

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FOURTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019

Course Code: EC212

Course Name: LINEARINTEGRATED CIRCUITS AND DIGITAL ELECTRONICS

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks.

- | | Marks |
|--|-------|
| 1 'Sample and hold circuit can samples an input signal and holds on to its last sampled value'. Justify the statement. | (5) |
| 2 Compare the combinational and sequential circuits. Give a few examples of each of them. | (5) |
| 3 Derive the output voltage for a 4 bit R-2R ladder D/A converters. | (5) |
| 4 Write a short note on the following | |
| a) offset voltage | |
| b) Bias current | (5) |
| c) CMMR | |
| d) Slew rate | |
| 5 Show that how a S-R flip flop can be converted into a D flip flop. | (5) |
| 6 a) Subtract using 1's complement, 100-110000. | (5) |
| b) Subtract using 2's complement, 11011-100101. | |
| 7 Design an octal to binary encoder. | (5) |
| 8 Define ROM. Differentiate between static and dynamic RAM. | (5) |

PART B

Answer any three full questions, each carries 10 marks.

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|---|------------------------------|
| 9 a) Perform the following conversions. | (10) |
| a) $(4021.25)_{10}$ to binary | d) $(4537)_8$ to hexadecimal |
| b) $(95.05)_{10}$ to hexadecimal | e) $(11010111)_2$ to octal |
| c) $(1E7C)_{16}$ to octal | |
| 10 a) How we can use log and antilog amplifier in analog multiplier. | (4) |
| b) A Schmitt trigger with the upper threshold level $V_{UT} = 0V$ and hysteresis width $V_H = 0.2V$ converts a 1 kHz sine wave of amplitude $4V_{pp}$ into a square wave. Calculate the time duration of the negative and positive portion of the output waveform | (6) |

- 11 a) Derive an expression to obtain the transfer function of second order low pass filter. (6)
- b) Explain the working of a successive approximation type A/D converters. (4)
- 12 Briefly explain different applications of Op-Amp. (10)
- 13 a) Simplify using K Map. (6)
- $F(A,B,C,D) = \pi(1,3,5,7,13,15)$
- b) State and prove De Morgan's theorems. (4)

PART C

Answer any two full questions, each carries 15 marks.

- 14 a) Design a code converter which converts a 4 bit binary number to corresponding grey code. (10)
- b) Explain how a full adder circuit can be designed with the help of two half adders? (5)
- 15 a) Design a 4 bit shift left and shift right register using JK flip flop and also draw its output waveform. (6)
- b) Design a sequence detector that produces an output '1' whenever the non overlapping sequence 1101 is detected (9)
- 16 a) What is a demultiplexer? Explain the difference between DEMUX and MUX. (5)
- b) Implement the following Boolean function by using 8X1 multiplexer, $f(A, B, C, D) = \sum m(0, 2, 3, 6, 8, 9, 13, 14)$. (10)
- 17 Design and implement a 4 bit synchronous down counter by using JK flip flops. (15)
