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Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech Degree Examination June 2022 (2019 scheme)

Course Code: EET206

Course Name: DIGITAL ELECTRONICS

Max. Marks: 100

Duration: 3 Hours

PART A*(Answer all questions; each question carries 3 marks)*

Marks

- | | | |
|----|--|---|
| 1 | Perform the addition $37_{16} + 29_{16}$ | 3 |
| 2 | Using 2's complement method, perform the additions :
a) $21 - 42$ b) $-46 - 25$ | 3 |
| 3 | Using Boolean algebra techniques, simplify the expression
$BD + B(D+E) + \bar{D}(D+F)$ | 3 |
| 4 | Convert the expression $(A+B)(C+\bar{B})$ to standard SOP form | 3 |
| 5 | What are select lines and what is its importance in the case of multiplexers and demultiplexers, explain with example. | 3 |
| 6 | Design full adder circuit with decoder IC | 3 |
| 7 | What is the difference between J-K flipflop and S-R flipflop, Explain with truth table and logic implementation. | 3 |
| 8 | With respect to circuit what is the difference between a ring counter and a johnson counter. | 3 |
| 9 | Differentiate between moore and mealy machines | 3 |
| 10 | State the applications of FPGA | 3 |

PART B*(Answer one full question from each module, each question carries 14 marks)***Module -1**

- | | | |
|----|--|----|
| 11 | Draw and explain the circuit for CMOS NOR gate
What are the parameters significant to the logic families , Explain any three and compare TTL and CMOS logic on these parameters | 14 |
| 12 | Convert the following numbers:
a) $(1010110110111)_2 = ()_{16}$
b) $(0.4D8)_{16} = ()_2$
c) $(214)_{10} = ()_{16}$ | 14 |

d) $(1010110110111)_2 = ()_8$

e) $(0.725)_8 = ()_2$

f) $(9264)_{10} = ()_8$

g) $(467)_8 = ()_{16}$

Module -2

- 13 a) Convert the SOP expression $AB + \bar{A}B + \bar{A}C\bar{D}$ to standard SOP form 5
- b) State and explain De Morgans theorems 4
- c) Apply Demorgans theorem to the expression $\overline{ABC} + (\bar{D} + E)$ 5
- 14 Explain a look ahead carry generator with relevant expressions and circuit and give reason for its high speed of operation 14

Module -3

- 15 Implement the Boolean function $F(A,B,C,D) = \sum(1,3,4,11,12,13,15)$ using 8:1 MUX and external gates 14
- 16 a) Explain the operation of a 2 bit magnitude comparator 7
- b) Write the applications of a multiplexer and describe the implementation of a three variable function using multiplexer with a suitable example. 7

Module -4

- 17 a) What is Race-Around condition of J-K Flip-Flop? Suggest a method to avoid Race-Around condition of J-K Flip-Flop 7
- b) Design and implement a J- K flip flop using D flipflop 7
- 18 What is modulus of a counter and design a synchronous MOD-5 counter with state diagram and relevant truth tables. 14

Module -5

- 19 a) What are the important specifications of a A/D converters 7
- b) Why a weighted resistor type D/A converter is called so. Draw the schematic and explain. 7
- 20 Implement a full adder using Verilog 14
