MANIPAL ACADEMY of HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

Reg. No.										

DEPARTMENT OF SCIENCES, III SEMESTER M.Sc (Physis)
END SEMESTER EXAMINATIONS, NOVEMBER 2018

SUBJECT: Thin Films, Processing of Semiconductor Devices, Nano and Magnetic Materials [PHY 5001]

(REVISED CREDIT SYSTEM-2017)

Time: 3 Hours Date: 28:11:2018 MAX. MARKS: 50

Note: (i) Answer **ALL** questions
(ii) Draw diagrams, and write equations wherever necessary

1. a) Derive the Knudsen cosine law for the point source of evaporation adopted in the thin film preparation. [5 marks]
   b) Explain the preparation of thin films using a chemical vapor deposition technique? Mention its merits and demerits. [5 marks]

2. a) Describe the thin film growth stages with neat diagrams. [6 marks]
   b) Derive an expression for measuring thickness of the transparent thin films by interference pattern obtained using spectrophotometer technique. [4 marks]

3. a) Derive an expression for the reflectance of single transparent thin films deposited on glass substrate. [6 marks]
   b) Show that both negative and positive values of temperature coefficient of resistance are possible for discontinuous thin metal films. [4 marks]

4. a) Explain the growth mechanism of the crystals by Czochralski technique. Mention its advantages and limitations. [5 marks]
   b) What do you mean planar technology? Describe the preparation of pn junction by planar technology with neat diagrams. [5 marks]

5. a) Discuss the properties of carbon nanotube and its applications. [5 marks]
   b) Describe the various types of Giant Magneto-Resistance (GMR) with proper examples. [5 marks]