MANIPAL ACADEMY of HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

Reg. No.										

DEPARTMENT OF SCIENCES, I SEMESTER M.Sc. (PHYSICS)
END SEMESTER EXAMINATIONS, FEBRUARY 2021
SUBJECT: Fundamentals of Electronics [PHY 4107]
(REVISED CREDIT SYSTEM-2017)

Time: 3 Hours Date: 15.02.2021 MAX. MARKS: 50

Note: (i) Answer **ALL** questions

(ii) *Draw diagrams, and write equations wherever necessary*

1. (a) Sketch the logic system for a clocked SR flip flop and give its truth table. (3M)

(b) Use a Karnaugh map to minimize the following standard SOP expression
$\bar{A}\ \bar{B}\ \bar{C}\ \bar{D}$ + $\bar{A}\ \bar{B}$ C $\bar{D}$ + $\bar{A}\ \bar{B}$ C D + $\bar{A}\ B\bar{C}$ D + $\bar{A}$ B C $\bar{D}$ + $\bar{A}$ B C D+A $\bar{B}\ \bar{C}\ \bar{D}$ +A$\bar{B}\ \bar{C}$ D
(4M)

(c) Using phasor method arrive at the expression for the current in the case of the series LCR circuit with an ac source.
(3M)

2. (a) Draw the state diagram, flip flop transition table, Karnaugh map for the terminals J_0 and K_0 that is necessary for the design of a three bit Gray code counter. And obtain Boolean expression for J_0 and K_0.
(4M)

(b) Find the output voltage from a four-bit ladder that has a digital input of 1101.Assume that 0=0V and 1=10V.
(4M)

(c) Transfer –sin (580 t −110°) into phasor form. (2M)

3 (a) Draw the circuit diagram of an inverting amplifier using op amp .Using the equivalent circuit of op amp obtain an expression for its gain.
(4M)

(b) Describe how an op-amp can be used as Schmitt triger
(4M)

(c) Draw circuit diagram for a differentiator using op amp..
(2M)

4. (a) Explin how 555 timer can be used for monostastable operation and find the formula for its frequency.

(5M)

(b) Discuss how an op amp can be used as first order high pass filter and obtain an expression for its lower cut off frequency . (3M)

(c) Draw the block diagram of voltage series and voltage shunt feedback circuit. (2M)

5. (a) Draw voltage divider biasing for BJT in common emitter configuration.Using Thevenin's equivalent network obtain an expression for I_B and V_{CE}.

(5M)

(b) Discuss the constuction and working of UJT.

(3M)

(c) Explain how diode can be used as negative clipper.

(2M)