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$$I_C^2 \frac{V_{CC}}{R_L}$$

Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Final Examination, Summer 2025

Course Code: CSE215, Course Title: Electronic Devices and Circuits

Level: 2 Term: 2 Batch: 66

Time: 02:00 Hrs

Marks: 40

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	a) Name the components in a practical circuit of a transistor amplifier.	[1]	CO1
	b) Recall 3-db frequency.	[1]	
	c) Define unipolar transistor.	[1]	
	d) List down the characteristics of an ideal operational amplifier.	[1]	
	e) Write a short note on CMOS.	[1]	
2.	a) Explain in detail the operation of a tank circuit and the process through which undamped oscillations are achieved within it. <i>oscillatory circuit</i>	[5]	CO2
	b) Differentiate between positive and negative feedback in amplifiers with respect to phase relation between input and feedback signals. Illustrate the answer with diagrams.	[5]	
	c) Demonstrate the construction and working of a JFET with neat diagrams.	[5]	
3.	a) For a Hartley Oscillator, the values of the inductors are $L_1 = 1000 \mu H$, $L_2 = 100 \mu H$, and the capacitance is $C = 20 \text{ pF}$. The mutual inductance between the coils is $M = 40 \mu H$. If the output voltage developed across L_1 is 10 V , Solve for the following: <i>$M \propto \sqrt{\frac{L_2}{L_1}}$</i>	[4]	CO3
	b) An amplifier rated at 80 W output is connected to a 5Ω speaker. Solve for the value of (i) Calculate the input power required for full power output if the power gain is 29 db . (ii) Calculate the input current for rated output if the amplifier current gain is 38 db .	[4]	
	c) An amplifier has an open-loop gain of $100,000$. A negative feedback of 10 db is applied. If due to ageing, the amplifier gain falls to $80,000$; Solve for the value of (i) Voltage gain with feedback (ii) Value of feedback fraction (iii) The percentage reduction in stage gain without feedback. <i>$V_{BE} = 0.7 \text{ V}$</i>	[6]	
	d) A silicon transistor with $\beta = 150$ is biased with a V_{CC} of 9 V using the fixed-bias method, with $R_B = 415 \text{ k}\Omega$ and $R_C = 2 \text{ k}\Omega$. Solve the biasing circuit for (i) Draw the proper bias circuit (ii) Determine the operating point and (iii) The load line.	[6]	