

SCHOOL OF SCIENCES



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UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)  
उत्तराखण्ड मुक्त विश्वविद्यालय, हल्द्वानी ( नैनीताल)

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M.Sc. Physics (MSCPHY13)

First Year Assignment

Last Date of Submission: 15 May 2015

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Course Title: Semiconductor Devices Analog and  
Digital electronics

Course Code: PHY-504

Year : 2014-15

Maximum Marks :40

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### Section A

Section 'A' contains 08 short answer type questions of 5 marks each. Students are required to answer 4 questions only. Answers of short answer type questions should be in 250 words approximately.

- 1- Describe the construction, working and applications of silicon controlled diode (SCR).
- 2- Explain the working of series regulated power supply using Op Amp and transistor. What are the limits of series regulator and how these difficulties can be overcome?
- 3- Draw the circuit diagram of Corpitt's oscillator and explain its working.
- 4- Draw the neat circuit diagram of Schmitt trigger and explain its working in detail with the help of waveforms and mention any two applications.
- 5- Draw the circuit diagram for sine wave and square wave generator by using op amp. Explain its working also.
- 6- State and prove DeMorgan's theorems.
- 7- Design a half, full and parallel subtractors circuit using and explain truth tables.
- 8- What is a flip flop? Explain clocked RS flip flop and Master Slave JK flip flop.

### Section B

Section 'B' contain 04 long answers type question of 10 marks each and students are required to answers 02 questions only.

- 1- What are MOSFET (metal oxide field effect transistor)? Give the working and characteristics of depletion type MOSFET.
- 2- What is operational amplifier? Distinguish between inverting and non inverting operational amplifiers. By using op amp design half and full wave precision rectifier.
- 3- What do you mean by fundamental products and fundamental sums? By using example explain SOP and POS.
- 4- What is counter? Describe Mode 7 counter and its working.