

## B.Tech 4th Semester Examination, 2017

## Digital Electronics

Time : 3 hours

Full Marks : 70

## Instructions :

- (i) There are **Nine** Questions in this Paper.  
 (ii) Attempt **Five** questions in all.  
 (iii) **Question No. 1 is Compulsory.** akubihar.com  
 (iv) The marks are indicated in the right-hand margin.

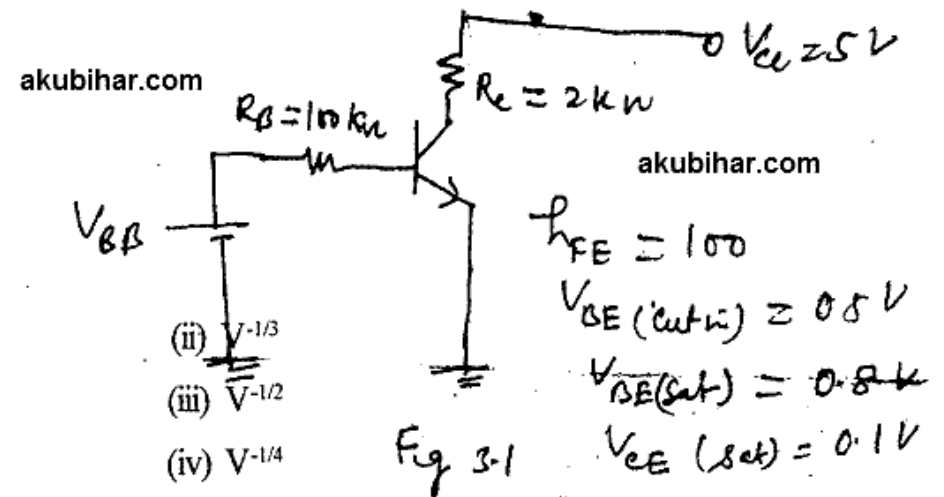
## 1. Fill in the blanks.

7×2

- (a) The MSB of a signal-binary number indicates its \_\_\_\_\_.  
 (b) The principle cause of propagation delay in a p-n junction is removal of \_\_\_\_\_ charge carriers.  
 (c) Fan-in signifies \_\_\_\_\_ of a gate. akubihar.com  
 (d) The temperature range for 74-series ICs is \_\_\_\_\_.  
 (e) AND-OR realization is equivalent to \_\_\_\_\_ realization.  
 (f) A \_\_\_\_\_ is a logic circuit that accepts one data input and distributes it over several outputs.  
 (g) sub tractors are designed using \_\_\_\_\_ ICs.  
 (h) Register and counters can be designed using \_\_\_\_\_.  
 (i) Ripple counter is \_\_\_\_\_ sequential circuits.

- (j) The linearity of a D/A converter is specified as \_\_\_\_\_  
 LSB. akubihar.com

2. (a) Draw EX-OR gates using only 4-NAND gates only.  
 (b) Draw NAND gates using Transistors and Resistors.  
 (c) Convert  $(11111)_2$  into gray code. 14
3. (a) Find the range of  $V_{BB}$  for the transistor shown in figure  
 (3.1) or  
 (i) in the cut-off region  
 (ii) in the active region  
 (iii) in the saturation region



- (b) Analyse TTL gate with totem pole output driver.

4. (a) Minimise in POS form

$$f(A,B,C,D) = \prod M(4, 6, 10, 12, 13, 15)$$

$$(b) \text{ Minimise } f(A,B,C,D) = ABC\bar{D} + \bar{A}BCD + \bar{A}\bar{B}\bar{C} \\ + \bar{A}\bar{B}\bar{D} + A\bar{C} + A\bar{B}C + \bar{B} \quad 14$$

5. (a) Design 16:1 multiplexer using 8:1 MUX.

(b) Design 3-bit Gray-to-Binary Converter. 6+8

6. (a) Explain Race-Around condition.

(b) Draw J-K flip-flop and explain its operation.

(c) Draw D-Flip flop and T-flip flop using J-K FF.

akubihar.com 4+6+4

7. (a) Design modulo-10 synchronous counter using J-K flip flop.

(b) Explain lock-out condition in counter.

(c) Draw 4-bit left to Right shift register and explain its operation. akubihar.com 7+3+4

8. (a) Draw 3-bit successive type A/D converter and explain its operation.

(b) Explain basic blocks of 555-timer. 8+6

9. Write notes on following-

(a) RAMs.

(b) Non-saturated logic families. 7+7

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