TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Bhadra

Exam.	Regular		
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) Define a microprocessor based instrumentation system. Differentiate between open loop and closed loop microprocessor based instrumentation. [1+4]
   b) Describe direct memory access. [3]
2. Design an interfacing circuit to set up bidirectional data communication in the master-slave format between two 8085A microcomputers. Use the 8255A as the interfacing between the master and the slave microcomputers. What will be the port addresses and control word. Write necessary program to transfer a block data from the master to the slave along with its flowchart diagram. [10]
3. a) Explain how communication takes place between PC (DB9 port) and printer (DB 25 port) using Null modern connection. [4]
   b) What are common USB packet field? Explain different USB packets. [3+3]
4. Interface a suitable DAC using 8255 PPI to an 8085 microprocessor to generate a square wave oscillating between 0V and 5V having a frequency of 1 KHz. Describe the interfacing circuit along with the necessary program. [8]
5. List the characteristics of Bluetooth. Explain the components of data logger with the help of block diagram. [2+6]
6. Describe any three mechanisms of noise coupling. Explain briefly on prevention of noise coupling. [3+3]
7. Write an importance of decoupling, ground bounce, cross talk and impendence matching in designing circuit. [6]
8. What are the different types of boards for electronics prototyping? List out each circuit boards characteristics. [2+4]
9. Explain about Embedded and Real Time Software used to run and control various modern instruments. As an instrumentation engineer, discuss the different approaches of coupling and cohesion technique to define tasks and design an integrated module. [6]
10. Case study is related to the basic measurement requirements, accuracy and specific hardware employed environmental conditions under which the instruments must operate, signal processing, transmission and output devices. Regarding your case study visit; draw a block diagram of the existing control system and mention the problems found in the existing system. You should also draw an interfacing diagram for solving the problem with discussing merits and demerits of your recommended system in terms of cost, manpower and plant automation. [12]

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