Final — 23.10.2021

Course Code: 1930405 Roll No: MLRS- R19

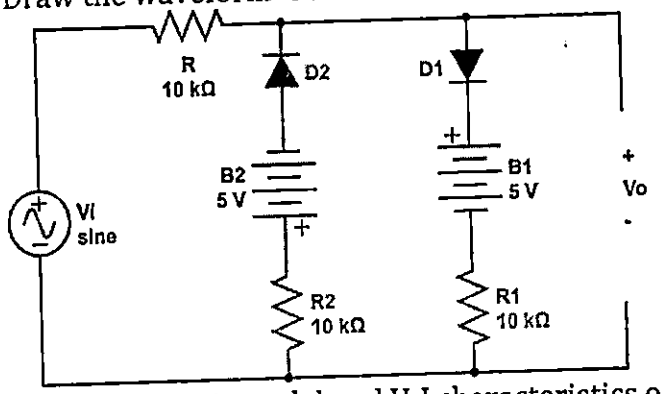
# MARRI LAXMAN REDDY
## INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

II B.Tech I Sem Supply End Examination, October 2021

## ANALOG AND DIGITAL ELECTRONICS
(CSE & IT)

**Time: 3 Hours.** **Max. Marks: 70**

Note: 1. Answer any FIVE questions.
2. Each question carries 14 marks and may have a, b as sub questions.

| | | | | | |
|---|---|---|---|---|---|
| 1 | a) | Explain how a diode used for rectification? Draw the full wave rectifier circuit diagram and derive the expression for ripple factor. | 7M | CO1 | BL4 |
| | b) | How a tunneling phenomenon is used as a diode and draw its band diagrams. | 7M | CO1 | BL2 |
| 2 | a) | Draw the waveform obtained at $V_0$ and indicate all the voltages.   | 7M | CO1 | BL5 |
| | b) | Draw the circuit model and V-I characteristics of photo diode and explain its conducting process. | 7M | CO1 | BL2 |
| 3 | a) | Draw and explain the circuit diagram, input and output characteristics of transistor in Common Collector configuration. | 9M | CO2 | BL4 |
| | b) | Find the collector and emitter currents for a transistor when both emitter and collector junctions are reverse biased. Assume $I_{C0}$=5μA, $I_{E0}$=3.57μA and $\alpha_N$=0.98. | 5M | CO2 | BL5 |
| 4 | | Derive the voltage gain of Common source MOSFET amplifier with a neat circuit diagram and draw its equivalent circuit diagrams and compare it with Common Drain amplifier. | 14M | CO3 | BL4 |
| 5 | a) | Explain the effect of coupling capacitor on the performance parameters of RC coupled amplifier. | 7M | CO2 | BL4 |
| | b) | Draw and explain the working of NOR gate in DTL using truth table | 7M | CO3 | BL4 |

6 Find all min terms and design logic circuit using NAND gates only by k-map method for the following function 14M CO4 BL5

$$f(x, y, z, w) = \sum 0,1,2,4,7,8,9,10,12,14$$

7 a) Design a 4-bit binary adder and draw its logic diagram. 7M CO5 BL4

b) Reduce the states for the following state table: 7M CO4 BL5

| Present state | Next State | | Output | |
|---|---|---|---|---|
| | x=0 | x=1 | x=0 | x=1 |
| A | A | B | 0 | 0 |
| B | C | D | 0 | 0 |
| C | A | D | 0 | 0 |
| D | E | F | 0 | 1 |
| E | A | F | 0 | 1 |
| F | G | F | 0 | 1 |
| G | A | F | 0 | 1 |

8 Design a ripple counter using D flip-flop and write its state table and explain why it is called Asynchronous counter? 14M CO5 BL4

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