

**M.Sc. 2nd Semester Examination, 2012**

**ELECTRONICS**

*( Electronic Materials and Device Lab )*

*( Practical )*

PAPER—ELC-206

*Full Marks : 50*

*Time : 3 hours*

Select **one** question by a lucky draw

1. Determine the band-gap of a semi-conductor using a P-N junction. Vary junction temperature and record the corresponding junction voltage. Determine the band-gap of the device material from the graph. Repeat this process for atleast two current values.

*( Turn Over )*

2. Implement a simple diode circuit on a breadboard. Measure diode current for different diode voltage. Draw a 'ln.  $I$  vs  $V$ ' graph and determine reverse saturation current and 'material constant' of the device. Also plot diode current with diode voltage in a semilog graph paper and show the series resistance effect.
3. Apply two different ac signals having frequencies 5 kHz and 25 kHz on a diode circuit. Measure two peak to peak voltage of ac signals using a cathode Ray oscilloscope and determine junction capacitance of the device for different reverse bias voltage. Plot the 'C-V' characteristics of the device. Determine doping concentration/profile from your recorded data.
4. Implement the 3 : 8 decoder using fundamental gates and Implement the function  $F = \Sigma m(0, 1, 3, 6, 8)$  on a breadboard using a '3 to 8' decoder and verify its truth table.
5. Design a binary adder and subtractor circuit using IC 7483. Implement the circuit on a breadboard and perform addition and subtraction for two sets of numbers.

6. Design a R-2R ladder circuit for digital to analog conversion verify the operation of this circuit for each combination of three bits as digital input. Draw the stair case graph showing digital to analog conversion.
7. Implement the function  $F = \Sigma m(1, 2, 5, 6, 7)$  on a bread board using 8 : 1 multiplexer and necessary logic gates. Verify your result and draw the truth table.
8. Design a 4-bit right shift register using JK F/F on a bread board. Verify your circuit for 4 sets of data. Also show the corresponding timing diagram of your data, clock and outputs. Convert this circuit to a ring counter.

Marks Distribution :

Theory	: 05
Circuit Design	: 10
Experiment	: 15
Discussion	: 05
Viva-voce	: 10
Lab Note Book	: 05
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	50