**A–094**

**Total Pages : 3** **Roll No. .....**

# MSCPH-521

## M.Sc. PHYSICS (MSCPH)

**(Digital Electronics and Communication System)**

3rd Semester Examination, 2024 (June)

Time : 2:00 Hrs. Max. Marks : 70

***Note* :–** This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given therein. ***Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.***

**Section–A**

**(Long Answer Type Questions)** 2×19=38

***Note* :–** Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any *two* (02) questions only.

1. What is the Boolean algebra in digital system ? Explain the fundamental properties of Boolean algebra.

2. What do you understand by flip flops ? Discuss various types of flip flops.

3. Discuss R–2R ladder circuit with working. What are the advantages of R-2R Ladder in digital to analog converter (DAC) ?

4. Explain AM and FM Modulation and Demodulation systems.

5. Write short note on :

   (a) Yagi antenna

   (b) High frequency antenna

   (c) Loop antenna

## Section–B

**(Short Answer Type Questions)** 4×8=32

***Note* :–** Section 'B' contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

1. Convert the octal number 215.17 in hexadecimal.

2. Discuss the various logic gates with truth table.

3. Explain the De Morgan's laws.

4. Minimize the following expression using K-map.

$$F = \overline{A}\overline{B}C + \overline{A}BC + A\overline{B}C + AB\overline{C}$$

5. Explain the working of Master-slave flip-flop.

6. Explain the universal shift register with block diagram.

7. An unmodulated carrier frequency is given by 1 MHz. After frequency modulation, the maximum frequency is given by 1.4 MHz. Find the frequency deviation $\Delta f$ and minimum frequency $f_{\text{min.}}$

8. What is the efficiency of an antenna ? If the power input to an antenna is 100 mW and if the radiated power is measured to be 90 mW, then calculate the efficiency of the antenna.

**********