Doll No.	
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Total No. of Questions : 09

M.Sc. (Physics) (Sem.–1) ELECTRONICS Subject Code : MSPH-414-21 M.Code : 91412 Date of Examination : 19-01-23

Time: 3 Hrs.

Max. Marks : 60

Total No. of Pages : 02

**INSTRUCTIONS TO CANDIDATES :** 

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

## **SECTION-A**

- 1. Write briefly :
  - a. Draw the VI characteristics of a Diode.
  - b. What do you mean by drift and diffusion carriers? Explain.
  - c. Discuss the need of a protection in SCR circuit.
  - d. What is the difference between DIAC and TRIAC? Explain.
  - e. List the ideal characteristics of an OPAMP.
  - f. Discuss the disadvantages of Boolean Algebra.
  - g. Compare synchronous and asynchronous counter.
  - h. What is the need of a multiplexer? Explain.
  - i. Compare digital and analog instruments.
  - j. Discuss the disadvantages of variable resistor type digital to analog converter.

## **SECTION-B**

- 2. Explain the principle, characteristics and working of Light Emitting Diodes. Also compare it with LCDs.
- 3. Explain the series operation of SCRs. Also, comment upon the string efficiency of such circuit.
- 4. What is the need of an OPAMP? Discuss the various applications of OPAMP's.
- 5. Explain the working of a J K flip-flop. Also mention its advantages and disadvantages.
- 6. Two BCD numbers A<sub>0</sub> A<sub>1</sub> A<sub>2</sub> A<sub>3</sub> and B<sub>0</sub> B<sub>1</sub> B<sub>2</sub> B<sub>3</sub> are required to be added, resulting in a BCD number. What modifications/alterations are required to be made in the circuit of 4-bit binary adder? Discuss. Mention clearly the assumptions made, if any.

## **SECTION-C**

- 7. a) Reduce F(D, C, B, A) =  $\Sigma m(1, 2, 4, 6, 8, 11, 12, 13)$  to the simplest possible form using K-Map method.
  - b) What is the need of shift registers? Discuss various types of shift registers.
- 8. a) Explain (in detail) the working of successive approximation analog to digital converter.
  - b) Discuss the operational principle of UJT. Also explain its use as a relaxation oscillator.

## **9.** Explain the following :

- i) Digital Frequency Meier
- ii) Schottky diodes