

**GANPAT UNIVERSITY****B. Tech. Semester V<sup>th</sup> Biomedical and Instrumentation Engineering****Regular Examination NOV-DEC 2014****2BM502: ELECTRONICS MEASUREMENT AND INSTRUMENTATION****Time: 3 Hours****Total Marks: 70****Instructions:**

1. Answer to the each sections must be written in separate answer books.
2. Figure to the right indicate marks.
3. Conventional terms / notations are used.
4. All the questions are compulsory.

**Section - I**

Que. - 1

- |     |   |   |
|-----|---|---|
| (a) | Derive equation for deflection factor G and sensitivity for deflection system of CRO. | 6 |
| (b) | Explain designing of a multirange voltmeters?   | 6 |

**OR**

Que. - 1 Answer the Following questions (any six)

12

- i Mention the basic requirements of measurement?
- ii Give the applications of measurement systems.
- iii Explain the calibration procedure.
- iv How the range of instrument can be extended in PMMC instruments?
- v List any four characteristics of measuring system.
- vi Define vertical and horizontal amplifier.
- vii What are the advantages of electronic voltmeter?

Que. - 2

- |     |  |   |
|-----|--|---|
| (a) | Explain the operation and working of D'Arsonval meter. | 6 |
| (b) | How measurements done using the CRO?                   | 5 |

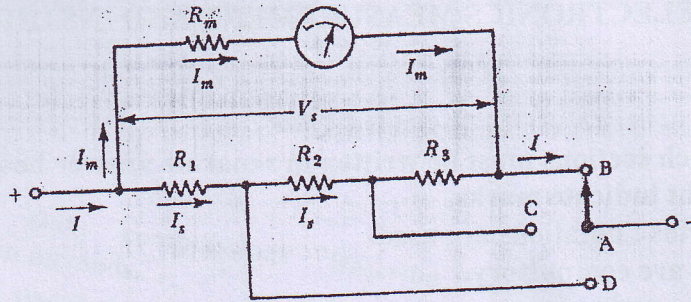
**OR**

Que. - 2

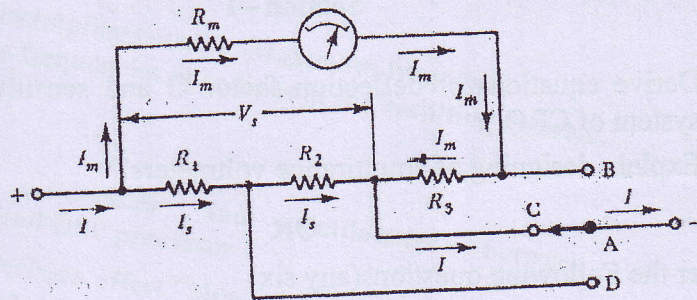
- |     |  |   |
|-----|--|---|
| (a) | Explain Galvanometer in detail.                                  | 6 |
| (b) | Explain in detail measurement of phase using lissajous patterns. | 5 |

Que. - 3

- (a) A PMMC instrument has a three-resistor Ayrton shunt connected across it to make an ammeter as shown in below figure. The resistance values are  $R_1 = 0.05\Omega$ ,  $R_2 = 0.45\Omega$  and  $R_3 = 4.5\Omega$ . The meter has  $R_m = 1k\Omega$  and  $FSD = 50\mu A$ . Calculate the three ranges of the ammeter. 6



(a)  $(R_1 + R_2 + R_3)$  in parallel with  $R_m$



(b)  $(R_1 + R_2)$  in parallel with  $(R_m + R_3)$

- (b) A PMMC instrument has  $FSD = 100\mu A$  and a coil resistance of  $1k\Omega$ . Calculate the required shunt resistance value to convert the instrument into an ammeter with (a)  $FSD = 100mA$  and (b)  $FSD = 1A$  6

### Section - II

Que. - 4

- (a) Write short note on hierarchical FDM. 6  
 (b) Write short note on Q meter. 6

OR

Que. - 4

- (a) Write short note on square wave generator 6  
 (b) Draw and explain basic block diagram of CRO. 6

Que. - 5

- (a) Write short note on wheatstone bridge. 6  
 (b) Explain designing of AC voltmeter using half wave rectifier 5

OR

Que. - 5

- (a) What is TDM. Explain synchronous TDM in detail. 6  
 (b) Describe in detail types of A to D converters. 5

Que.-6 Answer the Following questions(any six)

12

- i List the basic types of C.R.O
- ii State the advantages of inverted R-2R ladder D/A converter.
- iii What is sampling oscilloscope?
- iv Define rise time and fall time of a pulse
- v What are the types of wave analyser?
- vi List the important features of instrumentation amplifier
- vii What are the objectives of DAS?

END OF PAPER