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Course Code:1930401

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 Section 2(f) & 12(B) of the UGC act, 1956

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

## ANALOG ELECTRONICS

(EEE)

Time: 3 Hours.

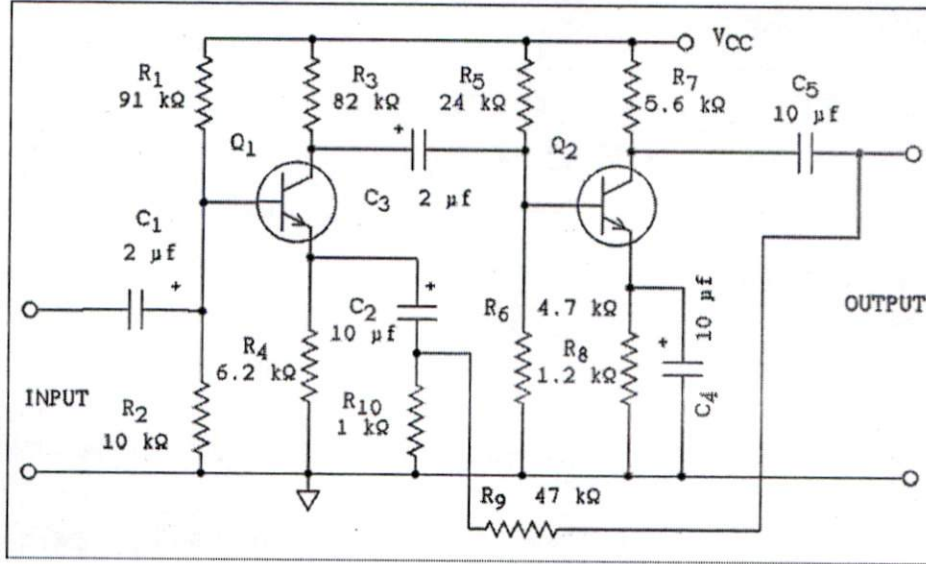
Max. Marks: 70

Note: 1. Answer any FIVE questions.

2. Each question carries 14 marks and may have a, b as sub questions.

- |   |    |                                                                                                                                                                                                                                                                                                      |     |     |     |
|---|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|
| 1 | a) | Derive the equation for ripple factor for the Full wave rectifier and draw its circuit diagram and waveforms.                                                                                                                                                                                        | 7M  | C01 | BL5 |
|   | b) | What is the significance of load line in working of transistor as an amplifier?                                                                                                                                                                                                                      | 7M  | C01 | BL1 |
| 2 |    | Draw the circuit diagram of CC amplifier and derive the equations for Voltage gain, current gain, input and output impedances from its equivalent circuit.                                                                                                                                           | 14M | C01 | BL5 |
| 3 | a) | Draw the V-I characteristics of n-channel enhancement MOSFET and identify all the regions of operation.                                                                                                                                                                                              | 7M  | C02 | BL3 |
|   | b) | Show that the transconductance $g_m$ of JFET is related to the drain current $I_{DS}$ by $g_m = \frac{2}{ V_P } \sqrt{I_{DSS} I_D}$                                                                                                                                                                  | 7M  | C02 | BL3 |
| 4 |    | An RC coupled amplifier stage used a FET with $g_m=1.5\text{mA/V}$ , $r_d=40\text{K}$ , $R_d=50\text{K}$ , and $R_g=10\text{M}$ . Assume a total shunting capacitance of 110pF. Find (a) The midband amplification (b) $f_2$ , (c) $C_b$ if $f_i=60\text{Hz}$ . Draw the respective circuit diagram. | 14M | C03 | BL2 |
| 5 | a) | Derive the equation for voltage gain of common source n-channel MOSFET amplifier by drawing its circuit and small signal low frequency equivalent circuit.                                                                                                                                           | 7M  | C02 | BL6 |
|   | b) | Draw the circuit diagram of Class A power amplifier and derive the equation for its power efficiency.                                                                                                                                                                                                | 7M  | C03 | BL3 |

- 6 Find feed back factor, voltage gain, input and output resistances for the following circuit and also identify type of feed back. 14M C04 BL3



- 7 a) Prove that a transistor with a small-signal common emitter short circuit current gain greater than 29 for RC phase shift oscillator. 7M C04 BL2  
 b) Write all dc and ac ideal characteristics of operational amplifier. 7M C05 BL1
- 8 How an op-amp is used to generate a square wave? Draw the circuit diagram and explain its working. 14M C05 BL1

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