TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Kartik

Exam.	Back		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Instrumentation II *(EX 602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) What is the rationale behind using a microprocessor in instrumentation systems? Describe two situations where an open-loop MBI system performs better than a closed-loop MBI system, illustrating your answer with block diagrams. [1+3]
   b) Describe the DMA active and idle cycles with appropriate figures. Provide at least five disadvantages of using DMA controllers. [2+2]
2. Draw the circuit diagram to interface 8255A PPI with 8085 microprocessor at base address B0H. Write an assembly program that determines the addition of contents of port A and port B and display the result in port C. Use appropriate control word to initialize the 8255A. [3+5]
3. a) Define bit rate and baud rate. Determine a character transmission rate using asynchronous serial data transfer method at baud rate 9600. Suppose a character has 7 bits data, one bit start bit, two bits stop bit and none parity. Calculate the time required to send a word: Engineer. [5]
   b) Describe the problems occur when you try to connect RS-232 devices that both are configured as DTE. How this problem can be resolved? [5]
4. What are the parameters to characterize ADCs? Design a circuit to interface ADC0808 with 8085 microprocessor using 8255A PPI. [2+6]
5. a) Draw the block diagram of a digital transmission system that can be used to transmit analog as well as digital data. Compare and contrast analog and digital transmission techniques with at least five distinguishing characteristics. [2+2]
   b) Design a data logging and storage system that is capable of receiving and storing signals from optical fibers, satellites and Bluetooth devices. Provide the block diagram of the overall system, which should show how messages get transmitted over the three transmission schemes and how the logger receives them. [4]
6. How ground loop can be prevented? Explain the Electromagnetic coupling. [6]
7. Explain ground bounce, decoupling and crosstalk in the context of circuit design. [6]
8. What are the factors that need to be considered while routing the signal traces in circuit layout. How do you avoid crosstalk while making layout of the circuit? [2+4]
9. What are the different phases of bugs in software development? Explain the different types of techniques used for software testing. [3+5]
10. Draw the complete block diagram of industrial process control system involved in your case study. Explain why you want to implement your control system over existing one in terms of cost, manpower and plant automation? What problems you might face after implementing this control system? What are the benefits of new system over old one? [12]

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