

**FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL/MAY 2005**

(Vocational Course)

Optional Subject : Physics

Paper VII—ELECTRONICS—II

(Common for Optical Instrumentation / Instrumentation and Electrical equipment  
Maintenance)

Time : Three Hours

Maximum : 60 Marks

*Answer any nine questions from Section A (2 marks each), three questions from Section B (6 marks each), and eight questions from Section C (3 marks each)  
Answers may be written either in English or in Malayalam.*

**Section A**

*Answer any nine questions.  
Each question carries 2 marks.*

1. Define and explain CMRR of differential amplifier.
2. Draw the circuit diagram of an operational amplifier in the inverting mode.
3. Explain the half power points in an amplifier response curve.
4. What do you mean by an Instrumentation amplifier ?
5. Find the decimal equivalent of  $(101101.10101)_2$ .
6. What do you mean by One's Complement representation ?
7. Explain Binary Coded Decimal.
8. Explain OR gate and obtain its truth table.
9. What do you mean by De-Morganization procedure ?
10. Draw the circuit diagram of an Astable multi-vibrator using Operational amplifier.
11. Explain the peculiarities of the orbit of communication satellites.
12. Explain the uplink and downlink frequencies in satellite communication.

(9 × 2 = 18 marks)

**Section B**

*Answer any three questions.  
Each question carries 6 marks.*

13. With a neat circuit diagram and necessary theory explain the construction of differentiator using operational amplifier.
14. With necessary block diagram, truth table and logic diagram explain the half adder.

15. Explain the circuit and working of a NAND gate R-S flip flop.
16. Describe the working of a 4-bit ripple counter using necessary logic diagram.
17. With a neat block diagram explain the architecture of the 8085 micro processor.

(3 × 6 = 18 marks)

### Section C

*Answer any eight questions.  
Each question carries 3 marks.*

18. An operational amplifier is wired in the inverting mode with  $R = 1.5 \text{ k}\Omega$  and  $R_F = 15 \text{ k}\Omega$ . Find the output voltage for an input of 1 mV.
19. Convert  $(43)_{10}$  to binary.
20. Add  $(1011)_2$  and  $(110)_2$ .
21. Demorganize the function  $\overline{A\overline{B} + C}$ .
22. Convert  $A + B$  to minterms.
23. Construct the K map for the function  $f(A, B, C, D) = A\overline{B}\overline{C}D + \overline{A}BCD + \overline{A}\overline{B}\overline{C} + \overline{A}\overline{B}\overline{D} + A\overline{C} + A\overline{B}C + \overline{B}$ .
24. Draw the truth table for the following equation  $T = WX + WY$ .
25. Prove the  $AB + BC + \overline{C}A = AB + \overline{C}A$ .
26. Draw the logic diagram for Type T modulo four counter.
27. Calculate the percentage resolution of a five bit digital to analog (D/A) converter.
28. Realise the following Boolean function using fundamental logic gates.

$$Y = \overline{A} \cdot (B + C) + A\overline{B}$$

29. Write a program to transfer one byte of data from the memory location 0010H to 1000 H.

(8 × 3 = 24 marks)