Code No.: R22EC301ES

using NAND gates.

 $F(A,B,C,D) = \Sigma m (1,3,5,8,9,11,15) + d (2,13)$ 

R22

H.T.No.

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## CMR ENGINEERING COLLEGE: : HYDERABAD UGC AUTONOMOUS

II-B.TECH-I-Semester End Examinations (Regular) - February- 2024 ANALOG & DIGITAL ELECTRONICS (Common for IT, CSM)  [Time: 3 Hours] [Max. Marks: 60]  Note: This question paper contains two parts A and B. Part A is compulsory which carries 10 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.  PART-A (10 Marks)  1. a) Draw the piecewise linear volt-ampere characteristic of a p-n diode. [1M] b) Define peak inverse voltage. [1M] c) What are transistor regions? [1M] d) What are the classifications of Multistage amplifiers? [1M] e) Draw the symbol of universal gates. [1M] f) Draw the CMOS inverter circuit. [1M] g) Define Multiplexer. [1M] h) Draw 1-bit digital comparator. [1M] j) Define a sequential system and how does it differ from a combinational system? [1M] j) Define a ROM. [5M]  2. a) Explain V-I characteristics of a PN junction diode. [5M] b) Determine the forward bias voltage applied to silicon diode to cause a forward current of 10mA and reverse saturation current I <sub>o</sub> =25X10 <sup>-7</sup> A at room temperature  OR  3. Explain the action of a full-wave rectifier and give waveforms of input and output [10M] voltages.
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voltages.
4. What is an amplifier? And explain various types of amplifiers. [10M]
OR
5. A CE amplifier is driven by a voltage source of internal resistance $R_S = 800 \Omega$ , and [10M]
the load impedance is a resistance $R_L = 1000 \Omega$ . The h-parameters are $h_{ie} = 1 \text{ k } \Omega$ ,
$h_{re} = 2 \text{ X } 10^{-4}$ , $h_{fe} = 50$ and $h_{oe} = 25 \mu\text{A/V}$ . Compute the current gain $A_{I_i}$ input resistance $R_i$ , voltage gain $A_V$ and output resistance $R_O$ using exact analysis and using
approximate analysis.
6. Draw the small signal equivalent circuit of FET amplifier in CS connection and derive [10M]
the equations for voltage gain, input impedance and output impedance.
7. a) Explain the De Morgan's Laws. [5M]
b) Simplify the following Boolean expressions [5M]  Simplify the following Boolean expressions [5M]
i. A+AB+ABC+ABCD ii. AB+BC+A'C
8. Implement full adder with two half adders and an OR gate. [10M] OR
9. Minimize the following Boolean functions using K-map and draw the logic diagram [10M]

10. Convert the S R Flip Flop to T flip Flop.

[10M]

OR

11. Explain how a shift register is used as a converter from i) serial-to-parallel data and [10M] ii) parallel-to-serial data.

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