TED (21) 3031
(Revision-2021)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, NOVEMBER - 2024

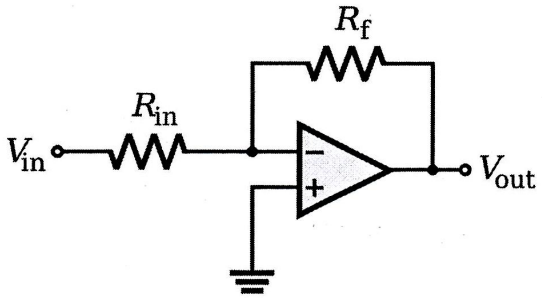
ANALOG AND DIGITAL CIRCUITS

[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 feedback mechanism in which the feedback signal opposes the input signal is called …….. feedback.	M1.02	R
2	List any two applications of oscillators.	M1.04	R
3	Define CMRR of an op-amp.	M2.01	R
4	Identify the circuit given below and write its output expression. 	M2.02	A
5	State the mathematical expressions of De Morgan's theorems in Boolean algebra.	M3.03	R
6	Write 2's complement representation of $(0101\ 1101)_2$	M3.01	A
7	Implement the logical expression Y = AB + C using basic logical gates.	M3.02	A
8	List any two applications of flip flops.	M4.02	R
9	Show the circuit symbol of D flip flop.	M4.02	R

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	Illustrate the operation of complementary symmetry push pull amplifier.	M1.01	U
2	List different types of coupling schemes in transistor amplifier circuits and state their importance.	M1.01	R
3	List the characteristics of class A power amplifier.	M1.01	R
4	Show the block diagrams of positive and negative feedbacks in amplifier circuits.	M1.02	R
5	State the characteristics of ideal op-amp.	M2.01	R

6	Illustrate the working of zero crossing detector.	M2.03	U
7	Draw the circuit diagram and waveforms of half wave precision rectifier.	M2.04	R
8	Draw a differentiator circuit using an op-amp and write its output equation.	M2.03	R
9	Draw the symbols of universal gates and write their truth tables.	M3.02	R
10	Show the truth table and block schematic representation of a 4x1 multiplexer.	M4.01	R

PART C

Answer all questions. Each question carries seven marks

(6 x 7 = 42 Marks)

		Module outcome	Cognitive level
III	Illustrate the working of a crystal oscillator.	M1.03	U
	OR		
IV	Explain the operation of astable multivibrator with a neat diagram.	M1.04	U
V	Explain op-amp as Integrator. Derive the expression for output voltage.	M2.03	U
	OR		
VI	Outline the concept of virtual ground in op amp circuits with the help of a neat diagram.	M2.01	U
VII	Apply De Morgan's theorem to find the solution of the following logical expressions. (a) $Y = \overline{A.(A+C)}$ (b) $Y = \overline{A + \overline{BC}}$	M3.03	A
	OR		
VIII	Convert the binary number $(1\ 1100\ 1011\ .\ 101)_{10}$ to its equivalent decimal number.	M3.02	A
IX	Using K map, minimize the following Boolean function f(A, B, C) = ∑m(0, 1, 2, 3, 5, 7)	M3.04	A
	OR		
X	Perform the following operations of binary numbers. (a) (11011)x(101) (b) (111010)÷(100)	M3.01	A
XI	Compare synchronous and asynchronous counters.	M4.02	U
	OR		
XII	Explain the operation of ramp type ADC with a neat diagram.	M4.04	U
XIII	Illustrate the following flipflops with their symbolic representations and truth Table. (a) JK flipflop (b) SR flipflop	M4.04	U
	OR		
XIV	Construct a half subtractor from its truth table using basic logic gates.	M4.01	U

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