Third Semester M.Sc. (Part – II) Physics
(CBCS Pattern) Examination

DIGITAL TECHNIQUES

Paper : 3 PHY 4-(i)

P. Pages : 4

Time : Three Hours] [Max. Marks : 80

Note : (1) All questions are compulsory and carry equal marks.
(2) Draw neat diagrams wherever necessary.

1. (A) Define-Fan in, Fan out, Propagation Delay and noise margin of a digital functional device. 4

(B) How C-MOS device is different from standard TTL device ? 4

(C) Draw a circuit of N-MOS NAND Gate and explain construction and working with truth table. 8

OR

(P) Show that NAND gate can be used as universal logic gate. 4

(Q) What is NOT function ? Draw circuit diagram for C-MOS NOT Gate and explain its working with truth table. 8

(R) Using D-type flipflop, organize 4-bit left shift SISO register and explain its working. 8

5. (A) What is the difference between volatile and nonvolatile memory ? 4

(B) What is ROM ? Enlist its applications. 6

(C) Using 7489 IC (16x4 RAM) arrange memory organization of 32x4 6

OR

(P) What is EPROM ? Explain its applications. 4

(Q) What do you mean by memory map for data processor system ? 4

(R) Explain the function of 6264 IC to obtain 8KB memory. 8

(R) How a low power and high power Schottky TTL devices are distinguished ? 4

2. (A) Write down Boolean laws for simplification of logic circuit and explain how these laws are effective in reducing Boolean algebraic expressions with suitable example. 12

(B) Reduce the following expression using Boolean algebraic method.

$Y = ABC + \bar{A}BC + A\bar{B}C + AB\bar{C} + \bar{A}\bar{B}C + A\bar{B}\bar{C}$ 4

OR

(P) Draw the block diagram of Internal circuit of 7483 IC. By using 7486 IC how a 2's complement of a given number is obtained ? 8

(Q) Draw neat circuit diagram for 4-bit binary multiplier using 7483 and 7408 IC's. 8

3. (A) Draw circuit diagram of 4:1 multiplexer using basic gates. 4

(B) Using two blocks of 4:1 multiplexer how one can obtain 8:1 operation. 4

(C) What are encoders and decoders ? Explain the working of 74138 IC with the internal circuit diagram. 8

OR

(P) Give salient features of 74181 (4-bit ALU). 4

(Q) Explain the operation of LED and how it can be used to display alpha-numeric characters. 6

(R) How HEX-code is obtained for display of characters ? 6

4. (A) What is flip-flop ? State its important applications. 4

(B) Explain the working of JKMS flip-flop and draw neat diagram using NAND gates. 8

(C) Using 7493 IC, show how it can be used as Mod-7 counter. 4

OR

(P) What are synchronous and asynchronous counters ? 4

(Q) Explain the working of Ring counter. 4