B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

August 2023 Semester End Make-Up Examinations

Programme: B.E.
Branch: Common to all Branches
Course Code: 22EC1ESBEC
Course: Basic Electronics

Semester: I
Duration: 3 hrs.
Max Marks: 100
Date: 11.08.2023

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1. a) Explain the forward and reverse biased condition of PN junction Diode. **05**

   b) Derive the expression for Ripple factor and efficiency of Half-wave rectifier. **10**

   c) Design a Zener regulator for following specification: Load current $I_L = 20mA$ output voltage $V_0 = 5$ V, Zener wattage $Pz = 500mW$, Input voltage $Vi = 12\pm2V$ and $I_{Zmin} = 8$ mA. **05**

OR

2. a) What is a Regulated power supply? Explain with a block diagram. **05**

   b) Derive the expression for Ripple factor and efficiency of Bridge rectifier. **10**

   c) For a Silicon Diode working at a Temperature of 250C, the forward voltage applied across the diode is 0.5V, determine its forward current, if the reverse saturation current is 10nA. **05**
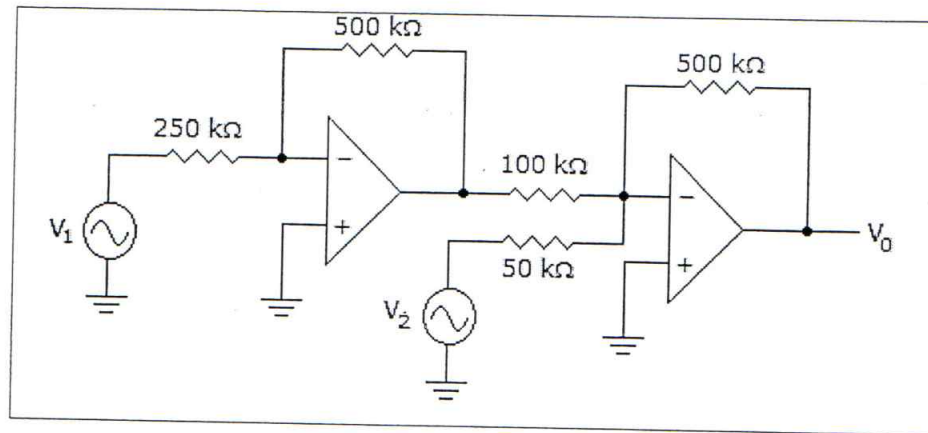
UNIT - II

3. a) With a neat diagram, explain the input and output characteristics of a transistor in common emitter configuration. **10**

   b) Derive the expression for gain of positive and negative feedback systems. An amplifier has midband gain of 125 and a bandwidth of 250KHz. If 4% negative feedback is introduced, find the new bandwidth and gain. If bandwidth is restricted to 1MHz, find the feedback ratio. **10**

UNIT - III

4. a) Explain operational amplifier with a neat block diagram. **05**

   b) The equivalent electrical parameter of a crystal oscillator is L=3H, C=0.05pF, C_P=6pF, and R=1KΩ. Determine the series resonant frequency and the percentage by which the parallel resonant frequency exceeds the series resonance frequency. **08**

   c) Calculate the output voltage of the circuit shown in figure, if V1 = 300 mV and V2 = 700 mV. Also mention how the op-amp is configured. **07**
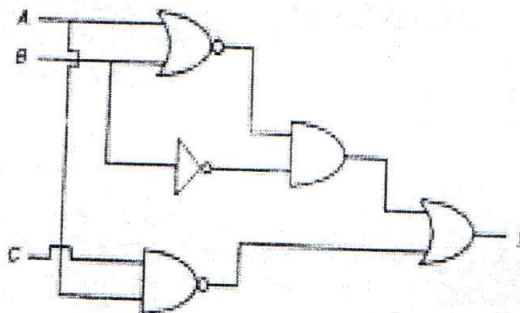
UNIT - IV

5 a) Implement half adder using basic gates   05

    b) Perform the following conversion   10

        (i) $(25.6)_{10} = (\ )_2 = (\ )H$

        (ii) $(7BEF)_H = (\ )_{10} = (\ )_2 = (\ )_8$

    c) A logic circuit has 3 inputs A, B, C and one output Y. Y=B XOR C when 05
A=0, and Y=C when A=1. Simplify the output expression and realize the same
using logic gates

OR

6 a) Analyze the logic circuit shown in fig. Determine the Boolean function for y 06
and state its truth table.

    b) Design Full Adder circuit using 2 Half adders.   08

    c) Design a logic circuit using a minimum number of NOR gates to implement 06
the following expression.

$$f (A, B, C) = \bar{A}B + B\bar{C} + BC + A\bar{B}\bar{C}$$

UNIT - V

7 a) With a neat block diagram, explain the components of the basic 10
communication System.

    b) Define Signal to Noise Ratio and Noise Factor with relevant equation. At a 05
receiver of a communication system, the signal and noise voltages are given as
3.5mV and 0.75mV respectively. Determine the SNR in dB.

    c) Discuss different types of computer communication networks based on their 05
size.

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