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H – 4541

Reg. No. :

Name :

Third Semester B.Tech. Degree Examination, February 2020

(2008 Scheme)

08.306 : DIGITAL ELECTRONICS (T)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions in part A. Each question carries **4** marks.

1. When is Boolean algebra called Switching algebra? Implement the switching function $Y = BC + \bar{A}B + D$.
2. What is a Multiplexer? Draw the logic diagram of an 8:1 line multiplexer.
3. What is ROM? Draw the basic structure of a ROM.
4. Simplify the function $F(A,B,C) = \sum(01367) + \sum d(245)$ where "d" denotes don't care.
5. Show that a positive logic AND gate is negative logic OR.
6. Draw a master slave JK flip flop and sketch its clock waveform.
7. Compare Synchronous counter with Asynchronous counters.
8. In what way Moore model differs from that of a Melay model.
9. What are the steps for the design of asynchronous sequential circuit.
10. What are hazards? Briefly explain the types of hazards.

(10 × 4 = 40 Marks)

P.T.O.



PART – B

Answer **any two** questions from **each** Module. Each question carries 10 marks.

Module – I

11. Simplify the given Boolean function.

$$F(A, B, C, D) = \sum m(0, 1, 3, 4, 6, 7, 12, 15) + \sum d(13, 14). \quad 10$$

12. Implement a full subtractor using Demultiplexer. 10
13. What is VHDL? Write the VHDL source code for a Full Adder. 10

Module – II

14. Draw the TTL based NAND and NOR gates and explain their operation. 10
15. Design a four bit Johnson counter and obtain its timing diagram to illustrate the clock input and all flip flop outputs. 10
16. Draw the logic diagram of a 4 bit serial input/serial output shift register. Indicate the inputs, outputs and a negative edge triggered clock in its timing diagram. 10

Module – III

17. With suitable block diagram explain Moore circuit and Melay circuit models. 10
18. An asynchronous sequential circuit is described by the following excitation (Y) and output function (Z).

$$Y = X_1 X_2 + (X_1 + X_2) Y$$
$$Z = Y.$$

- (i) Draw the logic diagram of the circuit. 3
(ii) Derive the transition table and output map. 7
19. For the given Boolean function 'F' obtain the hazard free circuit. 10

$$F(A, B, C, D) = \sum m(1, 3, 6, 7, 13, 15)$$

