

B.C.A. - I (CBCS Pattern) Semester-I  
**UBCAT105.1 - Elective-I - Paper-V : Digital Electronics**

P. Pages : 2

Time : Three Hours



**GUG/W/24/11747**

Max. Marks : 80

- Notes :
1. All questions are compulsory and carry equal marks.
  2. Draw neat and labelled diagram and use supporting data wherever necessary.
  3. Avoid vague answers and write specific answer related to questions.

**Either:**

1. a) Write steps to convert Decimal system to Binary system with suitable example. 8  
Also perform following-
- i)  $(1010.1011)_2 = ( )_8$
  - ii)  $(10111)_2 = ( )_{10}$
- b) Explain the following codes 8
- i) Excess-3 code
  - ii) Parity code

**OR**

- c) Define the following- 8
- i) Range
  - ii) Accuracy
  - iii) Overflow
  - iv) Underflow
- d) What is mean by 8421 code? Explain with suitable example. 8

**Either:**

2. a) What is 9's compliment? Explain the decimal subtraction using 9's compliment method with suitable example. 8
- b) What is Logic gates? Explain derived gates operation and write Boolean equation with proper truth table. 8

**OR**

- c) Perform the following subtraction using 2'S compliment method. 8
- i)  $(11010)_2 - (10110)_2$
  - ii)  $(11011)_2 - (100)_2$
- d) Explain the following with symbol and truth table. 8
- i) NOR gate
  - ii) EX-NOR gate
  - iii) OR gate
  - iv) Nand gate

**Either:**

3. a) Explain in brief laws of Boolean algebra. 8
- b) What is mean by Adder circuit? Explain construction and working of 4-bit binary Adder/Subtractor circuit. 8

**OR**

- c) Map the following expression & simplify using k-map. 8
- i)  $y = \Sigma m(4, 6, 7, 8, 9)$  ii)  $y = \Sigma m(0, 7, 9, 12, 13)$
- d) Simplify the following equations using Boolean laws and then draw simplified logic diagram. 8
- i)  $y = \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C} + A\bar{B}C$  ii)  $y = \bar{A}\bar{B}C + A\bar{B}C + \bar{A}\bar{B}\bar{C} + A\bar{B}\bar{C}$

**Either:**

4. a) What do you mean by sequential circuit? Explain the construction and working of JKFF with it's truth table & timing diagram. 8
- b) Draw & explain 4 bit Asynchronous counter with timing diagram. 8

**OR**

- c) Explain R's flipflops using Nand gates only. 8
- d) What is up counter? Explain the construction and working of 4-bit down counter with it's timing diagram. 8

5. Solve all the questions.

- a) What is data Representation? Explain positive number Representation with example. 4
- b) Perform the following. 4
- i)  $(111010)_2 + (011110)_2$
- ii)  $(1010)_2 + (101110)_2$
- c) State and prove demorgan's theorem. 4
- d) Explain Ring counter? 4

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