



**BRAINWARE UNIVERSITY**

**Term End Examination 2018 - 19**

**Programme – B.Sc. (Honours) in Computer Science**

**Course Name - Digital Electronics and Instrumentation**

**Course Code –EC301**

(Semester – 3)

**Time allotted: 3 Hours**

**Full Marks: 70**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

**Group –A**

(Multiple Choice Type Question)

10 x 1 = 10

1. *Choose the correct alternative from the following*

(i) Decimal equivalent of the Binary number  $(101.01)_2$  will be

- |                  |                  |
|------------------|------------------|
| a. $(5.56)_{10}$ | b. $(5.25)_{10}$ |
| c. $(6.28)_{10}$ | d. $(7.57)_{10}$ |

(ii) K-Map follows

- |                |               |
|----------------|---------------|
| a. Binary Code | b. BCD Code   |
| c. Gray Code   | d. ASCII Code |

(iii) The input condition for which the J-K flip flop Toggles is

- |            |            |
|------------|------------|
| a. J=1 K=0 | b. J=1 K=1 |
| c. J=0 K=0 | d. J=0 K=1 |

- (iv) Number of selection inputs of a 64:1 MUX will be
- a. 6
  - b. 7
  - c. 5
  - d. 4
- (v) Which Flip flop is known as 'Transparent latch'?
- a. S-R
  - b. J-K
  - c. D
  - d. T
- (vi) In synchronous counter
- a. One flip flop is activated by the clock input and its output act as a clock to the next stage
  - b. All the flip flops are activated simultaneously by the same clock input
  - c. Both a and b is possible
  - d. Separate clock input is given to each flip flop
- (vii) A CRO can measure
- a. A.C Volt
  - b. D.C Volt
  - c. Frequency
  - d. All of the above
- (viii) Maxwell Bridge is used to measure
- a. Unknown inductance
  - b. Frequency
  - c. Unknown capacitance
  - d. None of these
- (ix) DSO stands for
- a. Digital storage oscilloscope
  - b. Digital supply oscilloscope
  - c. Digital sweep oscilloscope
  - d. None of these
- (x) The Time base generator of CRO generates
- a. Square wave
  - b. Sine wave
  - c. Saw-tooth wave
  - d. All of these.

**Group – B**

(Short Answer Type Questions)

3 x 5 = 15

Answer any *three* from the following

- |    |   |   |
|----|---|---|
| 2. | Illustrate the action of NOR Gate as a Universal logic gate.              | 5 |
| 3. | State De-Morgan's theorem and prove it using truth table.                 | 5 |
| 4. | Explain briefly the working principle of 3:8 Decoder.                     | 5 |
| 5. | Discuss with proper truth table the operating principle of 'D' flip-flop. | 5 |
| 6. | Discuss the basic principle of AC Wheatstone bridge.                      | 5 |

**Group – C**

(Long Answer Type Questions)

3 x 15 = 45

Answer any *three* from the following

- |     |   |      |
|-----|---|------|
| 7.  | (a) Explain Full Subtractor circuit with proper truth table and circuit diagram.  | [8]  |
|     | (b) Design with truth table the 1:8 De-Mux using basic gates only.  | [7]  |
| 8.  | (a) Explain with proper circuit diagram the working principle of DTL NAND gate.   | [7]  |
|     | (b) Construct S-R flip-flop using NAND gates and explain with the help of truth table.  | [8]  |
| 9.  | (a) What is the problem of J-K Flip flop? Explain how this problem is eliminated by using Master-Slave Flip flop.   | 4+6  |
|     | (b) Write down the comparison between Synchronous and Asynchronous counter.   | 5    |
| 10. | (a) Explain with a neat block diagram the working principles of a Function generator.   | [10] |
|     | (b) Discuss briefly the operating principle of Vertical amplifier.  | [5]  |
| 11. | (a) Explain the working principle of Maxwell bridge.  | 10   |
|     | (b) The bridge parameters at balance are $C_1=0.01\mu\text{F}$ , $R_1=470\text{K}\Omega$ , $R_2=5.1\text{K}\Omega$ and $R_3=100\text{K}\Omega$ . Find the unknown resistance and inductance in the fourth arm of the bridge. Here, notation carries their usual meanings. | 5    |