B.E.(with Credits)-Regular-Semester 2012- Electronics Engineering / Electronics & Telecommunication Engineering / Communication Engineering Sem III

EN / ET 305 : Electronic Measurements & Instrumentation

P. Pages : 2 **GUG/W/16/3742**

Time : Three Hours * 3 6 1 2 * Max. Marks : 80

Notes : 1. All questions carry equal marks as indicated.
2. Due credit will be given to neatness and adequate dimensions.
3. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Explain the various types of errors in measurements? **8**

b) The following 10 observations were recorded when measuring a voltage: 41.7 : 42.0 ; 41.8, 42.0, 42.1, 41.9, 42.0; 41.9, 42.5 and 41.8 volt. Find **8**
i) The mean
ii) The standard deviation
iii) The probable error of one reading
iv) The probable error of mean and
v) Range

OR

2. a) Explain Dual-Slope Integrating-type DVM with neat sketch. **8**

b) With the help of a functional block diagram, describe the principle of operation of a digital multimeter. **8**

3. a) Explain the principle of working of a Kelvin's double bridge for measurement of unknown low resistances. Explain how the effects of contact resistance and resistance of leads are eliminated. **8**

b) Explain the working principle of a Crompton dc potentiometer with a suitable diagram. **4**

c) Write down the procedure of standardisation of a dc potentiometer. **4**

OR

4. a) Describe the working of Hay's bridge for measurement of inductance. Explain how this bridge is suitable for measurement of high q chokes? **8**

b) An ac bridge is configured as follows: **8**
Arm AB : A resistance of 600 Ω in parallel with a capacitance of 0.3μF
Arm BC : An unknown non-inductive resistance
Arm CD : A non inductive resistance of 1000 Ω.
Arm DA : A resistance of 400 Ω in series with a capacitance of 0.1 μF
If a supply is given between terminals A and C and the detector is connected between nodes B and D find the resistance required in the arm BC and also the supply frequency for the bridge to be balanced.

5. a) Define the following terms: **8**

i) Active and passive transducers.

ii) Primary and secondary transducers.

b) Explain generalised instrumentation systems? **8**

OR

6. a) Explain in detail static and dynamic characteristics of transducers. **8**

b) Explain working principle of RVDT. Discuss advantages and disadvantages. **8**

7. a) Write short note on: **8**

i) Optical pyrometer.

ii) Resistance temperature detector.

b) Explain the method of caliberation of strain gauges? **8**

OR

8. a) Explain the principle of working, constructional details and applications' of photo-diodes. Draw the characteristics. **8**

b) Explain with diagram the bounded and unbounded type of strain gauges. **8**

9. a) Describe the following terms in signal conditioning. **8**

i) Shielding technique.

ii) Protocols.

b) Describe the circuit diagrams of OPAMP and derive the expression for output voltage of differential amplifier. **8**

OR

10. a) Describe operational amplifier characteristics with example? **8**

b) Explain principle of operation of IEEE 4888 bus and I2C bus? **8**

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