



P.E.S. College of Engineering, Mandya - 571 401
 (An Autonomous Institution affiliated to VTU, Belagavi)
First Semester, B.E. - Semester End Examination; May - 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.

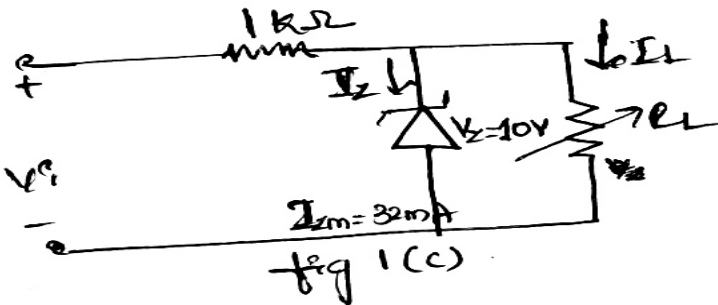
CO2: Analyze the analog and digital circuits.

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

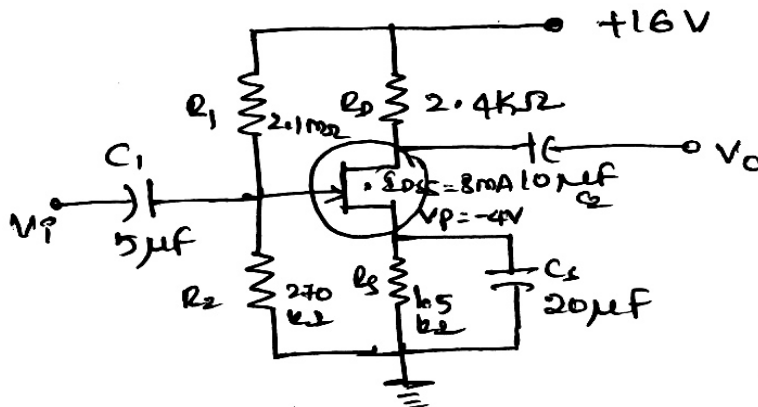
CO4: Design the combination logic circuit.

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
I : PART - A		10			
I a.	For a half wave rectifier, whose input is sine wave of $14 \sin \omega t$, determine the V_{DC} and V_{PIV} .	2	CO2	L2	PO2
b.	Write the structure of n-channel depletion type MOSFET.	2	CO1	L1	PO1
c.	List the applications of operational amplifiers.	2	CO1	L1	PO1
d.	Write the 2's compliment of $(10010)_2$.	2	CO4	L3	PO2
e.	Write the expression for total power of the AM modulated signal.	2	CO5	L3	PO2
II : PART - B		90			
UNIT - I		18			
1 a.	Define Q point. Explain the DC load line analysis for series diode configuration with neat circuit diagram and characteristics.	9	CO2	L2	PO2
b.	Explain the working of Half wave rectifier with its necessary diagram and wave forms. Also determine PIV of a diode.	9	CO2	L2	PO2
c.	For the network shown in Fig. 1(c) determine V_R and the range of R_L and I_L that will result in V_L being maintained at 10 V and also determine the maximum wattage rating of the diode (Given $V_i=50$ V).	9	CO3	L3	PO3
 <p align="center">fig 1(c)</p>					
UNIT - II		18			
2 a.	Explain the construction and sketch the transfer characteristics for an n-channel depletion type MOSFET with $I_{DSS} = 10$ mA and $V_p = -4$ V.	9	CO2	L2	PO2

- b. Sketch and explain the construction of p-channel E-type MOSFET. Also analyze drain and transfer characteristics
- c. Determine the following for the network shown below,
 - i) I_{DQ} and V_{GSQ}
 - ii) V_{DS}



UNIT - III

9 CO2 L3 PO2

18

- 3 a. Analyze the working of an inverting op-amp amplifier with the help of neat diagrams and equations.
- b. With neat circuit diagram, explain the following:
 - i) Voltage controlled voltage source
 - ii) Current controlled current source
 - iii) Voltage controlled current source
- c. Show the connection of an LM124 quad op-amp as a three stage amplifier with gains of +10, -18 and -27. Use a 270 kΩ feedback resistor for all three circuits. What output voltage will result for an input of 150 μV?

9 CO2 L2 PO2

9 CO2 L2 PO2

9 CO3 L3 PO3

UNIT - IV

18

- 4 a. Compute: i) $(FACE)_{16} = (?)_{10}$ ii) $(1111111)_2 = (?)_{10}$ iii) $(258)_{10} = (?)_2$
iv) Subtract using 2's complement $(15)_{10} - (31)_{10}$
- b. Simplify the following Boolean expression and realize using basic gates $Y = (A + B)(B + C)(C + B)$.
- c. Realize: i) OR using NOR only ii) AND using NAND only
iii) XOR using NOR only

9 CO4 L3 PO2

9 CO4 L3 PO2

9 CO4 L3 PO2

UNIT - V

18

- 5 a. With a help of relevant sketch, waveform and equation explain Amplitude Modulation (AM).
- b. Write the block diagram of basic communication system and explain briefly.
- c. Explain Optical Fiber Communication with neat block diagram and list the advantages of OFC.

9 CO5 L3 PO2

9 CO5 L3 PO2

9 CO5 L3 PO2