CARMEL COLLEGE OF ARTS, SCIENCE & COMMERCE FOR WOMEN, NUVEM - GOA.

SEMESTER END EXAMINATION, August 2020
B. Sc Semester: V old course PHYSICS (Paper I) -Electronics

Total Marks: 30   Date: 04/08/2020   Duration: 2 Hours   Total No of pages: **2**

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Instructions: 1) All questions are compulsory.
                 2) Figures to the right indicate marks.
                 3) Symbols have their usual meaning, unless otherwise stated.
                 4) Use of log tables and non programmable calculators is allowed.

Q I. Answer any **five** of the following.   **(5 x 2 marks = 10)**

   a) In case of op-amp what is meant by virtual ground? State any four characteristics of an ideal op-amp.

   b) Draw a functional circuit diagram of IC 555 timer. State the function of each basic block of the timer.

   c) For a transistor working as switch, what is meant by hard saturation and soft saturation.

   d) What is the working principle of current regulating diode (CRD)

   e) Draw the ideal voltage transfer curve of an op-amp. What is meant by comparator and window comparator?

   f) Convert the decimal number 36.43625 to binary and binary 10110 to BCD.

   g) State De Morgan's Law's laws for two inputs and verify the same by writing the truth table for two inputs.

   h) A truth table has output 0 for each of these input conditions: ABC = 001, 100 and 101. Write a POS expression for the output and draw a logical circuit diagram.

Q II. Answer any **four** of the following.   **(4 x 5 marks = 20)**

1. a) Draw the circuit diagram of a Fixed Bias circuit. If this circuit is to work as a switch, write the expression for the minimum value of transistor h_{fe} and the value of the voltage across the collector.

   b) Draw the drain and transfer characteristics of N-channel JFET. Why is the input impedance of JFET large?

2. a) Explain how FET can be used as a Voltage Variable Resistor (VVR).

   b) With the help of a neat circuit and waveform diagram explain the working of a transistorized astable multivibrator. Write expression for the period of oscillations.

3. a) Draw the circuit diagram of an Integrator using op-amp. Sketch the nature of output waveform when a sine wave is applied at the input.

b) Draw a functional circuit diagram of IC 555 when connected in monostable mode and write the expression for its pulse width.

4.   Explain decimal to BCD encoder with a logical diagram.

5.   Discuss 3 bit shift right register with logical diagram and waveforms.

6.   Explain the working of a Mod 5 counter with logical diagram, input and output waveforms.

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