

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Regular End Semester Examination – Summer 2022**

**Course: B. Tech.**

**Branch : Electrical Engineering**

**Semester : IV**

**Subject Code & Name: BTBS404 Analog and Digital Electronics**

**Max Marks: 60**

**Date: 23/08/2022**

**Duration: 3.45 Hr.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

**(Level/CO) Marks**

**Q. 1 Solve Any Two of the following.**

**2 x 6**

- A) In a Common Emitter configuration of transistor amplifier if  $V_{cc} = 12\text{ V}$ ,  $R_c = 3\text{ K-ohm}$ , determine the cutoff point and saturation point, and draw the DC load line. (L3/CO1)
- B) What do you mean by frequency response curve? Draw the nature of curve and define upper and lower corner frequencies. (L3/CO1)
- C) With the help of suitable diagram illustrate cascading of an amplifier. Also derive the gain relation for final stage. (L3/CO1)

**Q.2 Solve Any Two of the following.**

**2 x 6**

- A) Illustrate the working of operational amplifier with the help of block diagram. Explain each stage in brief. (L3/CO2)
- B) An inverting amplifier operating on  $\pm 9\text{ V}$ , resistance connected to the inverting terminal ( $R_1$ ) =  $2.7\text{ K-ohm}$ , resistance connected in the feedback path ( $R_0$ ) =  $10\text{ K-ohm}$ . If the input signal applied is having amplitude of  $4\text{ V}$ , sketch the input and output waveforms. (L3/CO2)
- C) Illustrate the working of regenerative comparator using operational amplifier with suitable circuit diagram, also sketch the input and output waveforms. (L3/CO2)

**Q. 3 Solve Any Two of the following.**

**2 x 6**

- A) Justify, that NAND and NOR gates are known as the universal gates. Implement NAND gate using NOR gate and NOR gate using NAND gates. (L3/CO3)
- B) Use 1's complement method to solve the following  $(1010)_2 - (0110)_2$  and  $(52)_{10} - (32)_{10}$  (L3/CO3)
- C) If Hamming code sequence is transmitted and due to error in one position, received code as 1110110, locate the position of the error bit using parity checks and give the method for obtaining the correct sequence. (L3/CO3)

**Q.4 Solve Any Two of the following.**

**2 x 6**

- A) Illustrate in brief working of TTL NAND gate (L3/CO4)
- B) With the help of neat diagram, explain working of CMOS 2-input-NOR gate. Tabulate all the voltage levels for each case. (L3/CO4)
- C) Design 3-bit ripple binary counter using J-K flip-flop. (L3/CO4)

**Q. 5 Solve Any Two of the following.**

**2 x 6**

- A) Simplify the following function using K-Map (L3/CO5)  
 $F(A,B,C,D) = \sum m(3,9,11,12,13,14,15) + \sum d(1,4,6)$
- B) Illustrate working of 4 bit Ripple Carry Adder. Give description of intermediate carry stage. What is the disadvantage of the circuit? (L3/CO5)
- C) Implement following function using 4:1 multiplexer. (L3/CO5)  
 $F(X,Y,Z) = X'Y'Z + X'YZ' + XYZ' + XYZ$

**\*\*\* End \*\*\***