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***B.Tech. Degree V Semester Special Supplementary Examination
August 2015***

**EC/EI 1505 ANALOG AND INTEGRATED CIRCUITS
(2012 Scheme)**

Time : 3 Hours

Maximum Marks : 100

**PART A
(Answer ALL questions)**

(8 × 5 = 40)

- I. (a) Explain the concept of virtual ground and hence derive the expression for gain in an inverting amplifier.
 (b) State how practical integrator is different from theoretical circuit, with relevant sketches.
 (c) What is a regenerative comparator? Explain.
 (d) Describe how triangular waveforms are generated using op-amp, with neat circuit diagram.
 (e) Design a phase corrector circuit with a lag output.
 (f) What is a switched capacitor filter? Explain.
 (g) What are regulators? Explain the classification of regulator ICs.
 (h) How to convert a 555 timer into an astable multivibrator to generate square waves of period 10 m sec? Explain its operation.

PART B

(4 × 15 = 60)

- II. (a) List the characteristics of an ideal op-amp. (5)
 (b) Derive the expressions for the gain, input and output resistances of a voltage series feedback op-amp configuration, with relevant circuit diagrams. (10)
- OR**
- III. (a) Derive the gain equation for a differential amplifier using two and three op-amps. (10)
 (b) Define the terms (i) slew rate (ii) SVRR. (5)
- IV. Using op-amp IC, design a log and antilog amplifier. (15)
- OR**
- V. (a) Draw and explain the operation of a full wave precision rectifier. (5)
 (b) Explain in detail about op-amp RC phase shift and wien bridge oscillators with neat circuit diagrams. (10)
- VI. (a) Derive the transfer functions of first and second order low pass and high pass Butterworth filters. (10)
 (b) Design a first order wide band pass filter having $f_L = 500 \text{ Hz}$, $f_H = 4.5 \text{ KHz}$ and pass band gain of 6. Find the value of Q. (5)
- OR**
- VII. Explain in detail different techniques involved in analog to digital and digital to analog conversion. (15)
- VIII. Draw and explain the functional diagram of 723 regulators. Using the functional diagram, explain the operation of a low voltage regulator with current fold back and high voltage regulator. (15)
- OR**
- IX. Explain with neat block diagram the operating principle of NE/SE 565 and discuss in detail any two applications of it. (15)