Roll No. 6211[redacted]

Total No. of Questions : 9] [Total No. of Printed Pages : 7

(2042)

B.C.A. (CBCS) RUSA IInd Semester Examination

3745

DIGITAL ELECTRONICS

Paper : BCA-0203

Time : 3 Hours] **[Maximum Marks : 70**

Note :– (i) Question No. **1** (Part–A) is compulsory. Attempt *four* questions choosing *one* question each from Part–B, C, D and E.

(ii) Figures at the right indicate marks.

Part–A

(Compulsory Question)

1. (A) Select the correct alternative for MCQs.

(i) With forward bias to a *pn* junction, the width of depletion layer :

(a) Increases

(b) Decreases

(c) Remains the same

(d) None of these

(ii) A digital circuit that can store only one bit is a :

(a) Register

(b) NOR gate

(c) Flip-flop

(d) XOR gate

(iii) The logical sum of two or more than two logical products is termed as :

(a) OR operation

(b) POS

(c) SOP

(d) NAND operation

(iv) Which of the given logic family provide minimum power dissipation ?

(a) JFET

(b) CMOS

(c) ECL

(d) TTL

(v) The number of inputs in a half adder is :

(a) 8

(b) 2

(c) 11

(d) 32

(vi) What is the value to be considered for a 'don't care condition' ?

(a) 0

(b) 1

(c) Either 0 or 1

(d) Any number except 0 and 1

(vii) Which device has one input and many outputs ?

(a) Multiplexer

(b) Demultiplexer

(c) Counter

(d) Flip-flop

(viii) A K-map of n-variables contains ..... cells.

(ix) The condition S = R = 1 is called as ..... condition.

(x) CMOS stands for ..... 1×10=10

(B) Answer the following in **25** to **50** words :

(i) Describe combinational circuit.

(ii) Distinguish between TTL and CMOS families.

(iii) Draw symbol and truth table of OR, NOT and NAND gate.

(iv) Explain the function of J-K Flip-flop.

(v) Draw the circuit diagram of an 8-input multiplexer. 4×5=20

Part–B

(Unit–I) 10 each

2. Discuss in detail Bipolar Junction Transistor and draw its circuit symbol.

3. Explain the non-saturated bipolar logic family, ECL in detail.

Part–C

(Unit–II)

4. Explain the various laws of Boolean algebra. Also state De-Morgan's theorem with example. 10

5. (a) Discuss 'NAND gates are Universal Gate'.

   (b) Draw the circuit diagram of NOR gate and also give its truth table. 6,4

Part–D

(Unit–III) 10 each

6. Simplify the following Boolean function using K-map and draw the circuit for simplified expression :

   $F(W, X, Y, Z) = \Sigma(0, 2, 4, 5, 9, 11, 14, 15)$

7. Explain the SOP form and POS form of simplifying Boolean expression using K-maps.

Part–E

(Unit–IV) 10 each

8. What is a Flip-flop ? Compare the operations of D and T Flip-flops with the help of their truth-table.

9. Draw and explain the working of Full Adder Circuit with Truth-table