91031

B.Sc. 1st Semester (Hons) Examination,

November–2014

PHYSICS

Paper–Phy-106

Linear Digital Integrated Circuits and Instrumentation–I

Time allowed : 3 hours] *[Maximum marks : 40*

Note : *Attempt **five** questions in all, selecting at least **two** questions from each unit.*

Unit–I

1. (a) List the difference between thick and thin film IC's. 4

(b) Differentiate between Linear Integrated circuits and Digital Integrated circuits. 4

2. (a) What is an OP-AMP ? Draw and explain the block diagram of OP-AMP. 4

(b) Why are open loop OP-AMP configurations not used in linear applications ? 2

(c) Write four characteristics of OP-AMP (ideal). 2

3. (a) Calculate the output voltage of a OP-AMP summer for the following set of input voltages and resistors

$V_1 = 1$ volt, $V_2 = 2$ volt, $V_3 = 3$ volt

$R_1 = 500\ k\Omega$, $R_2 = 1M\Omega$, $R_3 = 1M\Omega$ and

$R_F = 1M\Omega$ 4

(b) Write a note on zero crossing detetor. 4

4. (a) What is the difference between an oscillator and multivibrator ? Draw the circuit of bistable multivibrator and find the expression for collector swing of one transistor used in the multivibrator. 6

(b) How can a operational amplifier be used as a comparator ? 2

Unit–II

5. (a) How the decimal fraction numbers are converted to binary numbers ? Explain. 3

(b) Convert hexadecimal number 2 BAFC to binary and then to octal. 3

(c) What do you understand by floating point representation of binary numbers ? 2

6. (a) What is the difference between the ordinary algebra and Boolean algebra ? 2

(b) Explain how AND, OR, NOT gates can be realized using NOR gates alone. 4

(c) Draw a truth table of a Boolean function $F = \overline{A} \cdot B + C$. 2

7. (a) What is memory unit ? Explain with block diagram the concept of memory using registers connected to memory unit. 4

(b) Explain the working of Encoder with a neat and clean diagram. 4

8. (a) Implement a half Adder circuit using NAND gate only. 3

(b) Draw the diagram of a full subtractor and explain its working. 3

(c) Obtain 2's complement of 16 bit binary number 0111100011001100 by two methods. 2