Q. Code:869143

Reg. No. | | | | | | | | | | | | | |

B.E/B.TECH DEGREE EXAMINATIONS, MAY 2024

Third Semester

EC18305 – ELECTRONIC CIRCUITS

(Electronics and Communication Engineering)

(Regulation 2018/2018A)

TIME: 3 HOURS **MAX. MARKS**: 100

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Apply the knowledge of BJT to design practical amplifier circuits.	**3**
CO 2	Analyze high frequency effect on CE amplifier and design power amplifiers.	**4**
CO 3	Design a feedback amplifier to improve amplifier performance.	**3**
CO 4	Understand the operation of oscillator circuit.	**2**
CO 5	Analyze the application of tuned amplifiers.	**4**

PART- A (10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Why the operating point is selected at the centre of the active region?	**1**	**2**
2.	What is thermal run away in a transistor?	**1**	**1**
3.	Compare small signal and large signal amplifier.	**2**	**3**
4.	What are the merits and demerits of class A power amplifier?	**2**	**1**
5.	Define negative and positive feedback.	**3**	**1**
6.	What is the effect on input and output impedance of an amplifier if it employs current series negative feedback?	**3**	**2**
7.	Differentiate amplifier and oscillator.	**4**	**3**
8.	Why a LC tank circuit does not produced sustained oscillations. How can this be overcome?	**4**	**2**
9.	Mention applications of tuned amplifier.	**5**	**1**
10.	What is the need for neutralization circuits?	**5**	**1**

PART- B (5x 14=70Marks)

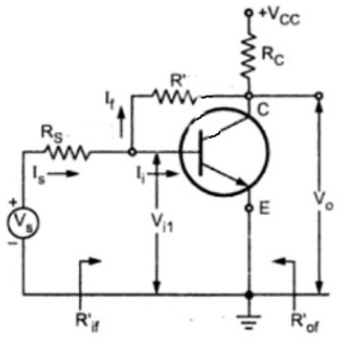
		Marks	CO	RBT LEVEL
11. (a)	Explain volatge divider bias method for BJT and derive an expression for stability factors.	**(14)**	**1**	**2**

(OR)

(b)	With neat diagrams, explain two bias compensation techniques and state its advantages and disadvantages.	**(14)**	**1**	**2**

12. (a)	A transistor has h_{ie} = 6kΩ and h_{fe} = 224 at I_C = 1mA, with f_T = 80MHz and $C_{b'c}$ = 12pF. Determine g_m, $r_{b'e}$, $r_{bb'}$ and $C_{b'e}$ at room temperature.	**(14)**	**2**	**3**
	(OR)			
(b)	A series fed Class A amplifier, operates from 18V dc source and applied sinusoidal input signal generates peak base current 9mA. It is given that R_B = 1.2 KΩ, R_L = 16 Ω, β = 40. Calculate: (i) Quiescent current ICQ, (ii) Quiescent voltage VCEQ, (iii) DC input power PDC, (iv) AC output power PAC and (v) Efficiency.	**(14)**	**2**	**3**

13. (a)	**(i)**	A negative feedback amplifier has an open loop gain of 60,000 and a closed loop gain of 300. If the open loop upper cut off frequency is 15KHz, estimate the closed loop upper cut off frequency. Also, calculate the total harmonic distortion with feedback if there is 10% harmonic distortion without feedback.	**(8)**	**3**	**3**
	(ii)	An amplifier has a volatge gain of 5000. Its input impedance is 1.5 KΩ and output impedance is 50 KΩ. Calculate the volatge gain, input and output impedance of the circuit is 4% of the feedback is fed in the form of series negative voltage feedback.	**(6)**	**3**	**3**
		(OR)			
(b)		The circuit shown below has the following parameters Rc =2 KΩ, R'= 20KΩ, Rs =5KΩ, hie =2.2KΩ, hfe =100, and hoe =0. Find R_{Mf} , A_{Vf} , R_{if} and R'_{of} .	**(14)**	**3**	**3**



14. (a)	Draw the circuit of a Wien bridge oscillator. Derive the transfer function of the phase lead-lag network used and hence explain how Barkhausen conditions are satisfied.	**(14)**	**4**	**3**
	(OR)			
(b)	Explain the operation of a Colpitt's oscillator and derive an expression for its frequency of oscillation and condition for sustained oscillation.	**(14)**	**4**	**3**
15. (a)	Draw the circuit of a Double tuned amplifier. Draw its frequency response. Using small signal equivalent derive expressions for gain at resonance and 3 dB bandwidth.	**(14)**	**5**	**3**
	(OR)			
(b)	A single tuned RF amplifier uses a transistor with an output resistance of 50 KΩ, output capacitance of 15 pF and internal resistance of next stage is 20 kΩ. The tuned circuit consists of 47 pF capacitance in parallel with series combination of 1μH inductance and 2Ω resistance. Calculate resonant frequency, effective quality factor and bandwidth of the circuit.	**(14)**	**5**	**3**

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	A CE amplifier is drawn by a voltage source of internal resistance r_s =1500 Ω and the load impedance is R_L = 1000Ω. The h-parameters are h_{ie} = 1.1KΩ, h_{re} = 2 X 10^{-4} , h_{fe} = 50 and h_{oe} =25μA/V. Compute the current gain A_i, input resistance R_i , voltage gain A_v and output resistance R_o using exact analysis.	**(10)**	**1**	**4**

****