U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

August 2023 Semester End Make-Up Examinations

Programme: B.E.
Branch: MD/EIE
Course Code: 22ES3PCAME
Course: Analog Micro Electronics

Semester: III
Duration: 3 hrs.
Max Marks: 100
Date: 10.08.2023

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1 a) Analyze and discuss the working of a negative clamper without reference voltage with necessary diagrams. **06**

b) Design a double ended clipping circuit to get the following transfer characteristics as in Fig1(b). Assume silicon diodes and $V_i = 10$ Sin wt. Draw input and output waveforms. Explain its working. **06**

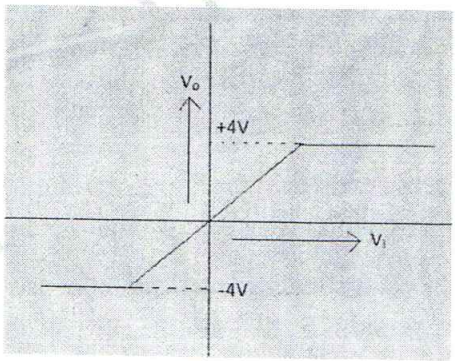


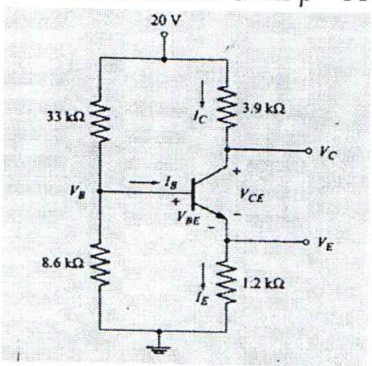
Fig 1(b)

c) For the voltage divider configuration shown below , Use approximate analysis and calculate **08**

a)V_B

b)I_C and I_B

c) V_E and V_{CE}. Assume silicon transistor with $\beta = 110$



OR

2 a) For the circuit shown in the Fig 2(a), determine I_D, V_1, V_2 and V_O **06**

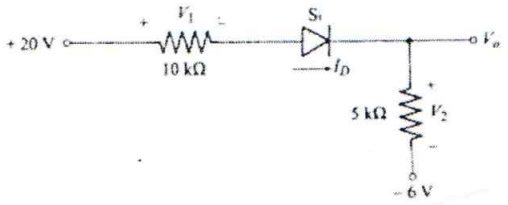


Fig 2(a)

b) Design a suitable circuit for the block shown below which has input and output waveforms as indicated **06**

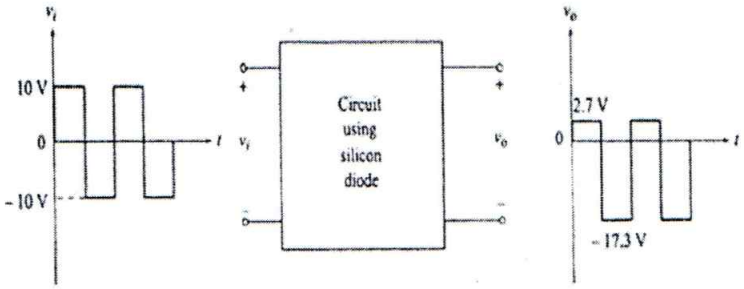


Fig 2(b)

c) Obtain the AC equivalent model of a CE voltage divider network and derive Zi, Zo, Av, AI **08**

UNIT - II

3 a) Derive expressions for gain, input resistance and output resistance of voltage shunt feedback with block representation approach. **10**

b) Discuss the significance of Miller capacitance at high frequencies with suitable expressions. **10**

UNIT – III

4 a) What is the drawback of the Class B Power Amplifier? Explain the measures to overcome the same with suitable diagrams. **05**

b) Suggest a suitable method to increase the efficiency of series fed Class A Power Amplifier using transformer and deduce an expression to prove the efficiency is higher than Series fed Class A type. **06**

c) Determine the voltage gain, input and output impedance with feedback for voltage series feedback having A=-90,Ri=15KΩ,Ro=20KΩ for feedback of: **09**
i) β=-0.2
ii) β=-0.75
Comment on the results

UNIT - IV

5 a) Analyze and Comment on the drain currents for a n-channel MOSFET with t_{ox} = 20 nm, μ_n = 650 cm2/V.s, Vt = 0.8 V, and W/L = 10. **04**
(a) V_{GS} = 5 V and V_{DS} = 1 V.
(b) V_{GS} = 2 V and V_{DS} = 1.2 V.

b) Derive an expression for drain current of NMOS transistor that operates in **09**
i) Triode region ii) Saturation region.

c) Design the circuit shown in the Fig 5(c) so that the transistor operates at I_D = 0.4mA and V_D = +0.5V. The NMOS transistor has V_t = 0.7V, $\mu_n C_{ox}$ = 100μA/V^2, L = 1μm, and W = 32 μm. Neglect the channel length modulation effect. **07**

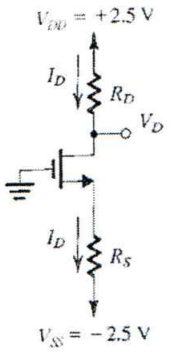


Fig 5(c)

UNIT - V

6 a) Deduce an expression for small signal voltage gain of enhancement MOSFET amplifier. **10**

b) Develop a T equivalent model of a MOSFET with necessary equations and diagrams. **10**

OR

7 a) Deduce an expression for overall voltage gain of a source follower amplifier with the help of equivalent circuits. **10**

b) Analyze and discuss the working of a MOS Current steering circuit with suitable circuit and equations. **10**

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