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B. Tech 4th Semester Examination

Digital Electronics and Microprocessor Architecture (O.S.)

EC-4041

Time : 3 Hours  Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : (i) Attempt only five question selecting one question from each section A, B, C and D.

(ii) Section E is compulsory.

(iii) Use of non-programmable calculator is allowed.

SECTION - A

1. (a) Perform the following conversion.

   (i) \((213.33)_{10}\) into octal, hexadecimal & binary number

   (ii) \((7730.01)_{8}\) into hexadecimal and binary number.(10)

(b) Give advantage & disadvantage of binary code over gray code. Also give application of excess-3 code. (10)

2. (a) Perform the following operation using \((r-1)\)'s compliment.

   (i) \((23)_{8} - (33)_{8}\) (ii) \((10011)_{2} - (11011)_{2}\) (10)

(b) What are error detecting codes? Explain with example how they work. (10)

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[P.T.O.]
SECTION - B

3. (a) Minimize the following function using k-map method and express the result in POS form

\[ f(a, b, c, d) = \Sigma M(2, 3, 4, 7, 9, 10, 13, 15) \]  \hspace{1cm} (10)

(b) Explain the construction and operation of 64x16 ROM \hspace{1cm} (10)

4. (a) Design a 3-bit counter with the sequence mentioned in Fig. 1. \hspace{1cm} (10)

![Diagram of a 3-bit counter sequence](image)

(b) Write short note on different types of analog to digital converters. \hspace{1cm} (10)

SECTION - C

5. (a) Write a program to find a factional of a number in assembly language. \hspace{1cm} (10)

(b) Discuss evolution of microprocessor. \hspace{1cm} (10)

6. (a) What are the future trends in microprocessor architecture? \hspace{1cm} (10)

(b) Write an assembly language program to check whether the number is prime or not. \hspace{1cm} (10)
SECTION - D

7. (a) Explain the operation and architecture of any 8-bit microprocessor. (10)

(b) Explain different types of instruction format supported by 8085. (10)

8. (a) Compare 8080 & 8085 microprocessor. Also give their block diagram. (10)

(b) What are different methods of debugging in 8080? Explain dynamic debugging. (10)

SECTION - E

9. (i) Realize full-adder using NAND gate.

(ii) Why we need interfacing?

(iii) Differentiate between microprocessor and microcontroller.

(iv) Give example of 8-bit, 16-bit & 32-bit microprocessor.

(v) Write BCD code for (8)_{10} & (10)_{10}.

(vi) Briefly explain serial I/O techniques.

(vii) Compare memory mapped and I/O mapped techniques.

(viii) Obtain 8×1 mux using 2:1 max.

(ix) Realize NOT gate using X-OR gate.

(x) Realize AND gate using only NOR gate. (2×10=20)