Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech (Minor) Degree Examination July 2021 (2019 admisssion)

Course Code: MRT282

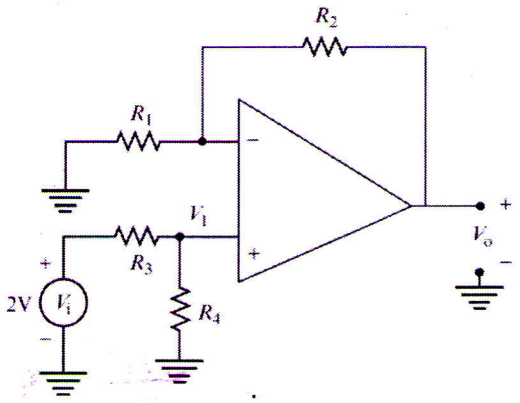
Course Name: FUNDAMENTALS OF ANALOG AND DIGITAL ELECTRONICS

Max. Marks: 100 Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks) Marks

1	With suitable diagram explain the working of E MOSFET	3
2	The feedback factor of an oscillator circuit is 0.02. Calculate open loop gain and the gain with feedback satisfying Barkhausen condition for oscillation	3
3	Differentiate the ideal and practical characteristics of an op-amp	3
4	For the amplifier shown below, calculate Vo	3



Given that Vi= 2 V, R1 = 10kΩ, R2 = 47 kΩ, R3= 5 kΩ, and R4= 10 kΩ.

5	Write short note on non-sinusoidal oscillators.	3
6	What are the characteristics of a VCO used in PLL	3
7	Implement the Boolean function F(A,B,C,D) =Σm(1,3,4,11,12,13,14,15) using 8:1 multiplexer.	3
8	Explain with figure how NAND gate can be used as universal gate	3
9	Explain parallel in serial out shift register	3
10	Write the difference between synchronous and asynchronous counter	3

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

11	a)	Draw the circuit for grounded emitter amplifier using NPN transistor and explain its working in detail.	10
	b)	Sketch and explain the construction of N- channel JFET	4
12	a)	With neat circuit diagram explain RC phase shift oscillator. Mention its advantages and disadvantages.	10
	b)	Mention the two conditions that need to be satisfied for the oscillations to build up and sustain.	4

Module -2

13		Explain op-amp as differentiator. Draw the frequency response of ideal differentiator. Mention the disadvantage of an ideal differentiator.	14
14	a)	Explain with help of circuit diagram an op-amp used as inverting comparator and non-inverting comparator.	10
	b)	Explain sample and Hold circuit with diagram.	4

Module -3

15	a)	Discuss the principle of operation of PLL	7
	b)	Explain the active band pass filter. sketch its the frequency response	7
16	a)	With necessary waveform explain the working of free running multivibrator	10
	b)	Mention the advantages and disadvantages of an Astable multivibrators	4

Module -4

17		Explain full adder in details. Implement the full adder circuit using basic gates	14
18		Simplify the logic function $F(A, B, C, D) = \Sigma m(0, 1, 2, 5, 6, 8) + d(3, 4, 7, 14)$ using K-map in SOP and POS form. Implement the simplified function using logic gates.	14

Module -5

19		With logic diagram and truth table explain the working of clocked J K Flip Flop. Also obtain its characteristic equation.	14
20		Design a synchronous decade counter using J K Flip Flop	14

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