



End Term Examination (December 2019)

School: School of Engineering

Program: B.Tech-First Year (Div-A)

Course: Basic Electronics and Electrical Engineering

Course Code: ENG 108

Semester: I

Max Marks: 40

Duration (mins): 90

Answer ALL the Questions

Q1. Write Short notes

[10]

(Each question carries 2 marks)

- Kirchhoff's current and voltage law.
- Power factor and disadvantages of low power factor
- Impedance, Admittance, Susceptance and Reactance
- Norton's and Thevenin's theorem applicable to DC Network
- RMS value and Average value of an AC quantity

Q2. Explain the working of the following (ANY TWO)

[10]

(Each question carries 5 marks)

- Show that the voltage and current in a pure resistive circuit are in phase and power consumed in the circuit is equal to product of rms voltage and current. The circuit is excited by AC source. Explain how the circuit behaves in case of series RL and RC circuit using proper equations and phasor diagram.
- A series circuit consists of a $300\ \Omega$ non inductive resistor, a $7.95\ \mu\text{F}$ capacitor and a $2.06\ \text{H}$ inductor of negligible resistance. If the supply voltage is $250\ \text{V}$ at $50\ \text{Hz}$, calculate a) The circuit current b) the phase angle c) voltage drop across each element,
- State the condition of resonance in series circuit. A coil of inductance $10\ \text{mH}$ and resistance $10\ \Omega$ is connected in series with $10\ \mu\text{F}$ capacitor of negligible resistance across a variable frequency ac source which has a constant output of $4\ \text{V}$. a) At what frequency will the current and applied voltage be in phase? b) the current in the circuit c) voltage across the capacitor.

Q3. Answer the following Questions (ANY TWO)

(Each question carries 5 marks)

[10]

- Explain the V-I characteristics of a Diode. Also explain the full wave rectification circuit using diode and find out the expression of average output rectified voltage in terms of V_m .

- b) Explain the DC load line analysis of Diode (Si) and explain how to find out the Q-point. For the series diode employing the diode characteristics determines- V_D and I_D ii. V_R
Input Voltage is 10V and $V_R=0.5K\Omega$

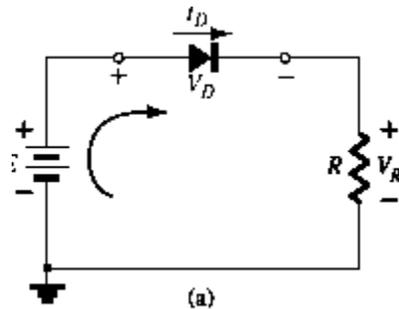


Figure (a)

- c) Explain the half wave rectification circuit using diode? Find out the expression of average output Voltage in terms of V_m . Sketch the output V_o and determine the dc level of the output for the network of Fig-b

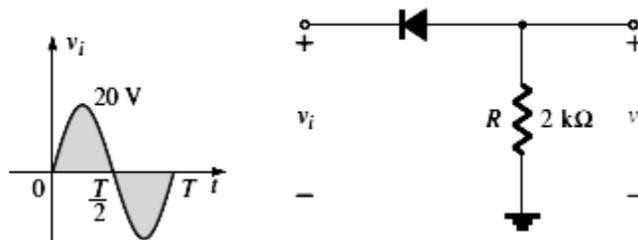


Figure (b)

Q4. Answer the following Questions (ANY TWO)
(Each question carries 5 marks)

[10]

- a) Prove the De Morgan's Theorem for two variables and extend the theorem for three variables. State different Boolean Algebraic theorem.
b) What are the different types of logic gates? Explain with circuit diagram and Truth Table? Realize (design) a digital circuit for the logic equation -

$$Y = \overline{A} \cdot B + A \cdot \overline{B}$$

- c) Find the following-
- i. Decimal equivalent of binary number $(11111)_2$
 - ii. Binary Equivalent of $(13)_{10}$, $(0.65625)_{10}$
 - iii. One's complement of 0100111001
 - iv. 2's complement of 01001110
 - v. Add the binary numbers 1011 and 1100
