



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

(An Autonomous Institution affiliated to VTU, Belagavi)

**Second Semester, B.E. - Semester End Examination; October - 2022**

**Basic Electronic Devices and Circuits**

(Common to All Branches)

Time: 3 hrs

Max. Marks: 100

**Course Outcomes**

The Students will be able to:

CO1: Apply the knowledge of physics and mathematics to understand the principle of devices, number system, circuits and communication system.

CO2: Analyze the analog and digital circuits.

CO3: Design circuits for rectification, regulation, amplification and filtering.

CO4: Design the combination logic circuit.

**Note:** I) PART - A is compulsory. Two marks for each question.

II) PART - B: Answer any **Two** sub questions (from a, b, c) for a Maximum of **18 marks** from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
<b>I : PART - A</b>		<b>10</b>			
1 a.	Draw the block diagram of Power Supply Unit.	2	CO1	L1	PO1
b.	List any two differences between Depletion type and Enhancement type MOSFET.	2	CO1	L1	PO1
c.	List the Ideal Characteristics of Op-amp.	2	CO1	L1	PO1
d.	Write the 1's and 2's Complement of binary number 1101011010.	2	CO4	L2	PO2
e.	Define amplitude modulation and draw modulated signal.	2	CO2	L1	PO2
<b>II : PART - B</b>		<b>90</b>			
<b>UNIT - I</b>		<b>18</b>			

2 a. Determine  $I_1$ ,  $I_2$ , and  $I_{D2}$  for the network shown in Fig. 2(a).

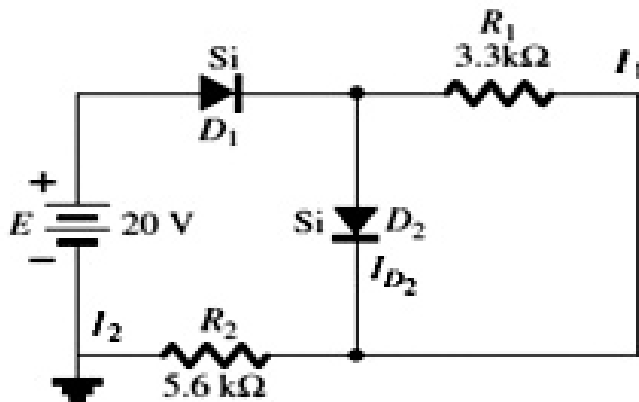


Fig. 2(a)

b. Analyze the working of Full Wave Bridge Rectifier with its necessary circuit diagram and waveforms with ideal diode. Also find the PIV of each diode.

- c. Determine  $V_L$ ,  $V_R$ ,  $I_Z$  and  $P_Z$  for the Zener diode network shown in Fig. 2(c).

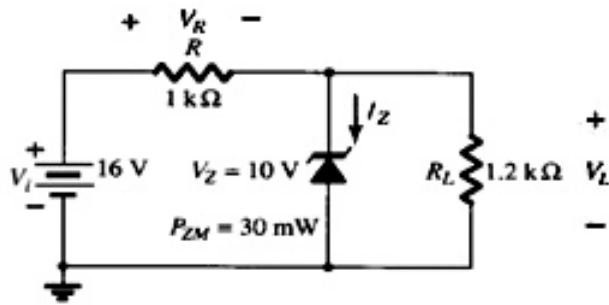


Fig. 2(c)

9 CO3 L3 PO3

**UNIT - II**

**18**

- 3 a. Explain the operation and characteristics n-channel Enhancement-type MOSFET with necessary diagrams.
- b. Determine the following for the network of Fig. 3(b).  
 i)  $V_{GSQ}$  ii)  $I_{DQ}$  iii)  $V_{DS}$

9 CO2 L2 PO2

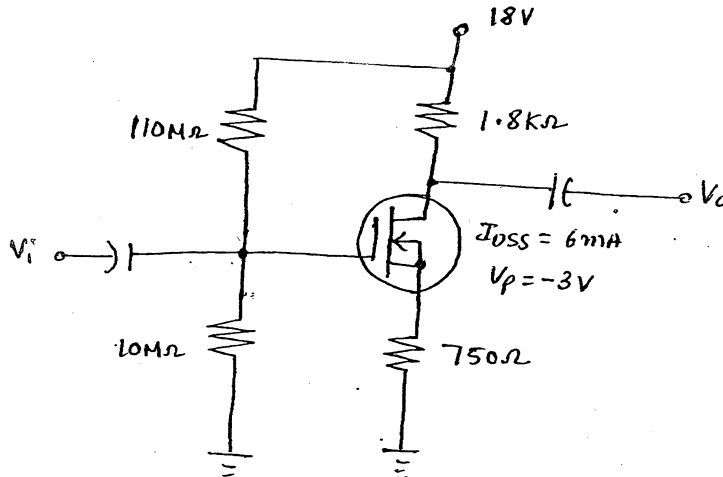


Fig. 3(b)

9 CO3 L3 PO3

- c. Explain the Enhancement-type MOSFET with a voltage divider configuration as an amplifier with a neat diagram and obtain the equations for the following:  
 i)  $g_m$  and  $g_{m0}$  ii)  $Z_i$  and  $Z_o$  iii)  $A_v$

9 CO2 L3 PO2

**UNIT - III**

**18**

- 4 a. Derive an expression for voltage gain ( $A_v$ ) of an inverting Op-Amp with the help of circuit diagram and its ac equivalent circuit.
- b. Explain the following with necessary diagram and equations:  
 i) Op-Amp as an Integrator  
 ii) Op-Amp Summing Amplifier  
 iii) Op-amp first order Low pass filter

9 CO2 L2 PO2

9 CO2 L2 PO2

- c. Explain the following controlled sources with required ideal diagram and circuit diagram;
- i) Voltage Controlled Voltage Source
- ii) Voltage Controlled Current Source

9 CO3 L3 PO3

**UNIT - IV****18**

- 5 a. Compute the following:

i)  $(1234.12)_{10} = ( )_2 = ( )_8 = ( )_{16}$

ii) Binary Multiplication  $(1011)_2 * (101)_2$

9 CO4 L3 PO3

- iii) Perform binary subtraction using 2's compliment

$$(15)_{10} - (3)_{10}$$

- b. Design and implement the full adder using 2 half adder with characteristics equation for sum and carry.

9 CO4 L4 PO2

- c. Implement the following logic gates using only NAND and NOR:

i) AND

9 CO4 L2 PO3

ii) OR

iii) XOR

**UNIT - V****18**

- 6 a. Explain Amplitude Modulation (AM) with waveforms and equation along with spectrum diagram of AM wave.
- b. Explain super heterodyne receiver used in radio receivers with neat block diagram.
- c. Explain the advantages and application of Optical fiber communication.

9 CO2 L2 PO2

9 CO2 L2 PO2

9 CO2 L2 PO2

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