Exam.		Regular	
Level	BE	Full Marks	80
Programme	BEI	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Instrumentation (EX 504)

✓ 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 are the essential components of Data Acquisition System? Explain it with the help of a block diagram. [4]

   b) What are the reasons to prefer pneumatic systems over hydraulic and electrical system? [2]

2. Obtain the balanced equation of an ac bridge and explain with diagram how Schering bridge can be used to measure unknown capacitance. [8]

3. What do you mean by piezoelectric effect? What are the different types of piezoelectric materials? Explain piezoelectric sensors in detail. [8]

4. Explain the types of microprocessor –based instrumentation system. [4]

5. Interface a printer and a keyboard in mode 1. Port A is designed as output for printer with status check I/O and port B is designed as input for keyboard with interrupt I/O.

   a) Draw the mapping circuit in I/O mapped I/O. [2]
   b) What are the port addresses captured by the PPI card. [2]
   c) Generate required control words. [1]
   d) Write initializing instructions and subroutines to read characters from keyboard and to send them to the printer. [3]

6. What are the errors in data communication? Compare and contrast Rs 232, Rs 422, and Rs 423 interfaces. [3+5]

7. Explain the working principle of successive approximation type of ADC. [5]

8. What do you understand by decoupling capacitor? Explain the capacitive shielding mechanism. [2+3]

9. What is fault tolerant system? Explain how careful design, testable functions and redundant architecture can avoid many failures in electronic circuits. [1+4]

10. Poor circuit layout and signal propagating principle may cause many problems in the circuit operation, manufacturing ease and probability of design errors. What factors will you consider while routing the signal traces on PCB. [5]

11. How does protyping model overcomes the short comings of waterfall model? Explain. [5]

12. What is wattmeter? Explain the working principle of induction wattmeter with diagram. [5]

13. Explain the existing system involved in your case study with the necessary block diagram. What was your recommendation over the existing system in terms of cost, manpower and plant automation? [8]

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