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B. Tech 3rd Semester (Civil Engg.) Examination – December, 2019

ENGINEERING MECHANICS

Paper : PCC-CE-203-G

Time : Three Hours]　　　　　　　[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is *compulsory*. Attempt at l*east one* question from each Section. All questions carry equal marks.

1. (a) Define Hooke's law.　　　　　　　　　　　3

   (b) Write the name of different types of stresses.　　3

   (c) Define Principal Stress and Principal Planes.　　3

(e) Explain D-type flip-flop. 2.5

(f) Define Hold Time. 2.5

UNIT – I

2. (a) Realize AND, OR and NOT gate with the help of Universal gates NAND and NOR separately. 9

(b) Implement Boolean expressions for EX-OR gate using NAND gates. 6

3. Write short notes on :

(i) Error detecting and correcting code 8

(ii) Excess-3 and gray code 7

UNIT – II

4. Realize a function with the help of NAND gates : 15

$$F(A, B, C. D) = \Sigma(0, 1, 4, 6, 9, 12, 15) + d(2, 3, 6)$$

5. Write short notes on : 15

(i) BCD adder circuit

(ii) Priority Encoders

(iii) Multiplexer

UNIT – III

6. (a) Explain the working of Master-Slave JK Flip flop. 9

(b) What is the difference between Synchronous and Asynchronous counters ? 6

7. (a) Convert SR flip-flop to JK flip-flop.   9

     (b) Explain the concept of Parallel to serial convertor.   6

UNIT – IV

8. (a) Implement a Full adder Using PLA.   9

     (b) Explain the concept of Quantization and Encoding.   6

9. Write short note on :   15

     (i) Field Programmable Gate array

     (ii) Complex programmable logic devices

     (iii) Content Addressable Memory

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SECTION – D

8. What is Truss ? Explain the various types of truss along with application. Discuss the various method of analysis of truss.   15

9. Explain various theories of failure.   15

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