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

(An Autonomous Institution affiliated to VTU, Belagavi)

First / Second Semester, B.E. - Semester End Examination; Sep. / Oct. - 2023

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
	I : PART - A	**10**			
1 a.	Mention the applications of Zener diodes.	2	L1	CO1	PO1
b.	Draw the structure of P-channel depletion type of MOSFET.	2	L1	CO1	PO1
c.	List the characteristics of OP-Amp.	2	L1	CO1	PO1
d.	Perform 1010X111 and write the resulting output.	2	L2	CO4	PO2
e.	Mention difference between FM and AM.	2	L1	CO5	PO2
	II : PART - B	**90**			
	UNIT - I	**18**			
2 a.	Define Q point. Explain load line analysis with relevant diagrams and equations.	9	L2	CO2	PO2
b.	Determine the output waveform for the network shown in Fig. 2(b) and obtain the output DC level and the required PIV of each diode.	9	L2	CO2	PO2
c.	Explain Zener diode as voltage regulate for the following cases: i) V_i and R_L fixed ii) Fixed V_i and variable R_L	9	L2	CO2	PO2
	UNIT - II	**18**			
3 a.	Explain basic construction and operation of n-channel enhancement type MOSFET with necessary diagrams and equations.	9	L2	CO1	PO1

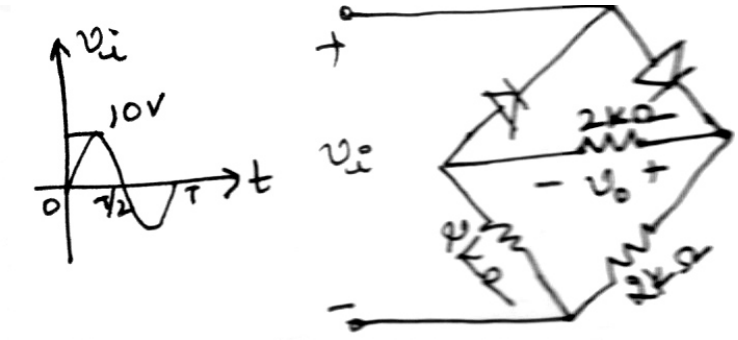

Fig. 2(b)

Contd....2

b. For the n-channel depletion-type MOSFET shown in Fig. 3(b), determine the following i) I_{DQ} and ii) V_{GSQ}

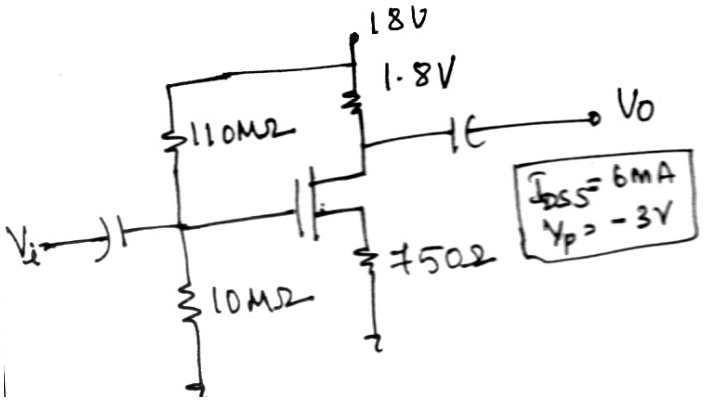

Fig. 3(b)

9 L3 CO2 PO2

c. Explain the E-MOSFET voltage divider configuration with neat circuit diagram and AC equivalent configuration. Also determine the following for the same: 9 L2 CO2 PO2

i) Z_i and Z_o ii) G_m iii) A_V

UNIT - III **18**

4 a. Derive an expression for the voltage gain of an inverting Op-Amp with necessary diagram and equations. 9 L2 CO3 PO2

b. Explain the following with respect to Op-Amp with necessary circuit diagrams and equations. 9 L2 CO3 PO2

i) Current Controlled Voltage Source ii) Differentiator iii) Ist order High Pass Filter

c. Show the connection of three Op-Amp stages using an LM348 IC to provide output that are 10, 20 and 50 times larger than the input use feedback resistor of R_f = 500 kΩ in all stages. 9 L2 CO3 PO2

UNIT - IV **18**

5 a. Realize the following using only NAND; 9 L2 CO4 PO2

i) OR ii) AND iii) XOR

b. Compute the following : 9 L2 CO4 PO2

i) $(54.325)_{10} = (\quad)_2 = (\quad)_8$

ii) Perform $(1011)_2 - (0111)_2$ using 2's compliment

iii) Simplify and realize using basic gates $Y = \overline{B}\overline{C}D + (\overline{B + C + D}) + \overline{B}\overline{C}\overline{D}E$

c. Design and implement full adder using two half adders. 9 L2 CO4 PO2

UNIT - V **18**

6 a. Explain Amplitude Modulation (AM) with the help of relevant sketch, waveforms and equations. 9 L2 CO5 PO2

b. List the characteristics of good receiver also explain super heterodyne receiver with neat block diagram. 9 L2 CO5 PO2

c. Explain the basic block diagram of Optical Fiber Communication (OFC) along with its applications. 9 L2 CO5 PO2

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