Basavarajeswari Group of Institutions

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN											Course Code	2	2	E	E	3	3

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.	Sketch and explain double ended clipper circuit. Also draw input and output waveform.	**07**	**(2 :1 : 1.4.1)**
	b.	Derive an expression for I_B and V_{CE} for emitter bias circuit. Also Sketch the load line.	**07**	**(3 :1 : 1.4.1)**
	c.	The emitter bias configuration has the following specifications I_{CQ}= 1/2(I_{csat}), where I_{csat}=8mA, Vcc=28V, Vc=18v, β=110. Determine R_B, R_C and R_E	**06**	**(3 :1 : 2.4.1)**
		(OR)		
2.	a.	Sketch the output for the positive and negative clamper circuits.	**06**	**(2 :1 : 1.4.1)**
	b.	Derive an expression for the stability factor S(I_{CO}) for a voltage divider bias configuration.	**07**	**(3 :1 : 1.4.1)**
	c.	Design a voltage divider bias circuit for the specified conditions. V_{cc}=10V, V_{CE}= 5V, Ic=2mA, S(Ico)≤5, β=50, Rc=1.5KΩ, Find R_1 and R_2.	**07**	**(3 :1 : 2.4.1)**
		Module-2		
3.	a.	Derive the expression for current gain, voltage gain, input impedance and output impedance of an emitter follower circuit.	**10**	**(3 :2 : 1.4.1)**
	b.	A voltage source of negligible internal resistance drives a common collector transistor amplifier. The load resistance is 2500Ω. The transistor h parameters are h_{fc}=-50, h_{ic}=1Kohm, h_{oc}=25μA/V and h_{rc}=1. Calculate A_i, Z_i, A_v and Z_o.	**10**	**(3 :2 : 2.1.2)**
		(OR)		
4.	a.	Derive an expression for lower cut off frequencies due to various RC networks in CE amplifiers	**10**	**(3 :2 : 1.4.1)**
	b.	Derive equations for Miller input and output capacitance.	**10**	**(3 :2 : 1.4.1)**
		Module-3		
5	a.	Draw and explain the Cascade configuration. Mention its advantages?	**06**	**(2 :3 : 1.4.1)**
	b.	Derive an expression for Zi, A_I and A_v for a Darlington emitter follower circuit.	**10**	**(3 3 : 1.4.1)**
	C	State the features of Darlington connection.	**04**	**(2 :3 : 1.4.1)**

.

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

(OR)

6.	a.	Prove that how band width of an amplifier increases with negative Feedback?	**10**	**(3 : 3 : 1.4.1)**
	b.	For a current series feedback amplifier, derive an expression for Z_{if} and Z_{of}?	**06**	**(3 : 3 : 1.4.1)**
	C.	List the advantages of negative feedback.	**04**	**(2 : 3 : 1.4.1)**

Module-4

	a.	Compare class A, B, AB, and C amplifiers with respect to Q-point, efficiency, collector current flow.	**06**	**(2 :4 : 1.4.1)**
7.	b.	Explain the operation of transformer coupled class A amplifier with neat circuit diagram and load line diagram.	**07**	**(2 :4 : 1.4.1)**
	c.	A class B push pull amplifier operating with V_{cc}=25V, provides a 22V peak signal to an 8Ω load. Find peak load current, dc current drawn from the supply, input power, output power, circuit efficiency and power dissipation.	**07**	**(3 :4 : 2.1.2)**

(OR)

8.	a.	Discuss Barkhausen criteria with neat block diagram.	**05**	**(2 :4 : 1.4.1)**
	b.	Explain how a Barkhausen criterion is satisfied in RC phase shift oscillator.	**08**	**(2 :4 : 1.4.1)**
	c.	A crystal has the following parameters L= 0.3344H, C_M=1pF, C= 0.065pF and R= 5.5KΩ. Calculate the series resonant frequency, parallel resonant frequency and Q of the crystal.	**07**	**(3 :4 : 2.1.2)**

Module-5

9.	a.	Calculate the trans-conductance gm of a JFET having values of I_{DSS}=12mA and V_p= - 4v at bias points i)V_{GS}=0v ii)V_{GS}= -1.5v	**06**	**(3 : 5 : 2.1.2)**
	b.	Compare BJT and MOSFET	**04**	**(2 : 5 : 1.4.1)**
	c.	Explain the construction, working and characteristics of an n-channel JFET ?	**10**	**(2 : 5 : 1.4.1)**

(OR)

10	a.	A JFET has gm= 6m℧ at V_{GS}= -1V.Find I_{DSS} if pinch off voltage Vp= -2.5V.	**06**	**(3 : 5 : 2.1.2)**
	b.	Compare BJT and FET	**04**	**(2 : 5 : 1.4.1)**
	c.	Explain the construction and operation of n-channel D-MOSFET	**10**	**(2 : 5 : 1.4.1)**

** ** **

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