



**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.

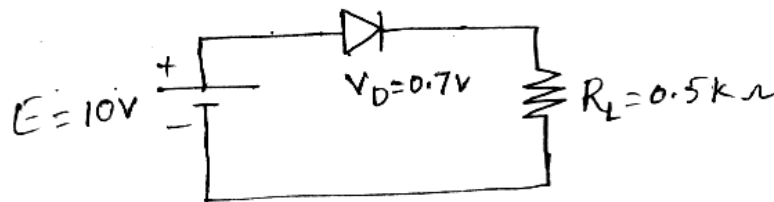


Figure Q1(a)

- 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  $I_{L\min}$ ?

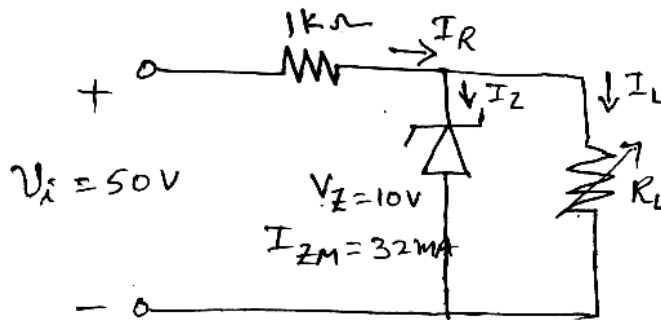


Figure Q1(c)

- 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)

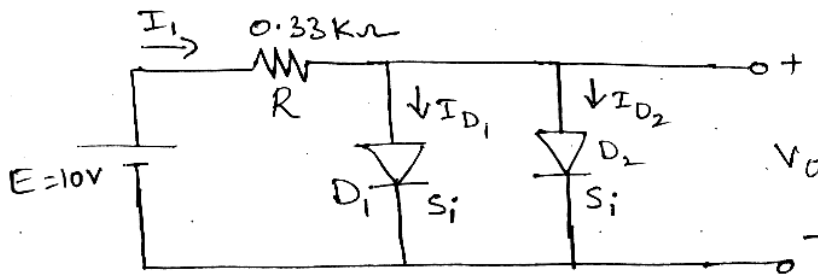


Figure Q 2(b).

**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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