U.S.N.										

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

Autonomous Institute Affiliated to VTU

May 2023 Semester End Main Examinations

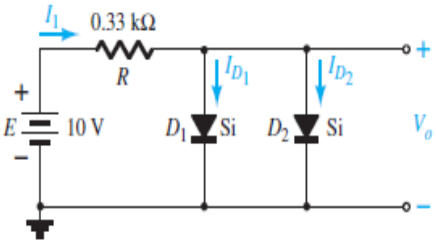
Programme: B.E. **Semester: III**
Branch: MD / EIE **Duration: 3 hrs.**
Course Code: 22ES3PCAME **Max Marks: 100**
Course: Analog Micro Electronics **Date: 08.05.2023**

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) Determine V_o, I_1,I_{D1} and I_{D2} for the parallel diode configuration shown **05**



b) For the circuit shown in Fig.1, determine the transfer characteristics and sketch the waveform for V_o and I_R. **06**

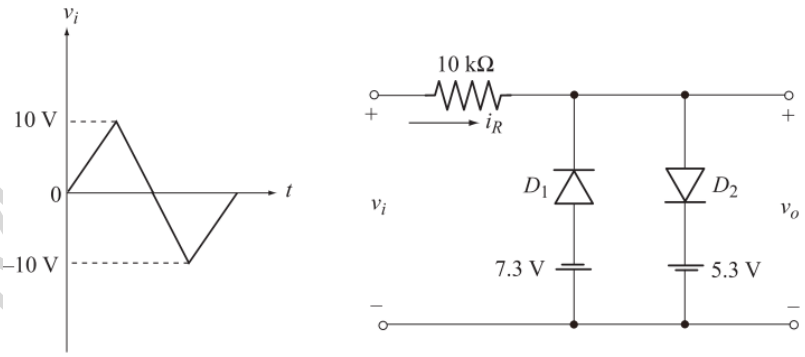
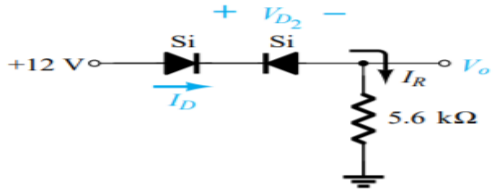


Fig1

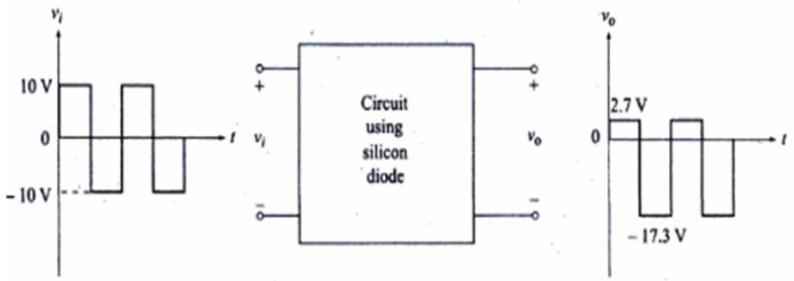
c) Determine the values of R_c, R_1, R_2, R_E for voltage divider configuration with Ic =10mA, V_{CE} = 12V and V_{cc} =24V.Assume silicon transistor with beta equal to 100. **09**

OR

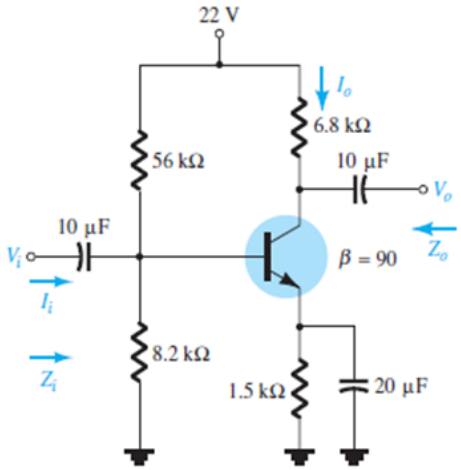
2 a) Determine I_D ,V_{D2} and V_O for the circuit shown **06**



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



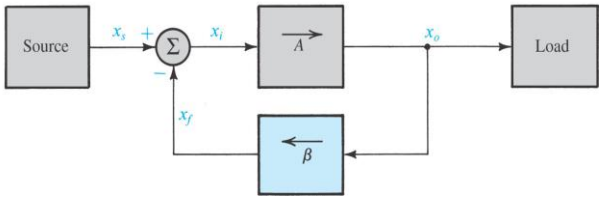
c) Determine r_e, Z_i, Z_o and A_V for the voltage divider configuration shown, with $r_o = \infty\Omega$,using r_e analysis **08**



UNIT - II

3 a) Derive equation for miller effect induced input and output capacitance for an inverting amplifier **07**

b) Identify the type of amplifier shown and explain its properties, **08**



c) Calculate gain, feedback factor, gain with feedback and voltage gain with feedback for the circuit shown in Fig 2 **05**

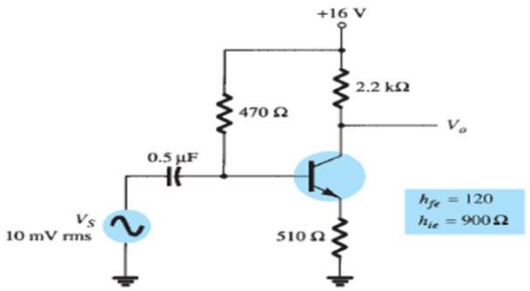


Fig2

UNIT - III

4 a) Explain the working of a Series fed Class A power amplifier with neat circuit. **08**

Also derive its efficiency.

b) For a class B amplifier providing a 20V peak signal to a 16Ω load speaker and a power supply of V_{cc} = 30V, determine the input power, output power and circuit efficiency. **06**

c) For a harmonic distortion reading of $D_2 = 0.1$, $D_3 = 0.02$, and $D_4 = 0.01$, with $I_1 = 4$ A and $R_C = 8\ \Omega$, calculate the total harmonic distortion, fundamental power component, and total power. **06**

UNIT - IV

5 a) With a neat diagram and i_d - V_{ds} characteristics, explain the operational of n – channel enhancement MOSFET. When **08**

(a)$V_{GS} \leq V_t$
(b)$V_{GS} > V_t$ & $V_{DS} < V_{GS} - V_t$
(c)$V_{GS} > V_t$ & $V_{DS} \geq V_{GS} - V_t$.

b) For a 0.8μm process technology, for which t_{ox}= 15nm and μ_n=550cm^2/V-s, find C_{ox}, k'$_n$ and the over drive voltage V_{ov}, required to operate a transistor having W/L =20 in saturation with I_D=0.2mA. What is the minimum value of V_{DS} needed? **06**

c) Discuss the biasing of n channel enhancement MOSFET using current source **06**

UNIT - V

6 a) Sketch the T equivalent circuit model of a MOSFET **06**

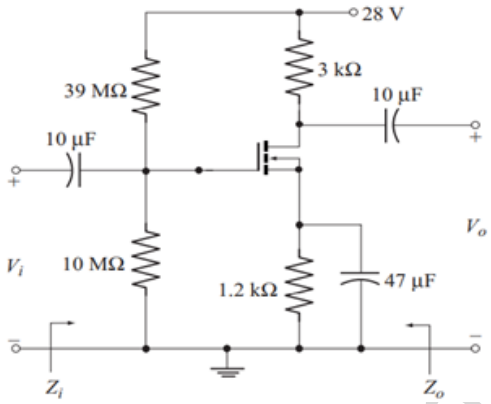
b) Derive expression for input resistance, output resistance, voltage gain and overall voltage gain of a common source MOSFET amplifier **08**

c) Discuss the working of MOS steering circuits **06**

OR

7 a) Obtain the three different relationships for determining g_m of a MOSFET. **07**

b) For the MOSFET voltage divider configuration shown, y_{os} = 25µS, calculate Z_i , Z_o, A_V. **07**



c) Explain the working of RC phase shift oscillator using MOSFET **06**

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