End Semester Examination, Autumn–2020-21

Part-B

Full marks: **20** Exam duration: **1 Hours**

Answer **all** questions. Figures next to each question in square bracket indicate marks.

All Parts of a question should be answered at one place.

This question paper contains ONE page.

1. Use a $2^{n-1} \times 1$ MUX (with n variables logic) to design a combinational circuit for the function $F = \sum(Minterms)$. [5]

    The minterms are to be generated in the following way:

    - Take the last 3 digits of your roll number and square it.

    - Consider any 5 unique digits in the result as the minterms.

    - If the number of unique digits are less than 5, append some more unique digits of your choice to make 5 unique terms.

2. Design a synchronous counter to count the minterm sequence generated for the above question from LSB to MSB. [5]

3. Design a sequence generator to generate a pattern. [10]

    The format of the pattern is given below:

    - Take the last 3 digits of your roll number and convert it to binary.

    - Use 4 least significant bits of the binary number.

    - If you get all ones, replace the LSB with 0.

    The resultant binary number is your pattern.

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