

DipIETE – ET/CS (Current & New Scheme)

Time: 3 Hours

JUNE 2017

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

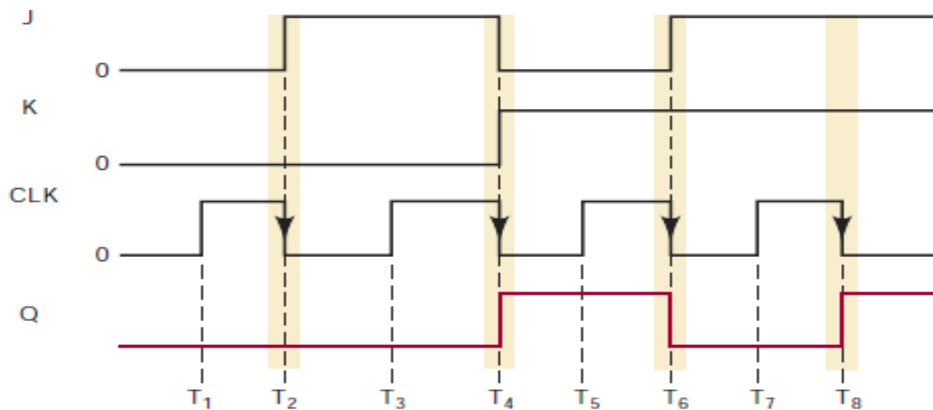
Q.1 Choose the correct or the best alternative in the following: (2×10)

- a. Binary equivalent of $(83)_{10}$ is
 (A) 1010011 (B) 1001010
 (C) 10000010 (D) 10000101
- b. Decimal equivalent of $(356)_{16}$ is
 (A) 856 (B) 854
 (C) 858 (D) 855
- c. How many nibbles are in a byte?
 (A) 1 (B) 2
 (C) 3 (D) 4
- d. How many table entries are needed for a four input circuit?
 (A) 16 (B) 8
 (C) 32 (D) 64
- e. $X+XY=$ _____
 (A) Y (B) XY
 (C) X (D) X+Y
- f. What will be the status of Q & \bar{Q} after an FF has been reset (cleared)?
 (A) $Q=0, \bar{Q} = 1$ (B) $Q=1, \bar{Q} = 0$
 (C) $Q=0, \bar{Q} = X$ (D) $Q=1, \bar{Q} = X$
- g. Which LED segments will be ON for a decoder/driver input of 1001?
 (A) a,b,d,f,g (B) a,b,c,f,g
 (C) a,c,e,f,g (D) b,c,d,e,g
- h. How many gates are needed to decode a six-bit counter fully?
 (A) 64 (B) 32
 (C) 16 (D) 128

- i. $2K = \underline{\hspace{2cm}}$ words.
 (A) 1024 (B) 2048
 (C) 16 (D) 128
- j. $(58)_{16} + (4B)_{16} = (\underline{\hspace{1cm}})_{16}$
 (A) A2 (B) 9F
 (C) 90 (D) A3

**Answer any FIVE Questions out of EIGHT Questions.
 Each question carries 16 marks.**

- Q.2** a. Draw Block diagram of digital computer and explain each block in detail. (8)
 b. Convert $(423)_{10}$ to hexadecimal. (4)
 c. Convert $(B2F)_{16}$ to decimal. (4)
- Q.3** a. Draw logic circuit for given Boolean expression. (5)
 $Y = AC + B\bar{C} + \bar{A}B$
 b. Simplify $Z = (\bar{A} + B)(A + B)$ using Boolean theorems. (5)
 c. Use K-map to simplify $Y = \bar{C}(\bar{A}\bar{B}\bar{D} + D) + A\bar{B}C + \bar{D}$ (6)
- Q.4** a. Draw NOR gate latch with function table. (4)
 b. Explain clocked S-R flip flop with function table and waveforms. (8)
 c. Determine the Q output for a negative-edge-triggered J-K flip-flop for the input waveforms shown in figure. Assume that $t_H = 0$ and that $Q = 0$ initially. (4)



- Q.5** a. Add the following pairs of binary numbers (6)
(i) $011 + 110$
(ii) $1001 + 1111$
(iii) $11.011 + 10.110$
- b. Perform BCD addition ($59 + 38$) (4)
- c. Draw full-adder circuit with truth table. (6)
- Q.6** a. Explain four bit Ripple counter with logic diagram and timing waveforms. (8)
- b. Draw MOD-8 Synchronous up/down counter with timing waveforms. (8)
- Q.7** a. Draw 3 to 8 decoder circuit diagram with truth table and explain its working. (8)
- b. Draw 4 input Multiplexer using SOP logic and explain its working. (8)
- Q.8** a. Draw and explain logic diagram for parallel In/parallel Out register with its logic symbol. (8)
- b. Explain four bit ring counter in detail. (8)
- Q.9** a. Draw Internal organization of a $(64 * 4)$ RAM and explain. (8)
- b. Draw cell arrangement in a $16K * 1$ DRAM and explain. (8)