Register Number:……………..

KUMARAGURU
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GENERAL INSTRUCTIONS TO THE CANDIDATES

1. Candidates are instructed to answer the questions as per Bloom's Taxonomy knowledge level (K_1 to K_6)
2. Candidates are strictly instructed not to write anything in the question paper other than their roll number.
3. Candidates should search their pockets, desks and benches and handover to the Hall Superintendent/ Invigilator if any paper, book or note which they may find therein as soon as they enter the examination hall.
4. Candidates are not permitted to bring electronic watches with memory, laptop computers, personal systems, walkie-talkie sets, paging devices, mobile phones, cameras, recording systems or any other gadget / device /object that would be of unfair assistance to him / her.
5. Corrective measures as per KCT examination policies will be imposed for malpractice in the hall like copying from any papers, books or notes and attempting to elicit the answer from neighbours.

B.E DEGREE EXAMINATIONS: DEC 2015

(Regulation 2014)

Third Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U14ECT301: Digital Electronics

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 1 = 10 Marks)

1.   Match List I & II. Choose appropriate answer: CO1   [K_2]

List I	List II
A. 1947.15	i. Hex fraction
B. 4AE.0F	ii. Octal number
C. 101100	iii. Decimal fraction
D. 3420	iv. Binary number

	A	B	C	D
a)	iii	iv	i	ii
b)	ii	iii	iv	i

c) iii   i   iv   ii

d) i   ii   iii   iv

2. One of the following code is used in encoders: CO1 [K$_1$]

a) Octal   b) BCD

c) Duo-decimal   d) Gray

3. Decimal number '9' is represented in 7421 BCD as   CO1 [K$_2$]

a) 1001   b) 0111

c) 1010   d) 1000

4. The main difference between de-mux and decoder is   CO3 [K$_2$]

a) Absence of 'DATA' input in demux   b) Use of 'STROBE' signal in demux

c) Use of 'SELECT' signals in decoder   d) Absence of 'DATA' input in decoder

5. Which of the following statements are 'TRUE' with respect to flip-flops?   CO4 [K$_2$]

     1. A basic flip-flop is constructed using NAND gates only.

     2. Flip-flops are constructed using NAND or NOR gates.

     3. In a J-K flip-flop both the inputs can be '1' at the same time.

     4. S-R flip-flop could converted to T-flip-flop.

a) 2,3   b) 1,4

c) 1,3,4   d) 2,3,4

6. A modulo-11 counter has sequence from   CO3 [K$_2$]

a) 00 to 11   b) '0000' to '1011'

c) '0000' to '1010'   d) 11 to 00

7. Assertion (A): State machine is a synchronous circuit.   CO4 [K$_3$]

Reason (R): In Moore machine, the output is a function of present state.

a) Both statements A and R are true   b) A is true but R is not the correct explanation of A

c) A is true but R is the correct explanation of A   d) A is true but, R is false.

8. Glitches in circuits, occur due to   CO4 [K$_2$]

a) Power supply   b) Clock

c) Static hazards   d) Use of asynchronous inputs

9. There are different types of memory – RAM, ROM, PROM, EPROM, EEPROM. The order in terms of number of switches used in construction of these memories is   CO5 [K$_2$]

a) ROM, PROM, EPROM, RAM, EEPROM   b) ROM, PROM, EPROM, EEPROM, RAM

c)	PROM, ROM, EPROM, EEPROM, RAM	d)	RAM , PROM, ROM, EPROM, EEPROM	

10.	One of the following family has least propagation delay -	CO5 [K$_1$]

a)	PLA	b)	TTL
c)	CMOS	d)	ECL

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

11.	Convert – (3/4)$_D$ into binary and hexadecimal numbers.	CO1 [K$_3$]
12.	Show that EXOR and EXNOR gates are dual of each other.	CO2 [K$_3$]
13.	Given two data items, A = a3a2a1a0 and B = b3b2b1b0. Define a logic equation for A > B.	CO3 [K$_3$]
14.	A 4:1 multiplexor is to be used to implement Boolean function. If '0110' is applied at the input, what is the equivalent function that is realized?	CO3 [K$_3$]
15.	Differentiate latch and flip-flop.	CO4 [K$_2$]
16.	Construct a Master-Slave J-K flip-circuit. (Diagram only)	CO4 [K$_1$]
17.	Compare Ring counter with Johnson counter.	CO4 [K$_2$]
18.	List the causes of hazards in circuits.	CO4 [K$_1$]
19.	State the features of flash ROM.	CO5 [K$_1$]
20.	22V10 is a PAL device. Identify the number of inputs and outputs. What does 'V' stand for?	CO5 [K$_2$]

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

21.	i) Given F(A..D) = ∑m(0,2,5,7,9,11) + d(13,15), implement using K-map. Also, draw gate level circuit diagram.	(7)	CO2 [K$_3$]
	ii) Implement the function given in (i) above, in POS form using K-map.	(7)	CO2 [K$_4$]

22.	i) State and prove DeMorgan's laws. Also, Illustrate how a 2-level NOR-NOR circuit	(7)	CO1 [K$_2$]

could be converted to equivalent OR-AND circuit using DeMorgan's law.

ii) Implement $F = \sum m(2,6,7)$ using Tabulation method. (7) CO2 [K$_3$]

23. Illustrate the design of a 4-bit carry look-ahead adder (Use algorithmic approach). Also, draw gate level circuit diagram. CO3 [K$_4$]

24. i) Compose state transition diagram for J-K flip-flop. Also, obtain characteristic equation for J-K flip-flop using K-map. (7) CO4 [K$_3$]

ii) Construct a 4-bit up-down binary counter and describe operation of the same. (7) CO4 [K$_2$]

25. A sequence detector generates output, Y='1' when the combination '011' is received at the input, X. Design a synchronous circuit using Moore Model. CO4 [K$_4$]

26. i) Given a Boolean function $F = AB'C + ABC' + A'BD + ABD'$, implement using PLA. Also, draw equivalent circuit. (10) CO5 [K$_3$]

ii) Compare TTL and CMOS family of devices. (4) CO5 [K$_2$]

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