

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2022**

ANALOG & 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)

		<small>Module Outcome</small>	<small>Cognitive level</small>
1.	List any two coupling schemes used in multistage transistor amplifier.	M1.01	R
2.	An oscillator employsfeedback.	M1.02	R
3.	Define CMRR of an op amp.	M2.01	R
4.	Select any one purpose of a half-wave precision rectifier.	M2.04	R
5.	Write 2's complement of 10110	M3.01	A
6.	Draw the symbol of AND gate.	M3.02	R
7.	K map for the function F is shown below. Write the reduced expression for F. <div style="text-align: center; margin: 10px 0;"> </div>	M3.04	A
8.	Write the truth table of half adder.	M4.01	R
9.	The number of select lines required for a 4 x 1 multiplexer is.....	M4.01	A

PART-B

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

(8 x 3 = 24 Marks)

		<small>Module Outcome</small>	<small>Cognitive level</small>
1.	State the importance of coupling in amplifiers.	M1.01	R
2.	Draw the block diagram of an opamp and label all the blocks.	M2.01	R
3.	List any three characteristics of an ideal op amp.	M2.01	R
4.	Draw the circuit for the addition of three input signals using op amp.	M2.03	U
5.	Draw the circuit of a zero crossing detector using op amp.	M2.04	U
6.	Divide the binary number $(1001110)_2$ by $(100)_2$	M3.01	A
7.	List the universal gates. Draw the symbol and write the truth table.	M3.02	R

8.	Simplify the expression $Y = \overline{(\overline{A} + B) + CD}$ using DeMorgan's theorem.	M3.03	A
9.	Convert the given SOP expression to its standard form. $f(A,B,C) = AB + BC + AC$	M3.04	A
10.	List any three applications of flip flop.	M4.02	R

PART-C

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

(6 x 7 = 42 Marks)

		Module Outcome	Cognitive level
III.	Compare class A, class B and class C power amplifiers. Write any four comparisons.	M1.01	U
OR			
IV.	With the help of block diagram, distinguish between positive and negative feedback.	M1.02	U
V.	Explain the working of a RC phase shift oscillator with a neat sketch.	M1.03	U
OR			
VI.	Illustrate the working of bistable multivibrator using transistor.	M1.04	U
VII.	Draw the circuit diagram of a differentiator circuit using op amp. Derive the expression for the output voltage.	M2.03	U
OR			
VIII.	Summarise the operation of an inverting amplifier using op amp.	M2.02	U
IX.	Convert the following binary numbers to decimal and hexadecimal numbers. a) 1101.101 b) 10010.01	M3.01	R
OR			
X.	Simplify the expression $f(A, B, C) = \Sigma m(0,2,3,4,5,6)$ using K map.	M3.04	A
XI.	Explain the implementation of a full adder using half adders.	M4.01	U
OR			
XII.	Explain a mod 8 ripple counter using JK flip flop.	M4.03	U

XIII.	Draw the logic diagram of following 4 bit shift registers using D flip flops. a) Serial In Serial Out shift register b) Serial In Parallel Out shift register <p style="text-align: center;">OR</p>	M4.03	R
XIV.	Draw symbolic representation and write truth table of the following flip flops. 1) JK 2) SR	M4.02	R
