Ref:- EX/M.SC/INST./II/I/301/42/2017

Master of Science (Instrumentation) Examination, 2017

2nd year, 1st Semester

SUBJECT :DATA ACQUISITION & INTERFACING

PAPER : XI (T-301)

Total Marks 100 time : 3 hr

Group A

Q1. Answer any four questions, each question carries 10 Marks

I. What is electrical noise. Describe the function of a lockin Amplifier with circuit diagram [2+8]

II. Mention at least 4 applications of PLL. How phase angle between two sinusoidal signal of same frequency can be detected by using analog multiplier [2+8]

III. Show that with it's all sections Phase Locked Loop is a second order system and also find out the expression for natural frequency of this second order system.[10]

a. a. What are the basic assumptions for electrical circuit analysis and why these assumptions are not workable so far as EMI is concerned?

b. What is ground loop in an electronic circuit, show with diagram.

c. Show with block diagram, single point grounding scheme of a hybrid circuit containing analog digital and power circuit. [4+2+4]

IV. a, A capacitor in the output low pass filter circuit of a AC to DC converter type power supply produces pulsating current. Explain this with circuit and showing nature of current in time domain.

b, How isolation transformer protects sensitive electronic circuit from transient surge voltages appearing in the mains input [6+4].

[Turn over

Group B

2. **Answer any five questions:**
   2x5=10

I. What is the difference between maskable and non-maskable interrupt?
II. What do you mean by sampling and anti-aliasing filter?
III. Write the difference between grounded and floating type signal source.
IV. What is the difference between single-ended and double ended signals?
V. What is the function of INT and INTA pin in 8259?
VI. Write down the functions of the two control signals in DMA transfer.
VII. What do you mean guard band?

3. **Answer any five questions:**

I. What is the use of the Sample and hold circuit? Discuss briefly about the different performance parameter of the S/H circuit. Write the purpose of sample and hold circuit. Discuss about the operating modes of sample and hold circuit.
1+5+2+2=10

II. What is multiplexing? What do you mean by multiplexer and de-multiplexer? Explain the working of Frequency Division Multiplexing with a proper diagram.
1+2+7=10

III. Distinguish between FDM and TDM. Explain the working of Time Division Multiplexing with a proper diagram. Distinguish between synchronous and asynchronous TDM.
2+6+2=10

IV. Draw the pin configuration of 8259 and explain the functions of each part with a suitable block diagram. Explain the sequence of events for 8259.
7+3=10

V. Write short-notes on the following: (any one)
   a) Mode control register for 8253 and different modes with suitable figure
   b) Modes of operation of 8279
10

VI. Explain the working of a 3-bit flash type ADC with suitable diagrams and mathematical expression. Discuss the advantages and disadvantages and mention few applications. **10**

VII. Explain the working of counter type ADC with suitable diagram and mathematical expression. Discuss the advantages and disadvantages. Compare the maximum conversion periods of an 8-bit digital ramp ADC and an 8-bit successive approximation ADC if both utilize a 1 MHz clock frequency. **8+2=10**

VIII. Explain the working of instrumentation amplifier with suitable mathematical expression. Discuss briefly about Data Acquisition System. **6+4=10**