

This question paper contains 2 printed pages.

Your Roll No.

Sl. No. of Ques. Paper : 2072

GC-3

Unique Paper Code : 32221303

Name of Paper : Digital Systems and Applications

Name of Course : B.Sc. (Hons.) Physics (CBCS)

Semester : III

Duration : : 3 hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any five questions in all. Q. No. 1 is compulsory. All questions carry equal marks.

1. Attempt any five of the following:

5x3

- a) Subtract decimal number 12 from decimal 9 using two's complement notation.
- b) Describe with an example each of 1-Byte, 2-Byte and 3-Byte instructions in 8085 microprocessor.
- c) The accumulator of 8085 microprocessor contains 5CH and carry is set. What will the accumulator contain and carry contain following each instruction given below
(i) XRA A (ii) RAL
- d) What is meant by the term edge clocked/triggered and draw a digital symbol of a negative edge triggered JK flip flop.
- e) Convert the hexadecimal number $8AD9_{16}$ to its octal equivalent.
- f) What is the largest decimal value that can be represented in binary using?
(i) one byte and (ii) two byte
- g) Explain rise time, fall time and duty cycle of a square wave.
- h) Prove the following Boolean equations:
(i) $(A+B)(A+\bar{B})(\bar{A}+C) = AC$
(ii) $ABC + A\bar{B}C + AB\bar{C} = A(B+C)$

2. (a) Simplify the function using K-Map

$\Sigma (3, 6, 7, 10, 11, 13, 14, 15)$

and give the logic circuit to realize this function.

7 ½

b) What is an encoder? Draw a circuit for a decimal to binary encoder and explain its functioning.

7 ½

3. (a) Draw a circuit for a 4 bit adder subtractor and explain its working.

7 ½

P. T. O.

- b) What are shift registers? What type of shift register is the fastest?
Realize a 4-bit SIPO shift register using block diagram of SR flip flop. 7 ½
4. (a) Explain working of a decade counter with the help of a circuit diagram. 7 ½
- b) Draw the block diagram of a cathode ray oscilloscope and explain how it is used to calculate amplitude and frequency of a sinusoidal wave. 7 ½
5. (a) Draw the circuit of an Astable Multivibrator using IC 555 timer IC and explain its operation.
Derive the expression for its frequency. 7 ½
- (b) Explain the working of a MASTER-SLAVE JK flip flop using logic circuit diagram.
How does it overcome racing problem. 7 ½
6. (a) Draw labelled pin out diagram of 8085 microprocessor. 5
- b) Describe the various flags used in 8085 microprocessor and show their bit positions.
- c) Write an assembly language program to multiply two eight bit number 04 H and 05H.
Numbers are stored in memory location 2000H and 2001H. Store the result in 2002H. 5
7. (a) How Demultiplexing of address bus and data bus is done in 8085 microprocessor.
Explain with the help of timing diagram. 10
- (b) Write an assembly language program to add two sixteen bit numbers FDFH and 0101 H. 5