U.S.N.										

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

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: ES Cluster (EEE/ET/ECE/EIE/MD) **Duration: 3 hrs.**
Course Code: 19ES3CCAEC **Max Marks: 100**
Course: Analog Electronic Circuits

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

UNIT - I

1 a) For the circuit shown in Figure 1 (a) double ended clipper, assume diodes are ideal. Plot V_{out} versus V_{in} indicating all voltage levels. **08**

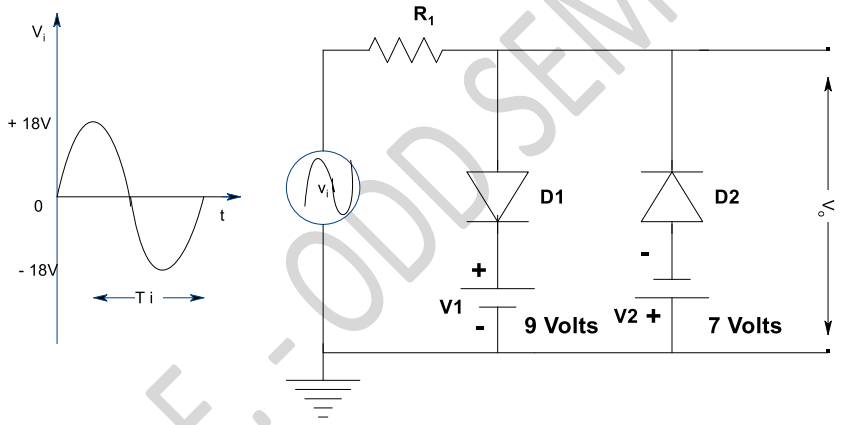

Fig 1.(a)

b) Determine v_o for the network shown in Figure 1 (b), assume Si diode. **06**

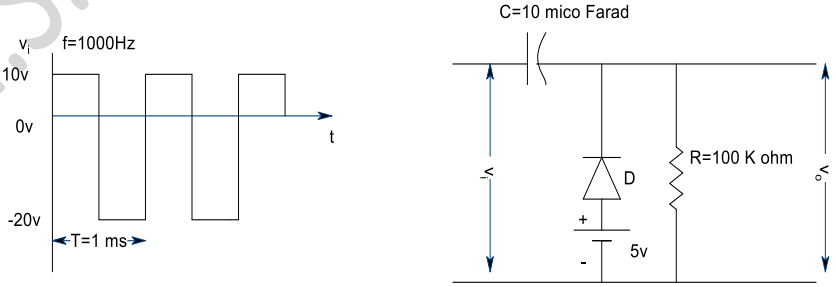

Fig 1. (b)

c) What is DC load line? How is 'Q- point' plotted on the DC load line? **06**

OR

2 a) Analyze the clipper circuit of Figure 2. (a), draw the output waveform and the transfer characteristic curve. **08**

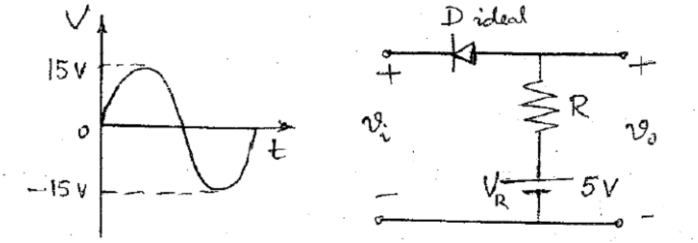

Fig 2.(a)

b) Design a clamper circuit to perform the function indicated in Fig 2. (b). **06**

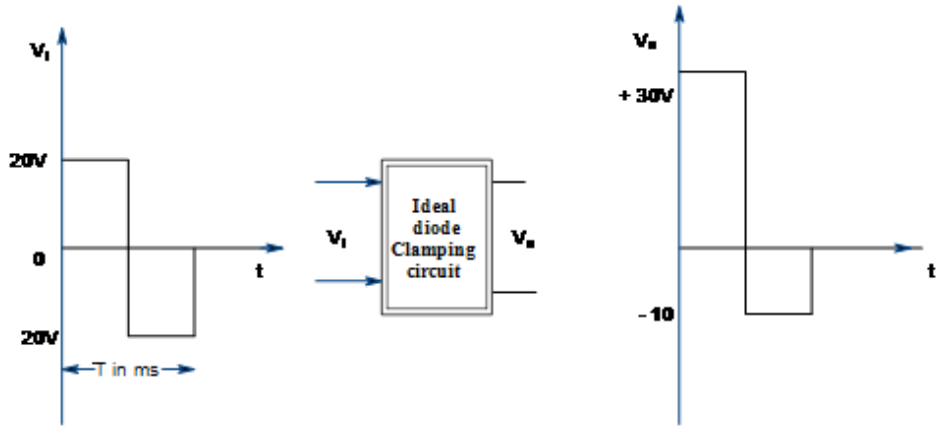

Fig 2.(b)

c) Draw bipolar junction transistor voltage divider circuit and its r_e equivalent model. Analyze the model to determine: i) voltage gain, ii) input impedance and, iii) output impedance. **06**

UNIT - II

3 a) Describe the factors that affect the low frequency response of a BJT- CE amplifier. **06**

b) Prove that Miller effect capacitance, $C_{Miller} = (1-A_V) .C_f$. **08**

c) Name four topologies of the feedback amplifiers. And draw any one block schematic among topologies. **06**

UNIT - III

4 a) Explain the classification of power amplifiers. **06**

b) Describe the working of class A transformer coupled amplifier. Derive an expression for its conversion efficiency. **06**

c) Derive expression for efficiency of Class B push-pull amplifier. For a class B Amplifier providing a 20V peak signal to a 16Ω load (speaker) and a power supply of Vcc =30V. Determine the input power, output power and power efficiency. **08**

UNIT - IV

5	a)	Explain device structure of the enhancement type NMOS and physical operation.	**08**
	b)	Derive relation for current i_d of n-channel MOSFET in triode region and saturation region.	**06**
	c)	For small-signal operation of the enhancement MOSFET amplifier, derive $A_v = v_d / v_{gs} = -g_m \cdot R_D$.	**06**

UNIT - V

6	a)	Draw the T Equivalent circuit model of MOS device and comment on the gate current value.	**10**
	b)	Derive an expression for input resistance, output resistance, voltage gain and overall voltage gain of a common source MOSFET amplifier.	**10**

OR

7	a)	Illustrate the development of T Equivalent-Circuit model for the MOSFET.	**08**
	b)	Analyze the Wilson MOS mirror circuit with improved performance. Also justify for the reducing β dependency and increasing in output resistance in Wilson MOS mirror circuits.	**12**

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