

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- Sep 2017

B.Tech 3<sup>rd</sup> Semester

COURSE CODE: 10B11EC401

MAX. MARKS: 15

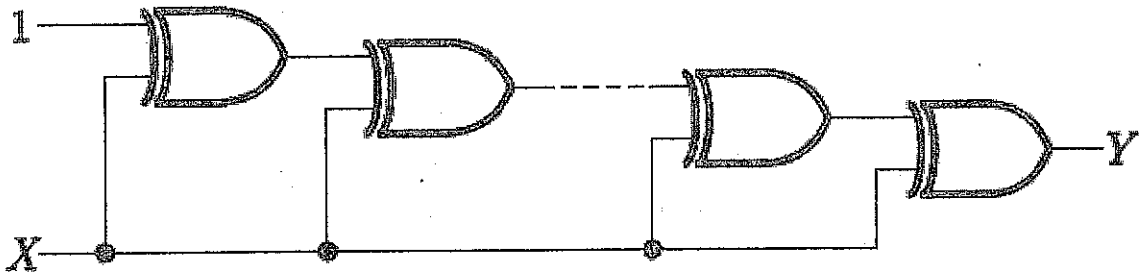
COURSE NAME: Digital Electronics

COURSE CREDITS: 4

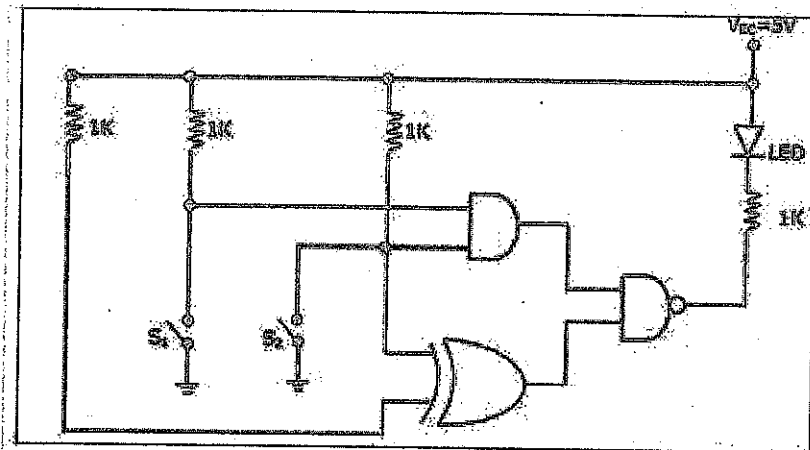
MAX. TIME: One Hr

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

1. A vehicle seat belt circuit is such that the car should only start if the driver's seat belt is fastened and either the front passenger seat is unoccupied or the front passenger seat is occupied and the passenger seat belt is fastened. Obtain a truth table and reduced boolean equation using karnaugh map. 2
2. If the input to the digital circuit (in the figure) consisting of a cascade of 20 EXOR - gates is X, then the output Y is equal to: 1



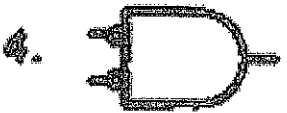
3. Design following expression using minimum no of two input NAND gates  
 $(\bar{X} + Y)(W + Z)$  1
4. Implement full subtractor using minimum no of two input NOR gates. 2
5. What are the values respectively of  $R_1$  and  $R_2$  in the following expression:  
 $(235)_{R_1} = (565)_{10} = (1065)_{R_2}$  1
6. In the figure given below the LED emits light with what combination (On/Off) of switches  $S_1$  and  $S_2$ . Switches will be on with logic 1 and will be off with logic 0.



7. What are the advantages of 2's complement over 1's Complement. Perform the following subtraction using 2's complement  $0011.1001 - 0001.1110$ . Convert the result into decimal number. 2
8. What are the advantages and disadvantages of Digital Electronics? What are differences between digital signal and discrete Signal? 2
9. Match the logic gates in column A with their equivalent in column B. 1

Column A

Column B



10. Prove using identities of Boolean algebra:

$$\overline{(A+B)}(B+C)(\overline{A+C}) = \overline{(A+B)}(B+C)$$