

GANPAT UNIVERSITY

B.Tech Semester V Electronics & Communication Engineering
CBCS Regular Examination November 2014
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) Describe all statistical analysis to remove random error with example. 6
 (B) Give the basic principles of a D'Arsonval movement. Write a short note on PMMC movement. 6
- OR**
- (A) What are the advantages of LED Display over LCD display? Explain working of segmented displays using LEDs. 6
 (B) A set of independent current measurements was taken by six observers and recorded as 12.8mA, 12.2mA, 12.5mA, 13.1mA, 12.9mA and 12.4mA. Calculate (a) arithmetic mean; (b) standard deviation. 6
- Que-2** (A) Draw block diagram of vertical section of CRO. And explain vertical deflection system in brief. 6
 (B) Explain basic operation of Wheatstone bridge with its measurement errors. 5
- OR**
- (A) Explain horizontal deflection system in brief. 6
 (B) Find the series equivalent inductance (L_x) and resistance (R_x) of network that causes an opposite angle to null the bridge with following specification. 5
 $\omega = 300\text{rad/s}$, $R_1=22\text{k}\Omega$, $C_1=0.01\mu\text{F}$, $R_2=5.1\text{k}\Omega$ and $R_3=100\text{k}\Omega$.
- Que-3** (A) Justify following statements: 4
 1. "Systematic errors should be small compared to random errors."
 2. "Precision is a necessary but not sufficient condition for accuracy."
 (B) Find minimum distance L, that will allow full deflection of 4cm at the oscilloscope screen with a deflection factor of 100V/cm and with an acceleration potential of 2000V? 4
 (C) Explain working of Electrophoretic image display. 4

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SECTION-II

- Que-4 (A) List down factors influencing the choice of transducers. Explain working principle of thermocouple in brief with one application. 6
- (B) Draw different types of gage configuration of strain gauge and derive expression for the gage factor K in terms of Poisson's ratio. 6
- OR**
- (A) A resistance strain gage with gage factor of 2.5 is mounted on a steel beam whose modulus of elasticity is $2 \times 10^6 \text{ kg/cm}^2$. The strain gage has an unstrained resistance of 320Ω which increase to 320.2Ω when the beam is subjected to a stress. Calculate the stress at the point where the strain gage is mounted. 6
- (B) Which are the different types of photo electric transducers? Describe photoconductive and photovoltaic transducers with one application of each. 6
- Que-5 (A) State the important features of instrumentation amplifier. Explain instrumentation amplifier and derive expression for voltage gain. 6
- (B) Draw and explain the block diagram of spectrum analyzer. 5
- OR**
- (A) Explain different types of harmonic distortion analyzers based on fundamental suppression techniques. 6
- (B) What is the purpose of ADC in DAS? Explain working of flash type ADC. 5
- Que-6 (A) What are the advantages of differential amplifier over single ended amplifier? Derive expression of gain for two opamp differential amplifier. 4
- (B) Explain working principle of piezoelectric transducer with neat diagram. 4
- (C) List down objectives of a Data Acquisition system. 4

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