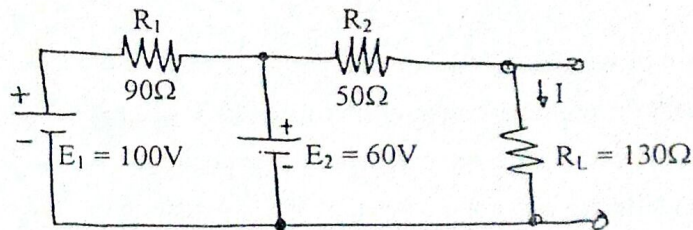


| Exam.       | New Back (2066 Batch Only) |            |       |
|-------------|----------------------------|------------|-------|
| Level       | BE                         | Full Marks | 80    |
| Programme   | All (Except B.Arch.)       | Pass Marks | 32    |
| Year / Part | I / II                     | Time       | 3 hrs |

**Subject: - Basic Electronics Engineering**

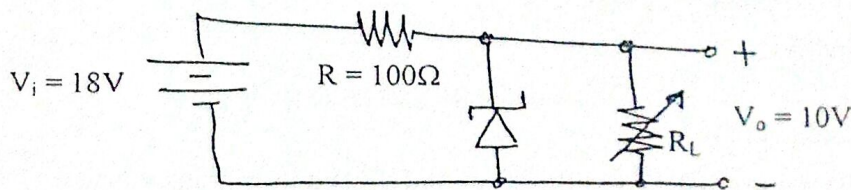
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Describe the principle of superposition theorem by solving following problem. [5]



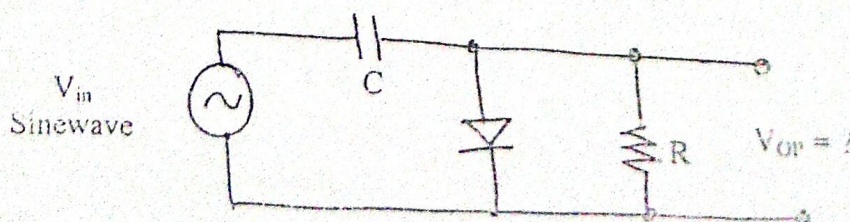
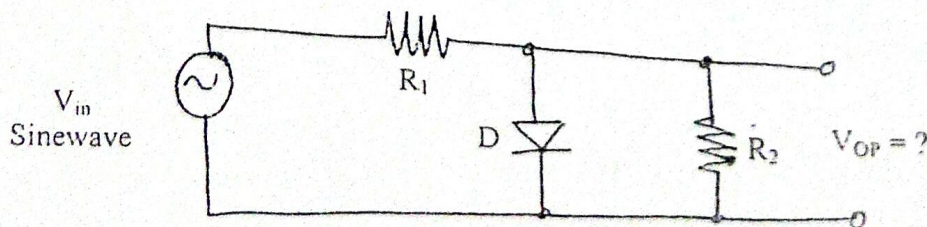
Find current I through  $R_L$ .

- b) Explain the concept of voltage gain and transconductance using block diagram. [3]
2. a) Describe the working principle of PN junction diode with the help of circuit diagram and its IV characteristics graph. [3]
- b) Find zener current in the given circuit when  $R_L = 1.2k\Omega$ . [3]



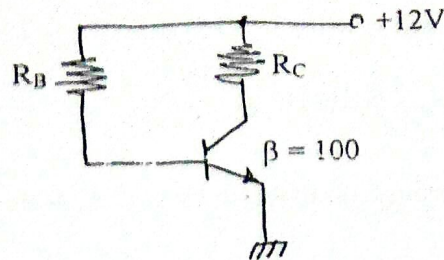
Assume  $V_Z = 10V$ .

3. a) Draw bridge rectifier circuit and its output waveform with output load resistor ( $R_L$ ) connected. Express the ripple factor if smoothing capacitor, C is connected to the circuit. [3]
- b) Draw output waveforms of the following circuits and indicate the peak output voltage. Assume diode is ideal. [3]





4. a) Draw basic differential amplifier circuit and indicate its input and output voltage waveforms. [2]  
 b) Describe the operation of CMOS NOT-gate circuit. [4]  
 c) Find  $R_B$  and  $R_C$  in the given circuit. Given data are:  $I_C = 1.2\text{mA}$ ,  $V_{CE} = 6\text{V}$  and  $\beta = 100$ . [4]



5. a) State six important properties of ideal opamp. [3]  
 b) Derive voltage gain for noninverting amplifier using ideal opamp. [3]  
 c) Describe the operation of square wave generator using opamp. [4]  
 6. a) Define antenna and electro magnetic wave (EMW) propagation. [4]  
 b) Explain and enlist wired and wireless communication systems. [4]  
 c) Draw a block diagram of AM super heterodyne radio receiver. [2]  
 7. a) Why NOR and NAND gates are called universal gates? Explain with examples. [3]  
 b) Draw a block diagram of edge triggered, with preset and clear facilities, D-flip flop and its truth table. State one important advantage over RS flip flop. [3]  
 8. a) State and prove De Morgan's Theorems. [3]  
 b) Convert the followings: [3]  
     i)  $33_{10}$  to binary  
     ii)  $(1100\ 0011)_2$  to decimal  
     iii) Add  $(1001)_2$  and  $(0111)_2$   
 9. a) Draw the block diagram of (CRO) oscilloscope. And explain its working function. [4]  
 b) Draw the block diagram of DMM (Digital Multimeter). And explain how it measures DC voltage, DC current and resistance. [6]  
 10. Write short notes on: (any two) [2×4]  
     a) Graphical analysis of diode circuit  
     b) Shift register and counter  
     c) E-MOSFET

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