

Student Exam No: \_\_\_\_\_

**GANPAT UNIVERSITY**

**B.TECH SEM. V<sup>th</sup> BIOMEDICAL & INSTRUMENTATION ENGINEERING**

**REGULAR EXAMINATION NOVEMBER-DECEMBER 2011**

**BME-503: ELECTRONIC MEASUREMENT SYSTEMS**

**TIME:-3 HOURS**

**TOTAL MARKS-70**

**INSTRUCTION:-**

1. All the questions are compulsory.
2. Answer to each section must be written in separate answer sheet.
3. Figure to the right indicate marks.
4. Assume suitable data and draw figure wherever necessary.
5. Conventional terms / notations are used

**Section-I**

- Que.-1** [12]
- (a) Write short note on EPID (electrophoretic image display). 6
  - (b) Explain the galvanometer type recorder. 6

**OR**

- Que.-1** [12]
- (a) Draw the structure of an LCD and explain its operation. What is the difference between reflective LCD and transmissive LCD? 6
  - (b) Explain the block diagram of the digital DAS. 6

- Que.-2** [11]
- (a) Write the short note on laser printer. 6
  - (b) State the difference between recorder and printer. 2
  - (c) What is the acceptance angle & numerical aperture of fiber with core index of refraction 1.58 & cladding index of refraction of 1.52? Also find the loss experienced in this fiber as the source fiber numerical aperture is 0.3. 3

**OR**

- Que.-2** [11]
- (a) Draw and explain the basic parts of magnetic tape recorder. 5
  - (b) How much current would be developed in PIN photodiode with quantum efficiency of 82%, which is illuminated with  $75\mu\text{W}$  of  $1300\text{nm}$  photons.  $[h = 6.63 \times 10^{-34}, q = 1.6 \times 10^{-19}\text{C}, c = 3 \times 10^8\text{m/s}]$  3
  - (c) Enlist the advantages of Nixie tube. 3

- Que.-3** [12]
- Answer the following questions(Any Two)**
- (a) Draw and explain the optical time domain reflectometer.
  - (b) Write the short note on Digital to Analog multiplexing.
  - (c) Explain with neat diagram non contact type shaft encoder.



## Section-II

Que.-4

- (a) Explain the working of staircase type DVM in detail. State its advantages and disadvantages. [12]  
5
- (b) State important features of cathode ray tube and explain each in detail. 3
- (c) Draw AC voltmeter using full wave rectifier. Prove that in this voltmeter the pointer will deflect to 90% of its full scale when 10 V rms sinusoidal voltage is applied as input. 3
- (d) Define: persistence and measurement 1

OR

Que.-4

- (a) Derive the equation for deflection D on the CRT screen. Also write equation for deflection sensitivity and deflection factor. [12]  
5
- (b) Describe variable persistence oscilloscope with figure. Give its application. 4
- (c) Discuss the probability of error. Draw Gaussian curve and show the region of probable error in the curve. 3

Que.-5

- (a) What is limiting error? A Voltmeter having 150 V scale is having the accuracy of  $\pm 1.5\%$ . Calculate the limiting errors when this instrument is used to measure voltage across two different resistor showing 100 V and 80 V reading respectively. Compare and discuss both the results. [11]  
5
- (b) Describe the sweep generator required for generating horizontal deflection on CRT screen. Draw the related waveforms. 3
- (c) Explain the sampling oscilloscope with block-diagram and waveforms. 3

OR

Que.-5

- (a) Discuss in detail the factors causing error in Q-meter? Calculate the inductance value (L), if the self capacitance of coil is given 20 pF and the capacitance value is 500 pF at the resonant frequency of 1 MHz. [11]  
6
- (b) Explain principle of secondary emission in Analog storage oscilloscope. 3
- (c) What is burning of CRT screen? State factors causing burning and how it can be avoided. 2

Que.-6

**Write short note on (Any three)**

- (a) Spectrum analyser
- (b) Period measurement
- (c) RF power and voltage measurement
- (d) Amplified D.C. voltmeter using rectifier

[12]

END OF PAPER