

GANPAT UNIVERSITY

B.Tech Semester V Electronics & Communication Engineering
CBCS Regular Examination Nov-Dec 2015

2EC506 Electronic Measurement Techniques

Max. Time: 3 Hrs.]

[Max. Marks: 70

Instructions:

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

- Que-1** (A) Design a multi-range ammeter with ranges of 0-5mA, 0-20mA, 0-30mA, 0-50mA employing individual shunt for each range. A D'Arsonval movement with an internal resistance of 350Ω and full scale current of $80\mu A$ is available. 6
- (B) Explain following types of static errors in detail 6
1. Gross errors 2. Systematic errors 3. Random errors

OR

- Que-1** (A) Design an Ayrton shunt to provide an ammeter current with current ranges of 0-1mA, 0-5mA, 0-20mA and 0-50mA. Using D'Arsonval movement having internal resistance of 50Ω and full scale current of $100\mu A$. 6
- (B) A set of independent voltage measurements taken by five observers was recorded as 107.02V, 107.11V, 107.08V, 107.10V and 107.03V. Calculate (a) arithmetic mean; (b) the deviation from the mean; (c) Standard deviation. 6
- Que-2** (A) Explain with example how sensitivity of null detector affects the measurement in Wheatstone bridge. 6
- (B) Justify following statement with help of suitable example. 5
- "Precision is a necessary but not sufficient condition for accuracy."

OR

- Que-2** (A) Which ac bridge is convenient for measuring high-Q coils? Derive expression of L_X and R_X for the same bridge. 6
- (B) State the difference between analog indicator and digital indicator. Discuss with neat diagram, a method of realizing a 7-segment numeric display using LEDs. 5
- Que-3** (A) Enlist commonly used displays in the digital electronic field and explain working principle of Electrophoretic Image Display (EPID). 4
- (B) A moving coil instrument has the following data: 4
- Number of turns=100 Width of the coil=25mm
 Depth of the coil=25mm Flux density in the gap= 0.1 wb/m^2
 Calculate the deflection torque when carrying a current of 20mA. Also calculate the deflection if the control spring constant is $2 \times 10^{-6} \text{ N.m/degree}$.
- (C) Explain tuned circuit harmonic distortion analyzer. 4

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SECTION-II

- Que-4 (A) Draw a block diagram of general purpose oscilloscope. Define term Deflection Sensitivity of CRO. A CRO with sensitivity of 4cm/V is used. An ac voltage is applied to the y-input. An 8cm long straight line is observed on screen. Determine the ac voltage. 6
- (B) How much voltage is required across two deflection plates separated by 1.5cm to deflect an electron beam at 2° if the effective length of the deflection plates is 3cm and the accelerating potential is 1200V ? 6

OR

- Que-4 (A) Draw block diagram of vertical section of oscilloscope. Explain different types of attenuator circuits used in vertical section of oscilloscope. 6
- (B) Prove that the path of electron travelling through an electric field of a constant intensity and entering the field at right angles to the lines of flux is parabolic. 6
- Que-5 (A) Explain working principle of photo conductive and photovoltaic transducer. 6
- (B) Draw the cross section of cathode ray tube. And explain how the electron beam is focused to a fine spot on the face of the cathode ray tube? 5

OR

- Que-5 (A) What is the roll of A to D converter and D to A converter in electronic measurement system? Describe the operation of successive approximation type A to D converter. 6
- (B) List different types of temperature transducers and explain working principle of thermistor. 5
- Que-6 (A) Draw block diagram of single channel DAS and multi channel DAS. 4
- (B) What is piezoelectricity? Write a short note on piezoelectric transducer. 4
- (C) In what way is the voltage follower is special case of non inverting amplifier? Explain. 4

=====END OF PAPER=====