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DEPARTMENT OF SCIENCES, I/III SEMESTER M.Sc. (PHYSICS) END SEMESTER EXAMINATIONS, NOVEMBER 2018 SUBJECT : Fundamentals of Electronics [PHY 4107] (REVISED CREDIT SYSTEM-2017)

Time: 3 Hours

Date: 27-11-2018

MAX. MARKS: 50

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

(ii) Draw diagrams, and write equations wherever necessary

- (a) Sketch the logic system for a clocked JK flip flop and give its truth table. (3M)
 (b) Use a Karnaugh man to minimize the following standard SOP expression

 ABC + ABC + ABC + ABC
 (4M)
 (c) Define a decoder. Determine the logic required to decode the binary number1011. Give one application of decoder. (3M)
- 2. (a) Describing the design procedure obtain the circuit diagram of a three bit Gray code counter. (6M)(b) Draw the five-bit binary ladder. Find the output voltage from a five-bit ladder that has a digital input of
- 11010.Assume 0=0 V and 1=+10 V(4M)3. (a) Draw the schematic diagram for a Wein bridge oscillator using op-amp and derive an expression for its frequency.(5M)
 - (b) Calculate the output voltage in the following circuit for $v_1 = 2.4$ volts.



(2M)

(c) Draw the circuit diagram of voltage regulator using series transistor and opamp and explain how the voltage is being regulated. (3M)

4. (a) Drawing the block diagram of timer 555 explain how it can be used for astable operation. Arrive at an expression for its output frequency. (5M)
(b) Show how an op amp can be used as a noninverting comparator and draw its output waveform when sinusoidal wave is given to the input (i) if V_{ref} is positive (ii) if V_{ref} is negative. (3M)

(2M)

(c) Discuss the operation of an op amp differntiator.

5. (a) Using a.c equivalent circuit for transistor in CE configuration obtain expressions for input	
impedance, output impedance and voltage gain when voltage divider bias is used.	(4M)
(b) Discuss the construction and working of SCR and draw its charecteristic curve.	(4M)
(c) Transfer the function $-5\sin(580t - 110^{\circ})$ into the polar form.	(2M)

