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(Revision – 2021)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2025

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 *'one'* mark.

(9 x 1 = 9 Marks)

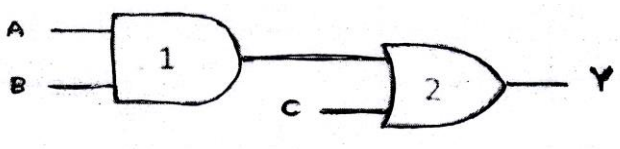
		Module Outcome	Cognitive level
1.	Define class 'A' operation of a power amplifier.	M1.01	R
2.	State the importance of coupling in amplifiers.	M1.01	R
3.	Match the following (A) Amplifier (a) No feedback (B) Oscillator (b) Positive feedback (c) Negative feedback	M1.02	R
4.	Define slew rate of an op-amp.	M2.01	R
5.	List any two characteristics of an ideal op amp.	M2.03	R
6.	Solve the given relation to calculate X $(45)_{10}=(X)_2$	M3.01	A
7.	Write the full form of BCD.	M3.01	R
8.	Show the circuit symbol of JK flip flop.	M4.02	R
9.	List any two types of shift registers.	M4.03	R

PART-B

II. Answer any '*eight*' questions from the following. Each question carries *'three'* marks.

(8 x 3 = 24 Marks)

		Module Outcome	Cognitive level
1.	Draw the circuit of a two stage RC coupled transistor amplifier and label all the components.	M1.01	R
2.	State barkhausen's criteria for sustained oscillations.	M1.02	R
3.	List any three comparisons between amplifiers and oscillators.	M1.02	R
4.	List the classification of oscillators based on the output waveforms. Give examples for each type.	M1.03	R
5.	Show the block diagram representation of an op-amp and label all the blocks.	M2.01	R
6.	State and explain demorgan's theorems and write its logical expression.	M3.03	U

7.	Identify the two gates represented by 1 and 2 in the figure below. Write the boolean expression for the output Y.  	M3.01	A
8.	Choose universal gates from the given list and draw its representation (a) AND (b) OR (c) NAND (d) NOR (e) XOR	M3.01	R
9.	Convert the hexadecimal number $(E56D.78)_{16}$ into decimal numbers.	M3.01	A
10.	Draw the block schematic representation of 4 X 1 multiplexer.	M4.01	R

PART-C

Answer '*all*' questions from the following. Each question carries *'seven'* marks.

(6 x 7 = 42 Marks)

		Module Outcome	Cognitive level
III.	Draw a crystal oscillator circuit and label all parts.	M1.03	R
	OR		
IV.	Show the circuit arrangement of a bistable multivibrator.	M1.04	R
V.	Illustrate the working of zero crossing detector using op-amp.	M2.03	U
	OR		
VI.	Draw the circuit diagram of an integrator using op-amp and derive an expression for output voltage.	M2.03	U
VII.	Outline the working of summing amplifier using op-amp.	M2.03	U
	OR		
VIII.	Explain the working of inverting amplifier using op-amp.	M2.03	U
IX.	Simplify the following boolean expression using K map. $Y = \bar{A}BC + A\bar{B}C + A\bar{B}\bar{C} + ABC$	M3.04	A
	OR		
X.	Perform the given operation in binary number system using 2 's complement method $(67)_{10}$-$(34)_{10}$.	M3.03	A
XI.	Differentiate between D and T flip flops with their truth tables and symbols.	M4.03	U
	OR		
XII.	With a neat circuit diagram, explain the working of ramp type ADC.	M4.03	U
XIII.	Explain the implementation of full adder using half adder.	M4.03	U
	OR		
XIV.	Illustrate the operation of a mod 6 asynchronous up counter using JK flip flop with its circuit, timing diagram and truth table.	M4.03	U

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