MASTER OF ELECTRICAL ENGINEERING 1ST YR 1ST SEMESTER EXAMINATION, 2018

SUBJECT: - ADVANCED INSTRUMENTATION TECHNIQUE

Time: Three hours   Full Marks: 100

Answer any five questions.

1. a) Explain the purpose of auto zeroing in DVM. Describe the working   10
       principle of a typical auto-zero circuit.
    b) Illustrate a scheme for measurement of magnitude and phase angle for an   10
       unknown impedance 'Z' in polar and Cartesian form.

2. a) Describe how waveform with variable frequency and variable magnitude   10
       can be generated in digital method with the help of ROM based look table
       technique.
    b) State the advantage of address accumulation technique. Also explain how   10
       this is suitable for controlling the resolution of digitally synthesized
       waveform generation.

3. a) What the limitations of conventional AC Bridge? Hence justify the use of   6
       automatic AC Bridge.
    b) Outline a scheme for automatic AC Bridge.   8
    c) Explain how the bridge balance condition can be achieved by iterative   6
       algorithm.

4. a) Describe the working principle of Digitally Controlled Oscillator.   6
    b) Explain the working principle of Lag-Lead type DPLL showing timing   8
       diagram.
    c) Give an application of DPLL as frequency shift keying (FSK)   6
       demodulator.

5. a) State the basic purpose of IEEE-488 bus. Also explain how various smart   8
       devices or systems can be interconnected through this bus.
    b) Describe the functions of handshake and bus management signals with   7
       timing diagram.
    c) Outline a scheme for automatic test system using IEEE-488 bus.   5

6. a) Compare the advantages and disadvantages of serial and parallel bus for   10
       connecting smart instrumentation system, devices etc.
    b) Explain how several smart devices, connected among themselves through   10
       IEEE-488 (GPIB) bus work by supervision of handshake signals. Show
       the timing diagram.

7. a) There are for tasks as i) Alarm (LO/HI) scanning, ii) ADC operation   10
       using sampling method for two channels, iii) Generation of control signal

SUBJECT: - ADVANCED INSTRUMENTATION TECHNIQUE

Time: Three hours   Full Marks: 100

by digital computers and iv) Data logging operation (i.e. generation of print out) for reporting the values obtained from two analog channel analog. Illustrate a scheme by real time programming using priority diagram of tasks. Interrupted process etc.

b) Describe the method of inter processor communication with the help of different function elements and different methods.   10

8. a) Discuss the advantages and disadvantages of common I-O bus and Multiprocessor I-O bus.   6

b) A digital synthesizer generates sinusoidal waveform with 128 steps per cycle. It covers a frequency range of 1Hz to 1024 Hz in steps of 1Hz. Determine (i) The frequency of the clock and (ii) The word length of the phase accumulator.   8

c) What is meant by the priority of tasks? What is meant by polling of event/tasks?   6