuum gauge with suitable sketches. [2+6=8]
- (b) Explain how dead weight tester is used for the calibration of pressure measuring equipments. [8]

OR

- Q.2 (a) Explain the following: [4+4=8]
- (i) Working principle of capacitive type pressure transducers.
- (ii) Working principle of piezoelectric pressure transducers.
- (b) Explain the working principle of McLeod gauge. Mention its advantages and disadvantages. [6+2=8]

UNIT-III

- Q.3 (a) Differentiate between the 'Rate meters' and 'Quantity meters.' Explain with examples for each. [4+4=8]
- (b) Explain the working principle of turbine flow meters. Discuss its merits, demerits and applications. [6+2=8]

OR

- Q.3 (a) Derive an expression for flow rate in the venturimeter. Assume appropriate parameters. [8]
- (b) Explain the following - [4+4=8]
- (i) Working of vortex flow meters.
- (ii) Shunt flow meters.

UNIT-IV

- Q.4 (a) Discuss the scheme of level measurement using hydrostatic pressure devices in open vessels and closed vessels. [8]
- (b) Explain the working of ultrasonic densitometer with a suitable diagram. [8]

OR

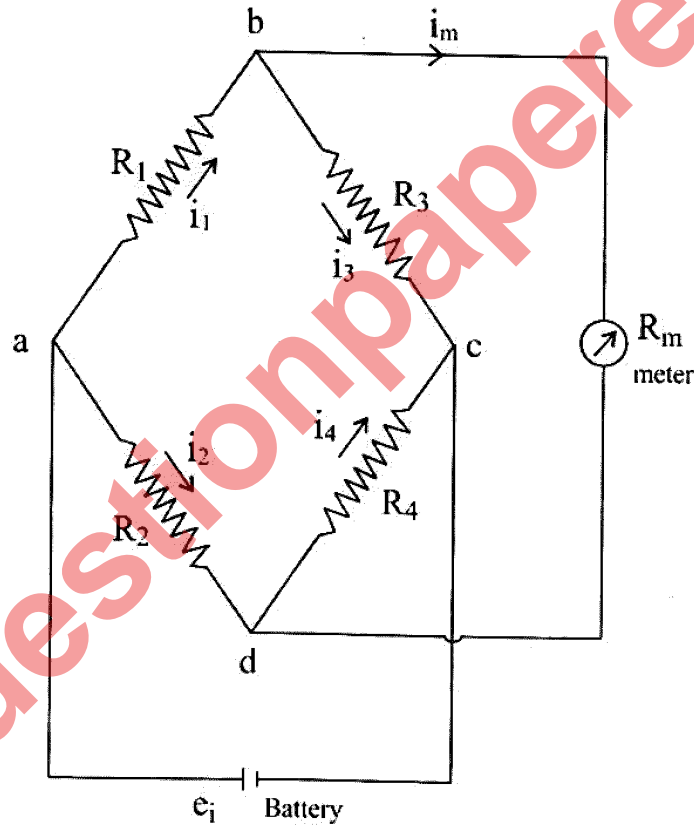
- Q.4 (a) Differentiate between working principle of gamma ray liquid level gauge and ultrasonic liquid level gauge with neat sketches. [8]
- (b) Explain the impulse wheel method of density measurements. Mention its merits and demerits. [6+2=8]

UNIT-V

Q.5 Describe the different methods used for compensation and cancellation the effects of temperature changes which affect the resistance element used in strain gauge bridge. Assume that all four arms of the strain gauge have the same value of resistance. [16]

OR

Q.5 (a) A Wheatstone bridge is shown below with $R_3 = R_4 = 100\Omega$. The galvanometer resistance is 50Ω . The strain gauge is connected in arm 1 and has an unstrained resistance of 120Ω . The value of R_2 is adjusted for balance under zero strain conditions. The gauge factor is 2. Calculate the galvanometer current when a strain of $400\mu\text{m/m}$ is applied. Take the battery voltage as 4V . [8]



(b) What is meant by Rosette gauges? Discuss its applications.

[3+5=8]