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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Third Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; March - 2021

Analog Electronics Circuit

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:

CO1: Analyze and design Diode and Transistor circuit such as Clippers, Clampers, Voltage Multipliers and Amplifiers.

CO2: Analyze and design two port hybrid equivalent model for BJT amplifier and Various BJT Oscillator Circuits.

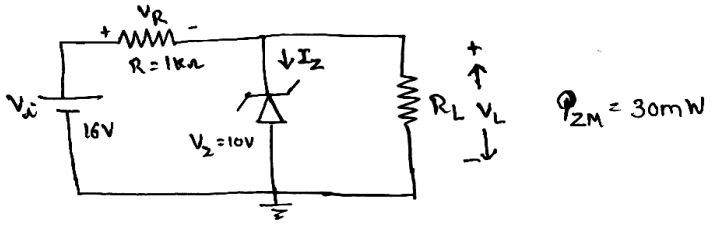
CO3: Analyze the effect of negative feedback in transistor amplifier.

CO4: Analyze and design various Power amplifier circuits and study the effect of distortions on Power amplifier.

CO5: Analysis of J-FET and MOSFET Circuit.

***Note**: I) **PART - A** is compulsory. **Two** marks for each question.*

*II) **PART - B**: Answer any **Two** sub questions (from a, b, c) for Maximum of **18 marks** from each unit.*

Q. No.	Questions	Marks	BLs	COs	POs
	I : PART - A	**10**			
I a.	Write the circuit diagram of a voltage multiplier circuit. Write input-output waveform.	2	L1	CO1	PO1
b.	State the Barkhansen criteria for sustained oscillation in oscillators.	2	L2	CO2	PO2
c.	Calculate the gain of a negative feedback amplifier having $A = -2000$, if the feedback factor is 20%.	2	L3	CO3	PO1
d.	A class *A* series fed power amplifier is required to deliver a maximum power of 20 W to a load of 4 Ω. Calculate the required supply voltage.	2	L3	CO4	PO4
e.	Write any two differences between JFET and MOSFET.	2	L2	CO5	PO2
	II : PART - B	**90**			
	UNIT - I	**18**			
1 a.	How clamping circuit differs from clippers circuit? With neat circuit diagram, explain negative clamper circuit.	9	L1	CO1	PO1
b.	For the voltage divider bias circuit, find the base current I_B , collector current I_C, collector to emitter voltage V_{CB} for CE configuration also determine V_B, V_C, V_E. Given : $R_1 = 62$ kΩ, $R_2 = 9.1$ kΩ, $R_c = 3.9$ kΩ, $R_e = 680$ Ω , $\beta = 80$, $Vcc = 16$V, $V_{BE} = 0.7$ V.	9	L3	CO1	PO3
c.	i) For the Zener regulator shown in Fig.1(c), determine V_L, I_Z, P_Z, for $R_L = 1.2$ kΩ.  Fig. Q1. (c) ii) Explain various distortions of the amplifier.	9	L3	CO1	PO4

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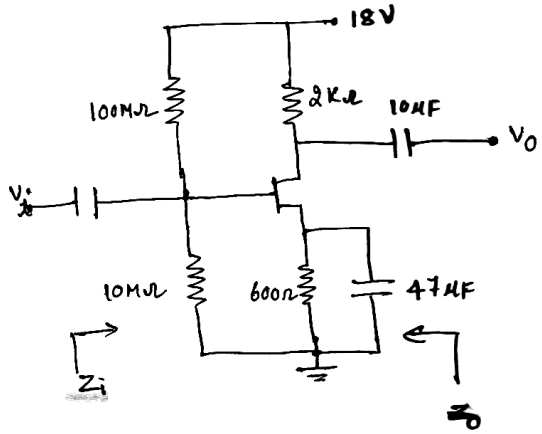
	UNIT - II	**18**			
2 a.	Derive the expression for H-parameters in a hybrid model of a transistor.	9	L1	CO2	PO2
b.	With circuit diagram, explain Hartley oscillator and write the condition for frequency of oscillation and also find the values of tank circuit elements for a transistor with h_{fe} = 40 and frequency of oscillation 100 kHz.	9	L3	CO2	PO3
c.	For CE amplifier configuration hybrid model derive an expression, i) Current gain ii) Input impedance iii) Voltage gain iv) Output impedance	9	L4	CO2	PO2
	UNIT - III	**18**			
3 a.	Explain the effect of negative feedback on output resistance of a voltage series feedback amplifier.	9	L4	CO3	PO4
b.	Derive the expression for input resistance of current series and current shunt feedback amplifier.	9	L4	CO3	PO2
c.	i) List the characteristics of negative feedback amplifier. ii) A voltage amplifier has the following parameters value without feedback: $A_V = -1000$, R_i = 20 kΩ, R_o = 15 kΩ, bandwidth = 200 kHz compute there parameter values, if negative series feedback with $\beta = -0.1$ is given.	9	L3	CO3	PO2
	UNIT - IV	**18**			
4 a.	Classify and explain power amplifier in detail.	9	L2	CO4	PO2
b.	For a class *B* push-pull power amplifier with *Vcc* = 25 V driving an 8 Ω load. Find; i) Maximum input power ii) Maximum output power iii) Maximum circuit efficiency iv) Maximum collector dissipation	9	L3	CO4	PO3
c.	With circuit diagram, explain transformer coupled class *A* power amplifier? Write *AC* and *DC* analysis expressions also state its advantages and disadvantages.	9	L4	CO4	PO1

Contd… 3

UNIT - V **18**

5 a.	Explain the construction and characteristics of E-MOSFET.	9	L2	CO5	PO1
b.	Write the circuit of JFET common source amplifier using voltage divider configuration and explain AC equivalent circuit.				
	i) Draw the small signal model	9	L4	CO5	PO2
	ii) Find input impedance and output impedance when effect of r_d is included and neglected				
c.	For the JFET amplifier shown in Fig.5(c),				
	i) Calculate Z_i and Z_o				
	ii) Calculate A_v				
	iii) Find V_o if V_i = 25 mV(rms)	9	L3	CO5	PO3



I_{DSS} = 12mA
V_p = -3V
y_{os} = 10μs
V_{GSQ} = -1V

fig 5(c)

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