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PG CBCS
M.Sc. Semester-III Examination, 2019
Physics
Paper Code: PHS-303
Special Paper – I

Full Marks : 40

Time: 2 Hours

Use Separate scripts for Group A& Group B
GROUP A
(Electronics: Analog)

1. Attempt any two of the following: (2 × 2 = 4)

   a) Define slew rate and CMRR of an OPAMP.

   b) What is the importance of a bleeder resistance in a rectifier circuit using LC filter.

   c) Why do we use higher order active filters?

   d) What is lock-in-range and capture range of a Phased Locked Loop (PLL)?

2. Attempt any two of the following: (4 × 2 = 8)

   a) Using 7805, design a current source to deliver 0.2 A current to a 22 ohm, 10W load.   (4)

   b) Implement the regenerative comparator using OPAMP and explain its working principal.   (4)

   c) What is active band pass filter? Design second order butterworthbandpass filter circuit using OPAMP.   (4)

   d) What is meant by zero crossing detector? What is the use of zero crossing detector?   (4)

3. Attempt any two of the following: (8 × 1 = 8)

   a) How you can use OPAMP for analog multiplication? Explain with circuit. Explain circuit of a triangular wave generator.   (4+4)

   b) i) What is phased-locked loop? Explain how it works.   (4)

   ii) Describe briefly a bucking a boosting switching regulator.   (4)

GROUP B
(Electronics: Digital)

4. Attempt any two of the following: (2 × 2 = 4)

   a) Define Figure of merit and Fan-out.

   b) Mention the difference between TTL and ECL.

   c) What is ALOHA? Explain the term slotted ALOHA.

   d) What is a Charged Coupled Device (CCD) and how is it used in astronomy?

                                                           (P.T.O)

5. Attempt any two of the following: $(4 \times 2 = 8)$

a) Implement the function F=CD+A+B using NMOS.

b) Design a ROM for conversion of single digit (BCD) to Excess 3 code.

c) What is CDMA? What are the advantage of CDMA over FDMA and TDMA?

d) Design full adder circuit using 4:1 MUX's and 2:1 MUX's.

6. Attempt any one of the following: $(8 \times 1 = 8)$

a. i) Construct a 4 bit bi directional shift register using multiplexers. (5)

ii) Design Binary to BCD converter. (3)

b. i) Draw and explain the architecture of GSM network. (3)

ii) Design universal gates using CMOS logic and explain its working principle. (5)

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