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

(An Autonomous Institution affiliated to VTU, Belgaum)

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

Semester End Examination; Dec - 2016/Jan - 2017

Analog Electronics Circuits

Time: 3 hrs *Max. Marks: 100*

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

UNIT - I

1 a. Draw the Physical structure of the Enhancement type NMOS transistor. Mention the different parts. 4

b. Design the circuit of Fig. 1b. The transistor operation at I_D = 0.4 mA, V_D = 0.5 V, V_{th} = 0.7 V, L = 1 µm and W = 32 µm and $\mu_n C_{OX}$ = 100 µA/V^2, Assume $\lambda = 0$. 8

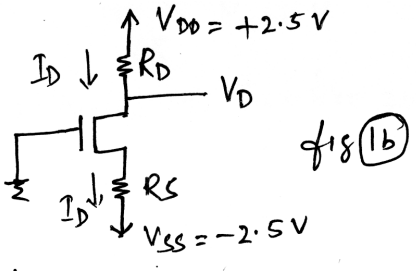

fig (1b)

c. What is biasing? Explain biasing using a constant current source. 8

2 a. With relevant diagram derive the equation for finite output resistance of a MOSFET. 10

b. Draw and explain the small signal operation of the common source MOSFET amplifier. 10

UNIT - II

3 a. Define the:
i) CMRR ii) Slew rate iii) PSRR. 6

b. Explain the working of differential input/output amplifier. 10

c. Develop the equation for Z_{in} for high input impedance capacitor coupled Voltage Follower. 4

4 a. Explain with circuit diagram and derive an equation for the output voltage of a two input Inverting and non-inverting summing amplifier. 12

b. Design capacitor coupled investing amplifier, a signal frequency range of 50 Hz to 1 kHz is applied. If the R_L is 250 Ω, calculate the requried capacitor values and sketch the circuit with values. Assume R_1 = 1 kΩ and R_2 = 47 kΩ. 8

UNIT - III

5 a. Define gain bandwidth product. Determine the upper cutoff frequency for a voltage follower with A_{OL} = 40 DB and gain bandwidth product is 1 MHz. 5

Contd.....2

	b.	Mention the any five precautions for Op-Amp circuit stability.	5
	c.	Explain with neat sketch the Integrating circuit. Discuss its DC operation.	10
6	a.	Explain miller effect. Derive the equation relating the input capacitance of an inverting amplifier.	8
	b.	Discuss the effects of slow rate of an Op-Amp.	6
	c.	Explain with neat sketch the current amplifier and derive an equation for current gain.	6

UNIT - IV

7	a.	With circuit diagram and waveform, explain the working of a saturating precision full wave rectifier.	10
	b.	Explain with neat diagram of Astable multi vibrator using Op-Amp.	10
8	a.	Sketch the circuit of a voltage type peak detector. Explain the circuit operation.	10
	b.	Draw an Op-Amp sample and hold circuit. Sketch the signal, control and output voltage waveforms. Explain the circuit operation.	10

UNIT - V

9	a.	Draw circuit and output waveform of a triangular wave generator. Explain the circuit operation.	10
	b.	using a BIFET Op-Amp with a supply of ± 12 V, design a Wein Bridge oscillator to have an output frequency of 15 kHz, Choose $C = C_1 = C_2 = 0.01\ \mu f$.	6
	c.	Explain the operation of DC voltage regulator with sketch.	4
10	a.	What is Barkhansen Criterion? Explain how oscillation starts in an oscillator.	6
	b.	Sketch the circuit of 2^{nd} order Low pass Active filter and explain the circuit operation.	10
	c.	Draw the basic circuit of a 723 IC DC voltage Regulator.	4

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