



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

First Semester, B.E. - Semester End Examination; Dec - 2016/ Jan - 2017

Electronic Devices and Communication

(Common to all Branches)

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. Calculate load Voltage (V_L) and load current (I_L) for the series diode configuration shown in Fig. Q1(b). Also plot the d.c. load line and mark the Q-point on it.

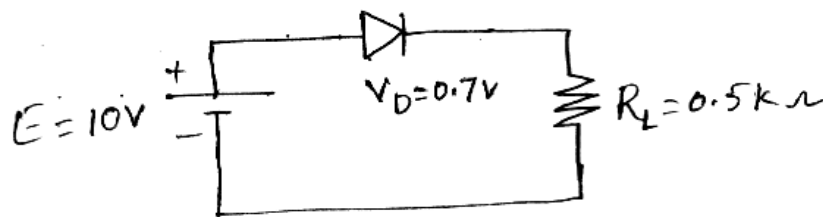


Figure Q1(a)

- b. Explain the working of Center-Tapped transformer full wave rectifier with the help of circuit and related waveforms.
- c. Calculate the following for the network shown in Fig. Q1(c) :
- (i) Range of R_L and I_L that will result in V_{RL} being maintained at 10 V.
 - (ii) Determine the maximum wattage rating of the diode.
 - (iii) If zener maximum wattage is increased to 380 mW, what is the new value of $I_{L\min}$?

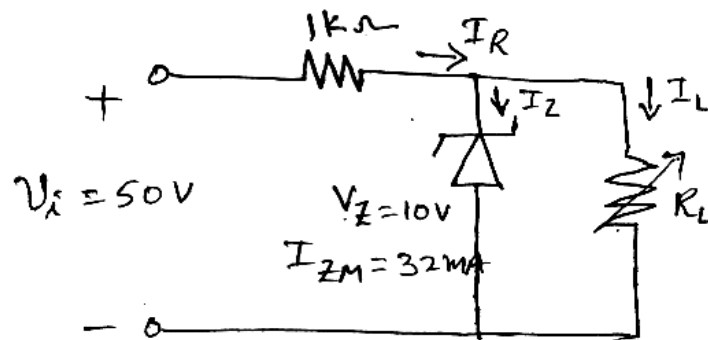


Figure Q1(c)

- 2 a. Write short notes on the following :
- i) Photodiodes
 - ii) Solar cells.
- b. Explain the principle of LCD (Liquid Crystal Display).
- c. Calculate V_0 , V_1 , I_{D1} and I_{D2} for the parallel diode configuration shown in Fig. Q2(b)

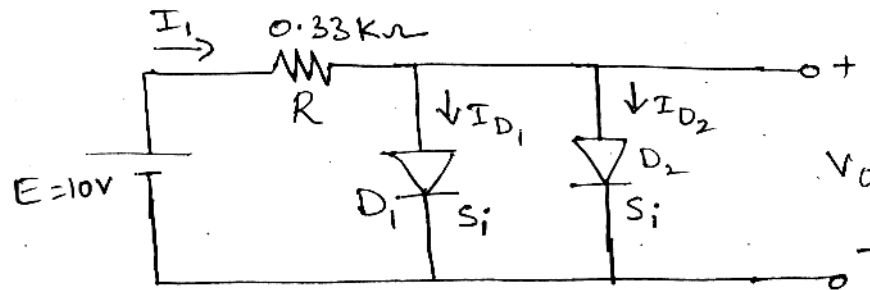


Figure Q 2(b).

UNIT - II

- 3 a. Describe the basic operation and characteristics of *n*-channel depletion type MOSFET. 10
- b. Explain the use of the complementary arrangement of CMOS inverter with figure. 6
- c. Sketch the transfer characteristics for an *n*-channel enhancement-type MOSFET from the drain characteristics. 4
- 4 a. Define Barkhausen criterion for oscillation. Explain the feedback circuit that is used as an oscillator. 7
- b. Sketch the E-MOSFET voltage divider configuration and its AC equivalent network. 6
- c. Write circuit of FET phase shift oscillation and explain its working. 7

UNIT - III

- 5 a. Derive equation for output voltage of an Op-Amp circuits, 9
 - i) Inverting Amplifier ii) Summing Amplifier iii) Differentiator Circuit.
- b. Define the Op-Amp frequency parameters : 6
 - i) Gain Bandwidth ii) Slew rate (SR) iii) Maximum signal frequency.
- c. Calculate the output voltage of an Op-Amp for input voltages of $V_{i1} = 150 \mu\text{V}$ and $V_{i2} = 140 \mu\text{V}$. The amplifier has a differential gain of $A_d = 4000$ and the value of CMRR is, 5
 - i) 100 ii) 10^5 .
- 6 a. Show the connection of three Op-Amp stages to provide outputs that are -10, -20 and -50 times larger than the input. Use a feedback resistor $R_f = 500 \text{ k}\Omega$ in all stages. 6
- b. Explain the use of active low pass and high pass filter with circuit and ideal response of filters. 10
- c. Calculate the output voltage of an Op-Amp inverting amplifier with a sinusoidal input of 2.5 mV, $R_f = 200 \text{ k}\Omega$ and $R_1 = 2 \text{ k}\Omega$. 4

UNIT - IV

- 7 a. Write the block diagram of a microcontroller and explain each block. 10
- b. Compute:
 - i) $1101.1011_{(2)} = \text{_____}_{(10)} = \text{_____}_{(16)}$
 - ii) $3E.4FC_{(16)} = \text{_____}_{(10)} = \text{_____}_{(2)}$ 10

iii) Perform Binary addition

$$\begin{array}{r} 95 \\ +189 \\ \hline \end{array}$$

iv) Perform Binary subtraction

$$\begin{array}{r} 189 \\ -95 \\ \hline \end{array}$$

- 8 a. Write PSW (Program Status Word) of 8051 and explain use of each bit in it. 8
 b. Explain internal RAM organization of 8051 microcontroller with figure. 12

UNIT - V

- 9 a. Define the following terms in wireless communication :
 i) Base station 6
 ii) Mobile station
 iii) Simple and Duplex communication.
 b. Describe the call handling procedure from mobile to wire line with block diagram. 10
 c. Explain handoff procedure in mobile communication. 4
- 10 a. Describe the Infrastructure and Ad-hoc network topology with diagrams. 10
 b. Explain the GSM architecture with block diagram. 10

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