First Semester B.C.A. Degree Examination, August/September 2021

(CBCS Scheme)

Computer Science

DIGITAL ELECTRONICS

Time : 3 Hours]   [Max. Marks : 70

Instructions to Candidates : Answer all Sections.

SECTION – A

I.   Answer any **TEN** of the following. Each question carries **2** marks :   **(10 × 2 = 20)**

1.   State Kirchoff's current law.

2.   What is the total resistance of two resistors R1 and R2 connected in parallel?

3.   Define rms value.

4.   What is biasing? Describe reverse bias.

5.   What is valence band and forbidden band?

6.   Differentiate Fan-in and Fan-out.

7.   Convert $(0010\ 0101)_2$ to excess 3 code.

8.   Define min term and max term.

9.   Why NAND and NOR are called universal gates?

10. What is multiplexer?

11. Write the truth table and logic symbol of EX-NOR gate.

12. What is toggling?

SECTION – B

II.   Answer any **FIVE** of the following. Each question carries **10** marks :**(5 × 10 = 50)**

13.   (a)   The output voltage of the battery is given as 12.0 V and the resistances are R1 = 1.00 Ω, R2 = 6.00 Ω and R3 = 13.0 Ω.

Find

(i)   The total resistance and current

(ii)   Calculate the voltage drop in each resistor and show these add to equal the voltage output of the source.   **(5)**

(b)   State and explain Norton's theorem.   **(5)**

14.   (a)   What is rectifier? Explain full wave rectifier.   **(5)**

(b)   State and explain super position theorem.   **(5)**

15.   (a)   Explain briefly the application of diode.   **(5)**

(b)   Write the differences between intrinsic and extrinsic semiconductors.   **(5)**

16.   (a)   State and prove De Morgan's theorem with truth table.   **(5)**

(b)   Simplify the SOP $Y = \sum m(1,5,7,8,9,13) + \sum d(3,12)$ using K map.   **(5)**

17.   (a)   Realize all basic gates by using NOR gate.   **(5)**

(b)   Explain the working of full adder with a neat circuit diagram.   **(5)**

18.   (a)   Write a note on TTL and CMOS.   **(5)**

(b)   Convert $(4096.3125)_{10}$ = ( )$_2$ (F4C)$_{16}$ = ( )$_{10}$.   **(5)**

19.   (a)   Discuss the master slave JK flip flop with block diagram.   **(5)**

(b)   Explain BCD adder with neat circuit diagram and truth table.   **(5)**

20.   (a)   Explain SIPO and PIPO shift registers with neat diagram.   **(6)**

(b)   Subtract $(29)_{10} - (7)_{10}$ using 2's complement method.   **(4)**

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