

**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, January 2025

**ANALOG ELECTRONICS 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>
<b>Module-1</b>			
1.	a. Draw the circuit of parallel negative clipper and explain its operation with the help of relevant wave forms.	06	(3 : 1 : 1.4.1)
	b. Draw the Thevenin's equivalent circuit for voltage divider bias and determine its stability factor $S(I_{CO})$ and also $S(V_{BE})$ .	06	(3 : 1 : 1.4.1)
	c. Design a voltage divider bias circuit for the specified conditions. $V_{CC}=12\text{ V}$ , $V_{CE}=6\text{ V}$ , $I_C=1\text{ mA}$ , $S(I_{CO})=20$ , $\beta=100$ and $V_{BE}=1\text{ V}$	08	(3 : 1 : 2.4.1)
<b>(OR)</b>			
2.	a. Draw the circuit of negative clamper and explain its operation with the help of relevant wave forms.	06	(3 : 1 : 1.4.1)
	b. Obtain the expressions for the coordinates of Q point for emitter bias configuration.	06	(3 : 1 : 1.4.1)
	c. For the circuit shown in Fig. Q2 (c) calculate $I_B, I_C, V_{CE}, V_C, V_E, V_B$ and $V_{BC}$ . Assume $\beta=100$ .	08	(3 : 1 : 2.1.2)

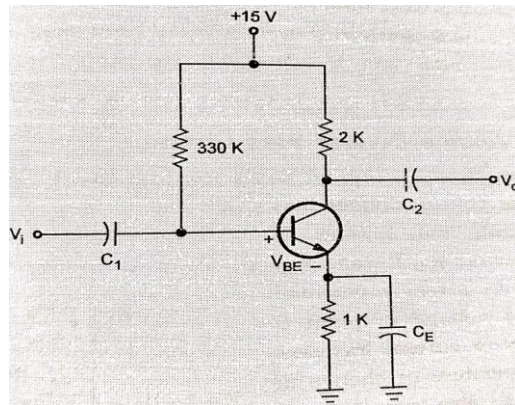


Fig. Q2 (c)

<b>Module-2</b>			
3.	a. Starting from the fundamentals, define h parameters and obtain h parameter equivalent circuit of CE configuration.	10	(3 : 2 : 2.1.2)
	b. For the transistor connected in CE configuration, determine $A_i, R_i, A_v, A_{is}, A_{vs}$ and $R_o$ using complete hybrid model. Given $R_L = R_s = 1\text{ K}\Omega$ , $h_{fe}=100$ , $h_{ie}=1\text{ K}\Omega$ , $h_{oe}=20\mu\text{ A/V}$ and $h_{re}=2 \times 10^{-4}$	10	(3 : 2 : 2.1.2)
<b>(OR)</b>			
4.	a. Derive an expression for lower cut off frequencies due to various RC networks in CE amplifiers.	10	(3 : 2 : 1.4.1)

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

- b. Derive equations for Miller input and output capacitance. **10** (3 : 2 : 1.4.1)

### **Module-3**

5. a. Explain cascade connection with the help of circuit. Mention its advantages. **06** (2 : 3 : 2.1.2)  
 b. Derive an expression for  $Z_i$ ,  $Z_o$  and  $A_i$  for a Darlington emitter follower circuit. **10** (3 : 3 : 1.4.1)  
 c. State the advantages of negative feedback. **04** (2 : 3 : 2.1.2)

(OR)

6. a. For a current series feedback amplifier, derive an expression for  $Z_{if}$  and  $Z_{of}$ . **06** (3 : 3 : 1.4.1)  
 b. Prove that how band width of an amplifier increases with negative feedback? **10** (3 : 3 : 1.4.1)  
 c. With neat block diagram explain the concept of amplifier with feedback. **04** (2 : 3 : 2.1.2)

### **Module-4**

7. a. Compare class A and B amplifiers with respect to Q-point, efficiency, collector current flow. **04** (2 : 4 : 2.1.2)  
 b. Explain the operation of series fed class A amplifier with neat circuit diagram and load line diagram. **08** (2 : 4 : 2.1.2)  
 c. A class B push pull amplifier operating with  $V_{cc}=25V$ , provides a 22 V peak signal to an  $8\ \Omega$  load. Find peak load current, dc current drawn from the supply, input power, output circuit efficiency and power dissipation. **08** (3 : 4 : 2.1.2)

(OR)

8. a. Explain how Barkhausen criteria is satisfied in RC phase shift oscillator. **08** (2 : 4 : 2.1.2)  
 b. In a Colpitts oscillator  $C_1=C_2=C$  and  $L=100\ \mu H$ . The frequency of oscillations is 500 KHz. Determine the value of C. **08** (3 : 4 : 2.1.2)  
 c. Compare Wien Bridge oscillator and RC phase shift oscillator. **04** (2 : 4 : 2.1.2)

### **Module-5**

9. a. Compare BJT and FET. **08** (2 : 5 : 2.1.2)  
 b. Explain the construction, working and characteristics of an n-channel JFET. **12** (2 : 5 : 2.1.2)

(OR)

- 10 a. Compare BJT and MOSFET. **08** (2 : 5 : 2.1.2)  
 b. Discuss the construction, working and characteristics of an enhancement type MOSFET. **12** (2 : 5 : 2.1.2)

\*\* \*\* \*