LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc.** DEGREE EXAMINATION – **PHYSICS**

THIRD SEMESTER – **APRIL 2012**

# PH 3106 - APPLIED ELECTRONICS

 Date : 28-04-2012 Dept. No. Max. : 100 Marks

 Time : 9:00 - 12:00

**PART A**

**Answer ALL questions (10 x 2 = 20)**

1. What is meant by Fermi level?
2. Calculate the current amplification factor α given IE = 2mA, IB = 20μA, IC = 1.98 mA.
3. Calculate the output voltage of an inverting amplifier when Vi = 1.5V, Ri=10 kΩ, Rf=20 kΩ.
4. State any two characteristics of an ideal OP-AMP.
5. Show that A($\overline{A}$ + B) = A.B
6. What is a decoder?
7. Write a short note on T flip flop.
8. Write a short note on mod 3 counter.
9. What is hit ratio?
10. What is an instruction code?

**PART B**

**Answer any FOUR questions (4 x 7.5 = 30)**

1. (a) Discuss the formation of depletion layer in a PN junction diode (3.5)

 (b) What happens to the depletion layer when the diode is forward and reverse biased? (4)

1. Explain the working of an inverting summing amplifier with a neat diagram.
2. State and prove DeMorgan’s theorems.
3. With neat diagram and truth table discuss the working of Johnson’s counter.
4. Discuss in detail with a neat diagram a 4 input multiplexer.

**PART C**

**Answer any FOUR questions (4 x 12.5 = 50)**

1. Describe the operation of a NPN transistor in common base mode. Obtain the input and output characteristics for the same.
2. What is A/D conversion? Explain with a neat diagram the function of a dual slope A/D converter.
3. Simplify using K – map F(A,B,C,D) = Σ (2,3,4,5) + $Ʃ\_{d}$ (10,11,12,13,14,15). Realize the Boolean expression using NAND-NAND network.
4. What is a ‘race around’ condition in a JK Flip flop? Explain in detail how it is solved using JK master – slave Flip flop.
5. (a) Explain the working of a full adder using circuit diagram and truth table (7.5)

 (b) Discuss in detail about computer registers (5)

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