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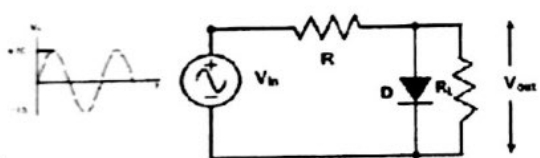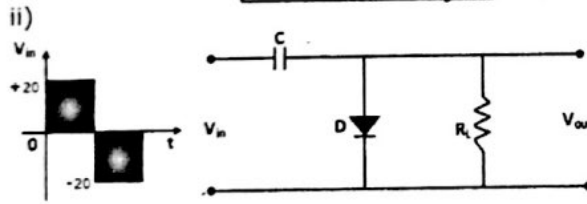(Autonomous Institute, Affiliated to VTU)
Bangalore – 560 054

SEMESTER END EXAMINATIONS – JANUARY 2017

Course & Branch	: B.E : Common to all branches	Semester : I/II
Subject	: Basic Electronics	Max. Marks : 100
Subject Code	: EC101/EC201	Duration : 3 Hrs

Instructions to the Candidates:
- Answer one full question from each unit.

UNIT- I

1. a) Determine the diode current at 20^0C for a silicon diode with $I_s = 50nA$ and applied forward bias of 0.6V. Take $\eta=2$. Find the current if the applied voltage is changed to 0.22. Take $\eta=1$.   CO1   (07)

   b) With necessary equations, show that the efficiency of a full wave rectifier with center tapped transformer is 81.2%. Also find its PIV.   CO1   (08)

   c) Explain the working of CE transistor amplifier with suitable example.   CO1   (05)

2. a) A full wave bridge rectifier with 120V rms, f=50Hz, sinusoidal input has a load resistor of $1K\Omega$. If silicon diodes are employed, find the dc voltage available at load. Assuming ideal diodes, calculate the average load current and ripple voltage if a capacitor value of $200\mu F$ is connected across the load.   CO1   (07)

   b) Determine V_{out} for each network shown and identify the network.   CO1   (06)

   i)

   ii)

   c) Draw the circuit of a common emitter configuration and explain the input and output characteristics with neat waveforms.   CO1   (07)
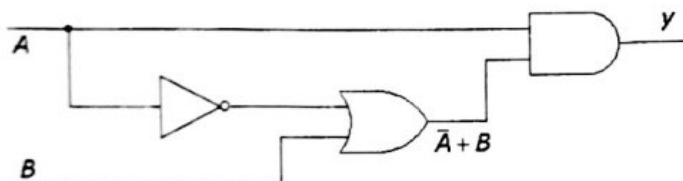
UNIT - II

3. a) A voltage divider bias circuit has $R_1=33K\Omega$, $R_2=10K\Omega$, $R_C=2.2K\Omega$, $R_E=1K\Omega$, $V_{CC}=20V$, $h_{FE}=100$. Calculate V_B, V_E, I_E, I_B, I_C, V_C and V_{CE} and also draw DC load line and mark Q-point. Assume $V_{BE}=0.7V$ CO2   (08)

   b) With neat circuit diagram, explain the operation of op-amp inverting amplifier.   CO2   (06)

   c) Explain how op-amp can be used as differentiator with circuit diagram and equations. Write its applications.   CO2   (06)

4. a) Define biasing in transistor. Explain Base Bias Circuit with a neat circuit diagram and necessary equations.   CO2 (06)

   b) Compare the ideal characteristics of operational amplifier with practical characteristics.   CO2 (06)

   c) Describe how op-amp can be used as subtractor circuit and prove that $V_0 = V_2 - V_1$ CO2 (08)

UNIT- III

5. a) Design and realize Full Adder circuit using two half adders.   CO3 (07)

   b) Perform the following clearly showing all the steps: CO3 (07)

     i) $(C8.B9)_{16} = (?)_{10} = (?)_2 = (?)_8$

     ii) $(56)_{10} - (74)_{10}$ using 1's and 2's complement Binary subtraction.

   c) Simplify the given expression using Boolean laws and then realize using NAND gates only: CO3 (06)

     $F = (A + \bar{B} C)(\bar{A} + B + \bar{C})(A + \bar{B})(A \bar{B} C + B)$

6. a) Realize basic gates using only NOR gates.   CO3 (07)

   b) Perform the following clearly showing all the steps: CO3 (07)

     i) $(1111001.00110)_2 = (?)_{16} = (?)_{10} = (?)_8$

     ii) $(1100.10)_2 - (1101.01)_2$ using 1's and 2's complement subtraction.

   c) For the circuit given obtain the simplified Boolean expression.   CO3 (06)

UNIT - IV

7. a) Compare combinational logic circuit and sequential logic circuit with example.   CO4 (06)

   b) With neat sketches, explain the operation of NAND gate latch and NOR gate latch.   CO4 (08)

   c) Explain the different flags in 8051 Microcontroller.   CO4 (06)

8. a) Explain the operation of clocked RS-Flip Flop with circuit, functional table and timing diagram.   CO4 (06)

   b) Differentiate between Microprocessor and Microcontroller.   CO4 (06)

   c) With neat block diagram explain the architecture of 8051 Microcontroller.   CO4 (08)

UNIT - V

9. a) Define Modulation. Mention the advantage of modulation.   CO5 (06)

   b) Derive an expression for the power output in an AM transmitter and hence determine the carrier power when the AM transmitter produces 10kW with a Modulation percentage of 75.   CO5 (08)

   c) What are transducers? Bring out the differences between active and passive transducers.   CO5 (06)

10. a) Define the terms Amplitude modulation, frequency and phase modulation.   CO5   (06)

    b) Explain the working of Linear variable Differential Transformer with neat diagram.   CO5   (08)

    c) Explain the working principle of thermistor.   CO5   (06)

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