INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal-500043, Hyderabad

B.Tech III SEMESTER END EXAMINATIONS (REGULAR) - FEBRUARY 2022
Regulation:UG-20
ANALOG AND DIGITAL ELECTRONICS

Time: 3 Hours   (CSE|IT|AIML|CS|CSIT)   Max Marks: 70

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
NOTE: Provision is given to answer TWO questions from among one of the Modules III / IV / V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) Explain the operation of half-wave rectifier with neat sketches and calculate its ripple factor. **[7M]**

   (b) Calculate the value of inductance to use in the inductor filter connected to a full-wave rectifier operating at 60 Hz to provide a DC output with 4% ripple for a 100 Ω load. **[7M]**

MODULE – II

2. (a) Draw the hybrid model of CB, CE and CC configurations and write the voltage and current equations. **[7M]**

   (b) A CE amplifier has the h-parameters given by $h_{ie} = 1000\Omega$, $h_{re} = 2 \times 10^{-4}$, $h_{fe} = 50$, and $h_{oe} = 25$ μmho. If both the load and source resistances are 1 kΩ. Determine:
   i) Current gain
   ii) Voltage gain. **[7M]**

MODULE – III

3. (a) Explain the gray to binary and binary to gray conversion with examples. **[7M]**

   (b) Design a 4-bit even parity checker. Explain error checking mechanism using parity bit. **[7M]**

4. (a) Explain the following with an example
   i) Minterm
   ii) Maxterm
   iii) Canonical SOP
   iv) Canonical POS **[7M]**

   (b) Design the following logic function using NAND gates only:
   F_1(A, B, C) = m (1,2,4,7)
   F_2(A, B, C) = m (1,2,3,7). **[7M]**

MODULE – IV

5. (a) Explain the working of 2 to 4 decoder and also implement a 2 to 4 decoder using 1 to 2 decoder. **[7M]**

(b) Design 4-bit magnitude comparator and explain its operation in detail. **[7M]**.

6. (a) Write short notes on the following:
   i) Weighted and Non-Weighted codes
   ii) Excess – 3 codes **[7M]**
   (b) Design a 4-bit binary to BCD code converter and explain its operation. **[7M]**

MODULE – V

7. (a) What do you mean by triggering? Explain the various triggering modes with examples. **[7M]**
   (b) Construct a JK flip flop using a D flip flop, a 2x1 multiplexer and an inverter. **[7M]**

8. (a) What is race around condition and how to avoid it along with circuit diagram. **[7M]**
   (b) Draw the circuit diagram of Johnson counter using D-flip-flops and explain its operation with the help of bit pattern. **[7M]**

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