

Basavarajeswari Group of Institutions
BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT
 (Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

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Third Semester B.E. Degree Examinations, September 2024

ANALOG ELECTRONIC CIRCUITS

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
 2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PI)</u>
Module-1			
1.	a. Explain the working principle of full wave rectifier and prove that (i) Ripple factor $\gamma=0.482$.	06	(2 : 1 : 1.3.1)
	b. Explain clipper with circuit diagram and necessary waveforms.	08	(2 : 1 : 1.3.1)
	c. Sketch the equivalent circuits of diode for the following conditions (i) Ideal diode (ii) Piece wise linear model (iii) Approximate model	06	(2 : 1 : 1.3.1)
OR			
2.	a. Explain the common emitter configuration with input and output characteristics	06	(2 : 1 : 1.3.1)
	b. Explain the construction and operation of enhancement type of MOSFET.	06	(2 : 1 : 1.3.1)
	c. Write a short note on (i) Positive Fixed Voltage Regulator (ii) Adjustable Voltage Regulator	08	(2 : 1 : 1.3.1)
Module-2			
3.	a. Explain voltage divider bias circuit with design constraints.	06	(3:2 : 2.2.1)
	b. Design voltage divider bias circuit to meet the following constraints: $I_E = 5 \text{ mA}$, $V_{CC} = 20\text{V}$, $\beta = 20$	10	(3:2 : 2.2.1)
	c. Draw the hybrid π Model and T-model and necessary Equations.	04	(2 : 2 : 1.3.1)
OR			
4.	a. Explain drain to gate feedback resistor biasing of MOSFET	06	(2 : 2 : 1.3.1)
	b. Draw the small signal equivalent circuit model for MOSFET and obtain the expression for voltage gain.	10	(2 : 2 : 1.3.1)
	c. Mention the relation between r_π and r_e	04	(2 : 2 : 1.3.1)
Module-3			
5.	a. With circuit diagram, explain the basic configuration of MOSFET	10	(2 : 3 : 1.3.1)
	b. Explain the different internal capacitances of a MOSFET	10	(2 : 3 : 1.3.1)
OR			
6.	a. Draw and explain the high frequency small signal model of MOSFET.	10	(1 : 3 : 1.3.1)
	b. Write a Short note on (i) Current Source (ii) Current Mirror	10	(2 : 3 : 1.3.1)

Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI- Performance Indicator)

Module-4

7. a. Explain the properties of negative feedback **10** (2 :4 : 1.3.1)
b. With neat block diagram explain the working of a voltage amplifier (Series-Shunt). Obtain expressions for gain, input resistance and output resistance with feedback. **10** (2 :4 : 1.3.1)

OR

8. a. What is power amplifier? Classify power amplifier based on output stages. **10** (1 :4 : 1.3.1)
b. Explain the working of Class B output stage amplifier and also prove that power conversion efficiency 78.5%. **10** (2 :4 : 1.3.1)

Module-5

9. a. Explain the working of instrumentation amplifier using transducer bridge and write the expression for output voltage. **08** (2 :4 : 1.3.1)
b. Explain the peak detector using op-amp. **06** (2 :4 : 1.3.1)
c. Explain R-2R digital to analog convertor **06** (2 :4 : 1.3.1)

OR

- 10 a. Explain the monostable multivibrator using IC555 timer **08** (2 :4 : 1.3.1)
b. Explain the working of a first order active low pass filter with circuit and frequency response **08** (2 :4 : 1.3.1)
c. Design astable multivibrator using IC555 timer. Assume $c=0.01\mu\text{F}$ **04** (2 :4 : 1.3.1)
(i) $f=1\text{ kHz}$, Duty Cycle = 75%

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