

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE, NOVEMBER - 2023**

**ANALOG CIRCUITS FOR INSTRUMENTATION**

[Maximum marks: 75]

[Time: 3 Hours]

**PART A**

**I. Answer all the following questions in one word or one sentence. Each question carries 1 mark  
(9 x 1 = 9 Marks)**

		Module outcome	Cognitive level
1	The phase difference between input and output signals in a Common Emitter amplifier is .....	M1.05	R
2	The number of depletion layers in a transistor is.....	M1.01	R
3	State the condition for Barkhausen criteria.	M2.02	U
4	A phase shift oscillator has..... RC sections.	M2.03	R
5	The input stage of an OP-amp is usually a.....	M3.01	U
6	Define slew rate.	M3.03	U
7	Draw the circuit of zero crossing detector.	M4.02	U
8	Write the name of any two nonlinear circuits using op-amps.	M4.01	R
9	Define output offset voltage in op-amp.	M3.02	U

**PART B**

**II. Answer any eight questions from the following. Each question carries 3 marks.  
(8 x 3 = 24 Marks)**

		Module outcome	Cognitive level
1	Draw the input characteristics of common emitter configuration.	M1.05	U
2	Describe the frequency response and bandwidth of transistor amplifier.	M1.06	U
3	Draw the circuit of Colpitt's oscillator.	M2.03	U
4	Draw the circuit of RC phase shift oscillator.	M2.03	U
5	Explain the block diagram of an operational amplifier.	M3.01	U
6	Discuss the operation of Op-amp differentiator.	M3.05	U
7	Explain the working of voltage to current converter.	M3.04	A
8	Draw and explain op-amp clipper circuit.	M4.03	U
9	Draw the circuit of log amplifier and explain.	M4.05	U
10	List out ideal op amp characteristics.	M3.02	U

**PART C**

**Answer all questions. Each question carries seven marks**

**(6 x 7 = 42 Marks)**

		<b>Module outcome</b>	<b>Cognitive level</b>
III	With a neat sketch, explain the working of emitter follower circuit. <b>OR</b>	M1.07	U
IV	Define $\beta$ . Show that $\beta = \frac{\alpha}{1-\alpha}$ .	M1.04	U
V	Explain the working of crystal oscillator. <b>OR</b>	M2.03	U
VI	Describe the working of astable multivibrator using transistor.	M2.04	U
VII	Design a non-inverting amplifier with gain five (5). <b>OR</b>	M3.04	A
VIII	With a neat sketch explain about instrumentation amplifier. List its two applications.	M3.05	A
IX	With neat diagram explain the working of sample and hold circuit. <b>OR</b>	M4.04	U
X	Draw and explain the working of precision half wave rectifier.	M4.01	U
XI	Explain DC load line with necessary diagram. <b>OR</b>	M1.05	U
XII	Explain the working of single stage C.E amplifier circuit with potential divider biasing.	M1.04	U
XIII	Explain the working of Wien bridge oscillator. <b>OR</b>	M2.03	U
XIV	Derive an expression for the gain of positive feedback amplifier.	M2.01	U

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