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

***(An Autonomous Institution affiliated to VTU, Belgaum)***

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

## Semester End Examination; Dec. - 2015

## Analog Electronics Circuit

*Time: 3 hrs* *Max. Marks: 100*

**Note**: *Answer **FIVE** full questions, selecting **ONE** full question from each **unit**.*

### UNIT - I

1 a. With circuit diagram and related waveform, explain the working principle of voltage doubler circuit. 6

b. How clamping circuits differ from clipping circuit? With neat circuit diagram, explain negative clamper. 8

c. For the circuit shown in Fig. 1. (c) using silicon transistor with $V_{BE}$ = 0.7 V and $\beta$ = 80 find, 6

i) All resistance values ii) $V_{CE,}$ given Vc = 7.6 V, $V_E$ = 2.4 V and $I_c$ = 2 mA.

2 a. With circuit diagram, input – output waveform and transfer characteristics explain Double – ended clipper. 7

b. For the zener diode network shown in Fig. 2(b), determine $V_L$, $V_{R,}$ $I_Z$ and $P_Z$. 6

c. For a voltage divider bias circuit, derive an expression for $I_B$, $I_C$ and $V_{CE}$. 7

### UNIT - II

3 a. For the collector feedback bias circuit, derive an expression for $S(I_{CO})$ and $S(V_{BE})$. 7

b. For a common base amplifier using transistor with the following hybrid parameters, 6

$h_{ib}$ = 22 Ω, $h_{fb}$ = - 0.98, $h_{rb}$ = 26 x $10^{-4}$, $h_{ob}$ = ½ MΩ, find;

i) Current gain ii) Input impedance iii) Voltage gain

iv) Output impedance v) Voltage gain considering source.

c. Applying dual of Miller's theorem find $R_i$ and $R_{ix}$ for the circuit shown using transistor Fig. 3(c). 7

$h_{ie}$ = 1 k, $h_{re}$ = 2.5 x $10^{-4}$, $h_{fe}$ = 50, $h_{oe}$ = $1/40\,k$

4 a. What is BIAS compensation? With circuit, explain diode compensation for $V_{BE}$. 6

b. Explain Millers Theorem and its Dual. 8

c. For a CE Amplifier configuration Hybrid model Derive an expression for, 6

i) Current gain ii) Input impedance iii) Voltage gain.

Contd…2

## UNIT - III

5 a. Derive an expression for low frequency response of an amplifier, plot magnitude and phase characteristics. 10

b. Explain Voltage – series feedback Amplifier and Voltage shunt feedback amplifier. 10

6 a. Explain the RC coupled amplifier circuit and its frequency response. 8

b. List the advantages of Negative feedback. 4

c. Explain effect of negative feedback on output resistance of a voltage series feedback amplifier. 8

## UNIT - IV

7 a. Classify and explain power amplifiers in details. 8

b. The class A 4 transformer coupled audio power amplifier is required to deliver a maximum of 1 W into a loud speaker of 10 Ωresistances. If the output resistance of the amplifier is 1000 Ω calculate; 4

i) Turns ratio of the transformer required.

ii) Power supply voltage, Assume an ideal transformer.

c. For a class B push – pull power amplifier with $V_{CC}$ = 25 V driving a 8 Ω load find, 8

i) Maximum input power ii) Maximum output power

iii) Maximum circuit efficiency iv) Maximum collection dissipation.

8 a. A transformer – coupled Class – A amplifier derives a 16 Ω loud speaker through a 4:1 transformer. With $V_{cc}$ = 36 V, the circuit delivers 2 W to the load find. (Assume 100% efficiency of transformer), 10

i) Power across the transformer primary ii) rms voltage across the load

iii) rms voltage across transformer primary iv) rms value of load current

v) Conversion efficiency if the dc collection current is 150 mA.

b. Explain working of class B push pull amplifier and show that the conversion efficiency is 78.54%. 10

## UNIT - V

9 a. Explain oscillator working principle and state Barkhausen's criteria for sustained oscillations. 7

b. Explain E – MOSFET characteristics. 7

c. A Hartley oscillator uses a transistor with $h_{fe}$ = 40, find the value of $L_1$, $L_2$ and C for a frequency of oscillation of 60 kHz. 6

10 a. Explain RC phase shift oscillator? State conditions for sustained oscillations. 7

b. Explain D – MOSFET characteristics. 6

c. Explain the working of crystal oscillator? What is piezoelectric effect? 7

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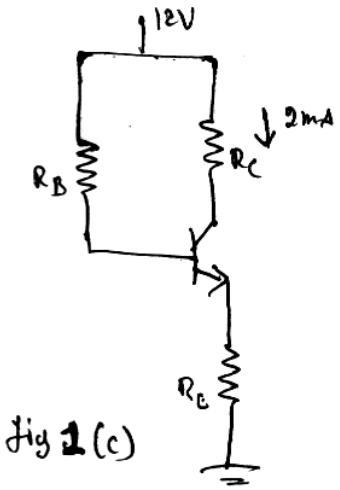


fig 1 (c)

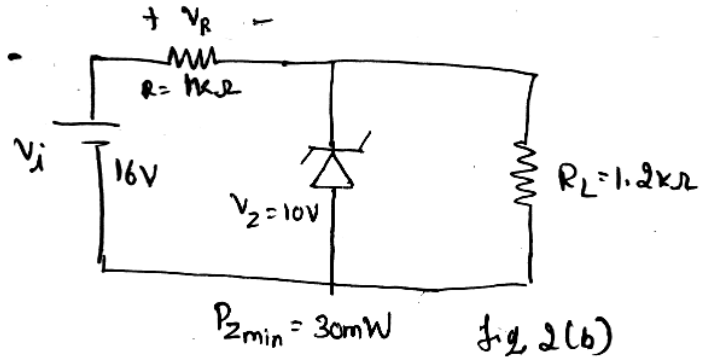


fig 2(b)

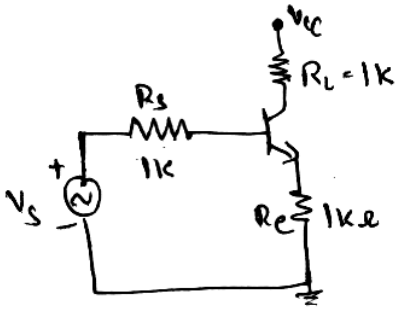


fig 3(c)

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