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**Third Semester B.E. Degree Examination, Dec.2015/Jan.2016**  
**Advanced Electronics and Instrumentation**

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.**

**PART – A**

- 1 a. Explain the construction, principle and working of LVDT. (08 Marks)
- b. What are thermocouples? Explain thermocouple by using Seebeck and Peltier effects. (08 Marks)
- c. Define pyrometers and Hence explain the working principle of pyrometers. (04 Marks)
- 2 a. What are the advantages of ICs over conventional circuits? (04 Marks)
- b. Explain the process of production of monolithic ICs in detail. (10 Marks)
- c. What are sequential circuits? Explain SR flipflops with relevant diagrams. (06 Marks)
- 3 a. Describe the following :
  - i) Direct Coupled Transistor Logic (DCTL)
  - ii) Bipolar Transistor – Transistor Logic (BTTL)
  - iii) Emitter – Coupled Logic (ECL). (06 Marks)
- b. Explain in detail about FINFETs. (04 Marks)
- c. Mention scaling factors for followings
  - i) Gate capacitance  $C_g$
  - ii) Current Density  $J$
  - iii) Max operating frequency  $f_o$
  - iv) Power speed product  $P_T$  (10 Marks)
- 4 a. With a neat diagram explain DAC with specifications. (06 Marks)
- b. Explain sample and Hold circuits with applications. (08 Marks)
- c. Write a note on successive Approximation ADC. (06 Marks)

**PART – B**

- 5 a. Explain implementation procedure for programmable logic arrays with applications. (08 Marks)
- b. Define FPGA. Explain architecture of FPGA with applications. (08 Marks)
- c. Define Read only memory. Discuss its types and speed. (04 Marks)
- 6 a. Explain Rotary and Ion pump systems with neat diagrams. (08 Marks)
- b. Explain principle of operation and practical considerations of Titanium sublimation pump. (06 Marks)
- c. Explain UHV Techniques with applications. (06 Marks)
- 7 a. With a neat diagram, explain working of SEM and also mention its applications. (08 Marks)
- b. Explain principle, working and applications of AFM. (08 Marks)
- c. What do you meant by chromatography? Explain any one method. (04 Marks)
- 8 a. What are the components of Mass spectrometer? Explain principle and working of same. (08 Marks)
- b. Discuss about following : i) Thermogravimetry ii) Differential Scanning Calorimetry. (12 Marks)

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