

February 2016
M. Sc. IIIrd Semester Examination

PHYSICS
Third Paper : Digital Electronics

Time 3 Hours]

[Max. Marks : Regular 85 / Private 100

Note : This question paper is meant for all Regular and Private students. Answer all five questions. All questions carry equal marks. The blind candidates will be given 60 minutes extra time.

- (a) What is number system ? Write the difference between a positional and a non-positional number system.
(b) Explain the term 1's and 2's compliment and solve following using 2's compliment method $-1111 - (0010)$.

OR

Explain how a decimal number is converted into binary, octal and hexadecimal number and vice versa. Give an example of each conversion.

- (a) Discuss the basic combination of Gates. Explain it with the help of truth tables and symbols.
(b) Explain EX-OR gate, EX-NOR gate and NAND gate with their graphical symbol and truth table.

OR

(a) Using DeMorgan's theorem, prove the following :

(i) $AB + CD = \overline{AB} \cdot \overline{CD}$.

(ii) $(A + B) \cdot (C + D) = \overline{(A + B)} + \overline{(C + D)}$

and hence prove the following statements :

(i) An AND-OR configuration is equivalent to NAND-NAND configuration.

(ii) An OR-AND configuration is equivalent to NOR-NOR configuration.

(b) Write short notes on :

(i) Error detection code

(ii) Excess-3 code.

- What do you mean by flip-flop ? Draw the circuit diagram master slave JK flip-flop and explain its working. <http://www.davvonline.com>

OR

Explain the following :

(a) Encoder

(b) Decoder.

- What do you mean by counters, registers and shift register ? Explain each with example.

OR

(a) Draw a MOD-5 counter using flip-flop and explain its working also.

(b) Draw a top-down counter using flip-flops and explain its working also.

- Discuss the importance of Digital to Analog conversion and Analog to Digital conversion and also explain the R-2R ladder network method.

OR

Explain successive approximation ADC.

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