

Total Pages-4

RNLKWC(A)-/PHYSICS/CC7T/SEM-III/2023

2023

B.Sc. (Honours)

B.Sc. Third Semester End Examination - 2023

PHYSICS

PAPER - CC7T

Full Marks : 40

Time : 2 hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

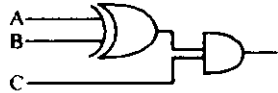
Group - A

- 1. Answer any five questions** **5×2=10**
- (a) Give differences between RAM and ROM. 2
- (b) Convert, $(-25)_{10} = (?)_2$
- (c) What do you know by combinational circuit and sequential circuit? 2
- (d) Design MUX as AND & EXOR gates.
- (e) Prove the identities $(B+BC)(B+\bar{B}C)(B+D) = B$

(Turn Over)

(2)

- (f) What is race-around condition in JK FF?
- (g) Design the following circuit with NAND Gates only.

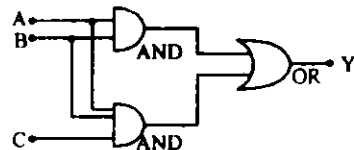


- (h) Draw half subtractor using NAND gates only.

Group - B

Answer any 4 out of 6 questions : 4×5=20

- 2. (a) Define positive and negative logic systems.
- (b) Design a XNOR gate using minimum number of NAND gates.
- (c) Obtain the Boolean expression for the output Y.



2+2+1=5

- 3. (a) What is Multiplexer? Construct a 8:1 multiplexer by using 2, 4:1 multiplexer. 1+2=3
- (b) Give Block diagram of a 1 line to 4 line de-multiplexer,

(3)

draw the same by using basic gates also. 3+2=5

- 4. (a) Give truth table of full-adder, Hence obtain the logical expressions of 'sum' and 'carry' outputs of the full adder in simplified form. 2+2
- (b) Classify registers, depending upon its application. 1
- 5. Give the block diagram of a general-purpose CRO and explain the function of each block. 5
- 6. (a) Design a positive logic NOT circuit using a transistor.
- (b) How OR gate can be constructed using a transistor only? 3+2
- 7. Draw the circuit diagram of an astable multivibrator using IC555 and explain its operation. 5

Group - C

Answer any one out of two questions : 10×1=10

- 8. (a) (i) Draw circuit diagram of J.K. flip-flop using universal gate, give truth table also.
- (ii) What advantage can you obtain in case of J-K flip flop over S-R flip flop. 3+2=5
- (b) (i) What is a Karnaugh map?

(4)

(ii) Write down the Boolean function corresponding to the standard sum-of-product (SOP) notation:

$$f(A,B,C,D) = \Sigma m(0,2,4,6,7,11,15) + d(1,8,14)$$

[where d=dont care] 5+5=10

9. (a) With the help of a logic diagram explain 14-bit parallel binary adder/subtractor. 5
- (b) What is a decade counter? Explain with the help of the relevant circuit diagram and truth table, the operation of BCD decade counter. 1+4