

M.Sc. Examination, 2018

Semester – III

Physics

Course: MPC-351

(Electronics-I)

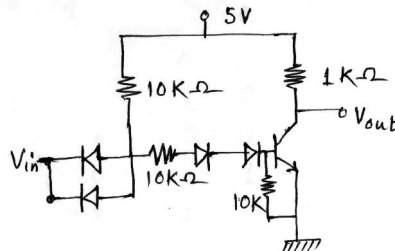
Time: Three Hours

Full Marks: 40

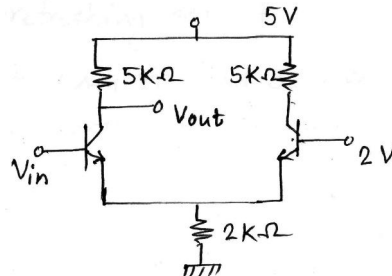
Questions are of value as indicated in the margin.

Answer **any four** of the following questions.

1. a) Draw the voltage transfer characteristics (VTC) and calculate the Fan-out of the following inverter circuit. 5



- b) Explain the inverting action with reference to the given ECL circuit.



(Take $\beta = 50$, $V_D = V_{BE} = 0.7V$, $V_{BE_s} = 0.8V$, $V_{CE_s} = 0.2V$) 5

2. a) Minimize the following expression using K-map

$$f = \sum m(0,1,4,5,8,9,11-17,26-29)$$

- b) Design a mod-5 counter with the following sequence of states 4

	A	B	C
→	0	0	0
	1	1	0
	1	0	0
	0	0	1
	1	1	1

3. a) Draw the circuit diagram of one bit DRAM cell using MOS. Explain its operation and the function of refreshing circuit. 6

- b) A 1024 bit RAM IC has 32 words. Organize the IC as an array of 256(rows) x 4 (columns) memory matrix. 4

4. a) Draw the diagram of a logarithmic amplifier using matched pair transistors. Derive the expression of its output voltage. 7

- b) How can you design a fourth order Butter-Worth Filter? Draw a typical circuit diagram. 3

5. a) Draw a block diagram to show the internal structure of 8085 microprocessor. Explain the interrupt block in details. 6

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(2)

- b) Write a program in 8085 μ P to find how many times a number (say xx) appears in a block of data stored 8201 H onward. The size of the block is stored at 8200H. 4
6. a) Show the scheme of interfacing a 2 KB RAM with 8085 μ P so that the memory starts from 8000H. 3
b) Connect an ADC to 8085 μ P through peripheral IC 8255. Write a program to read the output of the ADC. 4
c) Write a program in 8051 microcontroller to store the content of FFH into RAM locations 50H to 58H using indirect addressing mode. 3
7. Write short notes on *any two* of the following: 5+5
a) SAR-ADC
b) BCD subtractor
c) STTL inverter
d) EPROM
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