

Roll No. ....

**91031**

**B. Sc. (Hons.) Physics 1st Sem.**

**Examination – December, 2015**

**LINEAR DIGITAL INTEGRATED CIRCUITS &  
INSTRUMENTATION - I**

**Paper : Phy-106**

*Time : Three Hours ]*

*[ Maximum Marks : 40*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting at least *two* from each Unit. All questions carry equal marks.

**UNIT - I**

1. (a) Write two active and passive components each. 1
- (b) What is integrated circuit ? What is the advantages of integrated circuits over discrete circuit design. 2, 2
- (c) Explain the photolithographic process. 3

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(c) What is meant by 1's and 2's complement of a binary number? Explain the rules for binary subtraction using 1's complement methods. 4

5. (a) Sketch the basic AND circuit with two diodes and find its truth table. 2,1

(b) What does De-Morgan's theorem apply to, and what does it state. 3,2

7. (a) Explain minterms and Maxterms. 3

(b) Show that  $(A+B)(\bar{A}+C) = AC + \bar{A}B$   
 Prove the following identity:  
 $(A+B)(\bar{A}+C)(A+B) = AC$

(c) What do you mean by K-MAP? 1

8. (a) Explain in brief following terms. 3

(i) ROM

(ii) PROM

(iii) EPROM

(b) Explain with the help of circuit diagram the ENCODER circuit. 2,3

2. (a) Give the block diagram of an operational amplifier. 3

(b) Draw the basic circuit of a differential amplifier. 2

(c) What are common mode and differential mode signals? 3

3. (a) An OP-AMP has offset current of 100 mA and a feedback resistance of 200kΩ. Calculate the offset voltage. 2

(b) What do you understand by closed loop and open loop gain of an OP-AMP. 4

(c) Draw the circuit diagram of a OP-AMP when used as a subtractor. 2

4. Explain the principle of working of Wein bridge oscillator circuits. Explain why negative feedback is in addition to the usual positive feedback is employed in Wein bridge oscillator. Draw the circuit diagram also. 2, 4, 2

5. (a) Why do we use binary number system and not the decimal number system in digital electronics? 3

(b) Find the binary equivalent of 576. 1

UNIT - II