**MANIPAL INSTITUTE OF TECHNOLOGY**
Manipal University

### SECOND SEMESTER M.Tech. (E & C) DEGREE END SEMESTER EXAMINATION MAY/JUNE 2016
### SUBJECT: LARGE AREA MICROELECTRONICS (ECE - 562)

**TIME: 3 HOURS**                                            **MAX. MARKS: 50**

**Instructions to candidates**
- Answer **ANY FIVE** full questions.
- Missing data may be suitably assumed.

1A. Can the principle of conservation of momentum holds good in amorphous solids? Explain the consequences for amorphous solids

1B. Describe how atomic structure determines electronic properties of amorphous solids.

1C. Describe the defects in the crystalline solids in terms of symmetry groups. How the concept of defects in amorphous solids is developed?

(3+3+4)

2A. Explain formation of band-gap in the amorphous solids. Explain how the bonding rule works in a-Si and a-Se.

2B. Describe chemical reactions involved in PECVED technique to grow a-Si:H.

(6+4)

3A. Explain PVD and CVD like regimes in plasma growth technique of a-Si material.

3B. Explain the leakage currents sources in PIN photodiodes.

(4+6)

4A. Describe how TFT influences the a-Si based photodetector.

4B. Derive an expression and plot the expression for current- voltage characteristics of a-Si TFT both for output and transfer functions.

(3+7)

5A. Describe how different capacitances in PIN photo diode pixel will influence its performance.

5B. What is quantum efficiency? Describe quantum efficiency of P-I-N diode with ITO contacts.

5C. Describe the following: i) Photovoltaic converter. Ii) Pulse mode operation of TFT.

(3+3+4)

6A. Describe different techniques for charge separation in solar cells.

6B. Describe the following: i) Ideal photo converter. Ii) Threshold voltage of a-Si:H TFT .

(5+5