Reg. No.										

प्रज्ञानं ब्रह्म

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MANIPAL INSTITUTE OF TECHNOLOGY, MANIPAL 576104

(Constituent College of Manipal University)

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MANIPAL INSTITUTE OF TECHNOLOGY

THIRD SEMESTER B.TECH. (IT) DEGREE END SEMESTER EXAMINATION, DECEMBER – 2015
SUBJECT: ELECTRICAL AND ELECTRONIC CIRCUITS – ICT 207
(REVISED CREDIT SYSTEM)

TIME: 3 HOURS **08/12/2015** **MAX. MARKS: 50**

Instructions to candidates

- Answer any **FIVE FULL** questions.
- Missing data, if any, may be suitably assumed.

1A. For the circuit shown in fig.Q.1A, find the current through j1Ω element using Norton's theorem.
1B. With necessary expressions and waveforms explain the working of OPAMP as a square wave generator.
1C. Explain negative clamper diode circuit. Draw the waveforms.

[5+3+2]

2A. Explain the working of
(i) 2 – bit, R–2 R ladder type DAC
(ii) 6 – bit Successive Approximation type ADC
2B. Obtain the value of load resistance R_L for which maximum power transfer takes place in the circuit shown in fig.Q.2B. Find the power delivered to the load.
2C. Determine the voltage V which results in a zero current through the (5+j5) Ω impedance in the circuit shown in fig.Q.2C.

[5+3+2]

3A. Using superposition theorem, find the voltage across 4 Ω for the circuit shown in fig.Q.3A.
3B. Design a 2^{nd} order Butterworth wide band pass filter for a lower cut-off frequency of 3KHz and upper cut-off frequency of 8KHz with a pass band gain of 8.
3C. Explain the working of OPAMP based Wein Bridge oscillator circuit with neat circuit diagram and equations.

[5+3+2]

4A. With a neat block diagram and necessary waveforms, explain the working of astable multivibrator using 555 timer. Derive necessary expressions for ON and OFF time.
4B. Draw the current locus for the current I shown in fig.Q.4B.
4C. State and prove the reciprocity theorem with a suitable example.

[5+3+2]

5A. Using the concept of KCL solve for all node voltages for the circuit shown in fig.Q.5A.
5B. Explain the working of positive clipper circuit with a negative reference. For an input of 6sin(ωt)volts and a reference voltage of –3V, draw the input, output waveforms and transfer function.
5C. Explain the closed loop application of OPAMP as adder-subtractor.

[5+3+2]

6A. Design a voltage divider biasing circuit with an operating point (8V, 4mA). Assume a supply voltage of 15V and a negative feedback of 1.8V for a npn silicon transistor with a forward current gain of 100.
6B. Write all the mesh equations for the circuit shown in fig.Q.6B.
6C. Using the concept of source transformation write an equivalent current source circuit for the circuit shown in fig.Q.6C across X-Y terminal.

[5+3+2]