Reg. No																

B.Tech DEGREE EXAMINATION, NOVEMBER 2023

Fifth Semester

18AUE211J - ANALOG AND DIGITAL CIRCUITS FOR AUTOMOTIVE APPLICATIONS

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks)
Answer **all** Questions

		Marks	BL	CO
1.	Analog signals are _____ in nature (A) Continuous (B) Discrete (C) Parallel (D) Perpendicular	1	1	1
2.	In analog circuit design, the current-control is used because it is (A) Approximately non-linear (B) Approximately linear (C) Easy (D) Chaotic	1	1	1
3.	Semiconductors are made of _____ (A) Si and Pb (B) Ge and Pb (C) Pb and Au (D) Ge and Si	1	1	1
4.	The charge coupled devices are implemented using (A) CMOS Technology (B) PMOS Technology (C) MOS Technology (D) NMOS Technology	1	1	1
5.	Barkhausen stability criterion is a mathematical condition to determine when a linear electronic circuit behave as an (A) Amplifier (B) Oscillator (C) Rectifier (D) Inverter	1	1	2
6.	The phase shift in oscillator circuit is (A) 0 or 360° (B) 180o (C) 270o (D) 135o	1	1	2
7.	Which filter type is called a flat-flat filter? (A) Cauer filter (B) Butterworth filter (C) Chebyshev filter (D) Band-reject filter	1	1	2
8.	An oscillator employs _____ feedback (A) Positive (B) Negative (C) Neither positive nor negative (D) Data insufficient	1	1	2
9.	Which gates are ideal for checking the parity bits? (A) AND (B) NAND (C) EX-OR (D) EX-NOR	1	1	3
10.	What does the small bubble on the output of the NAND gate Logic symbol mean? (A) Open collector output (B) Tristate (C) The out is inverted (D) The out is non-inverted	1	1	3
11.	The number of Digits in octal system is (A) 8 (B) 9 (C) 10 (D) 11	1	1	3

12.	The number of distinct Boolean expression of 4 variables is _____. (A) 16 (B) 256 (C) 1024 (D) 65536	1	1	3
13.	The gates required to build a half adder are ____. (A) EX-OR gate and NOR gate (B) EX-OR gate and OR gate (C) EX-OR gate and AND gate (D) EX-NOR gate and AND gate	1	1	4
14.	The number of full and half adders are required to add 16-bit number is _____ (A) 8 half adders, 8 full adders (B) 1 half adders, 15 full adders (C) 4 half adders, 12 full adders (D) 16 half adders, 0 full adders	1	1	4
15.	A certain BCD-to-decimal decoder has active-HIGH inputs and active-LOW outputs. Which output goes LOW when the inputs are 1001? (A) 0 (B) 3 (C) 9 (D) 6	1	1	4
16.	How many 3-line-to-8-line decoders are required for a 1-of-32 decoder? (A) 2 (B) 4 (C) 6 (D) 8	1	1	4
17.	Which sequential circuits generate the feedback path due to the cross-coupled connection from output of one gate to the input of another gate? (A) Synchronous (B) Asynchronous (C) Either Synchronous or Asynchronous (D) Neither Synchronous or Asynchronous	1	1	5
18.	How are the sequential circuits specified in terms of time sequence? (A) By Inputs (B) By Outputs (C) By Internal states (D) By Inputs, By Output, and By Internal states	1	1	5
19.	A latch is an example of a _____ (A) Monostable multivibrator (B) Astable multivibrator (C) Bistable multivibrator (D) 555 timer	1	1	5
20.	The full form of SR is _____ (A) System rated (B) Set reset (C) Set ready (D) Set Rated	1	1	5

PART - B (5 × 4 = 20 Marks)
Answer **any 5** Questions

		Marks	BL	CO
21.	Differentiate between digital and analog system.	4	2	1
22.	Write a short note on oscillators.	4	1	2
23.	State and explain DeMorgan's theorem.	4	3	3
24.	Express the algorithm to convert binary to gray code.	4	3	4
25.	What are sequential circuits and classify its types?	4	2	5
26.	Write a short note on CE amplifier.	4	1	1
27.	Write the short notes on RC and RL circuits.	4	1	2

PART - C (5 × 12 = 60 Marks)
Answer **all** Questions

		Marks	BL	CO

28.	(a) How the power amplifiers are classified? Explain about the Class B amplifier.	12	4	1
	(OR)			
	(b) Design a Common Emitter Transistor amplifier for a mid-band gain of 50 and bandwidth of 5 KHz when VCC = 12 V, S = 10, IC= 2 mA, β= 360, fL= 1 KHz, Vin (P-P) =20 mV. (Assume VE = 10 % of VCC)			
29.	(a) Write a short notes on LC tank circuit. Explain the various modes of operation of LC tank circuit	12	2	2
	(OR)			
	(b) Explain in detail about Clippers, Clampers and Comparator with Waveforms.			
30.	(a) Draw the schematic diagram and explain the TTL logic.	12	2	3
	(OR)			
	(b) State the Boolean laws and explain in detail using logic gates.			
31.	(a) Write the short notes on Combinational circuits. Explain the arithmetic operation using the same.	12	3	4
	(OR)			
	(b) Explain in detail about Multiplexer and Demultiplexer.			
32.	(a) Write the short notes on Flip Flops and its types and explain the JK type in detail.	12	3	5
	(OR)			
	(b) Write the short notes on Counters and explain its types in detail.			

* * * * *