USN | | | | | | | | | | **Course Code** | 2 | 2 | E | C | 3 | 4 |

Third Semester B.E. Degree Examinations, March/April 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

Q. No		*Question*	*Marks*	*(RBTL:CO:PI)*
		Module-1		
1.	**a.**	What is equivalent circuit? Sketch the equivalent circuits of diode for the following biasing conditions. (i) Ideal diode (ii) Piece wise linear model (iii) Approximate model	**06**	(2 :1 : 1.3.1)
	b.	Explain the working principle of FULL wave rectifier and prove that (i) Ripple factor Υ =0.482 (ii) Efficiency η =81.00%	**08**	(2 :1 : 1.3.1)
	c.	Explain the positive and negative clamping circuits with neat waveform.	**06**	(2 :1 : 1.3.1)
		OR		
2.	**a.**	Explain construction and working principle of transistor with current/carrier flow diagram.	**06**	(2 :1 : 1.3.1)
	b.	Write a note positive fixed 78XX series voltage regulator and adjustable voltage regulator LM 317.	**08**	(2 :1 : 1.3.1)
	c.	Explain the construction and operation of depletion type of MOSFET and draw the drain and transfer characteristics. Explain the principle of operation of depletion MOSFET.	**06**	(2 :1 : 1.3.1)
		Module-2		
3.	**a.**	What is biasing? Explain voltage classical voltage divider bias circuit and discuss the design equation with examples.	**08**	(2 :2 : 1.3.1)
	b.	Define small signal modelling and derive expression of collector current and trans conductance.	**08**	(2 :2: 1.3.1)
	c.	Draw the hybrid T Model of transistor with necessary equations.	**04**	(2 :2 : 1.3.1)
		OR		
4.	**a.**	Explain biasing by fixing V_{GS} and connecting source resistance.	**06**	(2 :2 : 1.3.1)
	b.	Explain drain to gate feedback resistor biasing MOSFET	**06**	(2 :2: 1.3.1)
	c.	Draw the small signal equivalent circuit model for MOSFET and obtain the expression for voltage gain.	**08**	(2 :2 : 1.3.1)
		Module-3		
5.	**a.**	Explain the different configuration of MOSFET amplifier and characterization amplifier with necessary equation.	**10**	(2 :3 : 1.3.1)
	b.	Derive the input impedance, output impedance and voltage gain for the common source amplifier with source resistance	**10**	(2 :3: 1.3.1)
		OR		
6.	**a.**	Draw the high frequency model of MOSFET and obtain simplified model with proper assumption.	**06**	(2 :3 : 1.3.1)

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

	b.	Write a short note on current mirror and current steering circuit.	**08**	(2 :3: 1.3.1)
	c.	Explain the three frequency bands in MOSFET CS-Amplifier.	**06**	(2 :3 : 1.3.1)

Module-4

7.	a.	Draw the block diagram of feedback amplifier and derive the overall gain with feedback.	**06**	(1 :4 : 1.3.1)
	b.	Explain the different topologies of feedback ampler with neat block diagram.	**10**	(2 :4: 2.2.1)
	c.	List the properties of negative feedback.	**04**	(1 :4 : 1.3.1)

OR

8.	a.	Explain the working principle of class-A amplifier output stage and draw the transfer characteristics with necessary equations.	**10**	(2 :4 : 1.3.1)
	b.	Draw the class-B output stage circuit and prove that the efficiency of class B output stage efficiency is 78.5%.	**10**	(2 :4: 2.2.1)

Module-5

9.	a.	Explain instrumentation amplifier with bridge circuit diagram and derive equation for output voltage.	**08**	(2 :4: 1.3.1)
	b.	Briefly explain peak detector using op-amp with necessary waveform.	**06**	(2 :4: 1.3.1)
	c.	Explain the working principle of successive approximation network ADC.	**06**	(2 :4: 1.3.1)

OR

10	a.	Design and explain the first order low pass butterworth filter with circuit diagram.	**06**	(2 :4: 1.3.1)
	b.	Explain the operation of 555 timer as an actable multivibrator with relevant expressions.	**08**	(2 :4: 1.3.1)
	c.	Design the actable multivibrator with the following specification. C=0.1µF (i) fo=1khz, Duty Cycle=40% (ii) fo=2khz, Duty Cycle=50%	**06**	(2 :4: 2.2.1)

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