

Code: 20EE3403

II B.Tech - II Semester – Regular Examinations – JULY 2022**DIGITAL AND ANALOG CIRCUITS
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

UNIT – I

1. a) Perform the binary arithmetic operations on (-14) - (-2) using signed 2's complement representation. 7 M
- b) Prove that if $w'x + yz' = 0$, then $wx + y'(w' + z') = wx + xz + x'z' + w'y'z$. 7 M

OR

2. a) For the given function
 $T(w,x,y,z) = \Sigma(0,1,5,7,8,10,14,15)$
 i. Show the K-map.
 ii. Find a minimal expression and realize using basic gates. 7 M
- b) i. Convert the number $(127.75)_8$ to base 10, base 3, base 16 and base 2.
 ii. Given that $(64)_{10} = (100)_b$, determine the value of b. 7 M

UNIT – II

3. a) Design a combinational circuit to find the 2's complement of a given 4bit binary number and realize using NAND gates. 7 M
- b) Prove that NAND and NOR gates are Universal gates. 7 M

OR

4. a) Design a 3-bit parity checker/ generator circuit that can generate even parity using logic gates. 7 M
- b) Design a code converter logic circuit which converts BCD code to Excess-3 code. 7 M

UNIT-III

5. a) Convert RS flip flop to a i) D-latch ii) T-latch. 7 M
- b) Design an universal shift register of 4 bit. 7 M

OR

6. a) Using D-Flip flops and waveforms, explain the working of a 4-bit SISO shift register. 7 M
- b) With the help of clocked JK flip flops and waveforms, explain the working of a 3-bit binary ripple counter. Write truth table for clock transitions. 7 M

UNIT – IV

7. a) Explain the summer and difference amplifier using IC 741 and explain its operation. 7 M
- b) Explain the operation of 1st order band reject filter along with circuit diagram. 7 M

OR

8. a) Draw the Schmitt Trigger circuit and explain its operation in detail. 7 M
- b) Draw the RC phase shift oscillator using 741 Op-Amp and explain its operation. 7 M

UNIT – V

9. a) Draw the block diagram of R-2R DAC and explain its operation in detail. 7 M
- b) Draw the block diagram of successive approximation ADC and explain its operation in detail. 7 M

OR

10. a) What output would be produced by a DAC whose output range is 0 to 10V and whose input binary number is
- i. 10 (for a 2-bit DAC)
 - ii. 0110 (for a 4-bit DAC)
 - iii. 10111100 (for a 8-bit DAC) 7 M
- b) Draw the circuit diagram of flash type ADC and explain its operation in detail. 7 M