Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

(A Constituent Institute of Manipal University)
Manipal – 576 104

FIFTH SEMESTER B.Tech. (BME) DEGREE END SEM EXAMINATIONS NOV/DEC-2015

SUBJECT: INTEGRATED CIRCUIT SYSTEMS (BME 305)
(REVISED CREDIT SYSTEM)
Monday, 30th November, 2015, 2 to 5 pm.

TIME: 3 HOURS **MAX. MARKS: 100**

Instructions to Candidates:

1. **Answer any FIVE full questions.**
2. **Draw labeled diagram wherever necessary**

1A) Obtain the relation of transfer characteristics of a differential amplifier and sketch it. Over what differential voltage is differential amplifier a good limiter? Over what differential voltage the transfer characteristic quite linear? How does the trans conductance vary with the differential voltage? How automatic gain control is possible with the differential amplifier? (8)

1B) For the circuit shown in Fig. Q1B, if $R_i = \infty$, Show that the output admittance, (6)

$$Yof = \frac{1}{R+R^1} + \frac{1}{R_o}\left[1 - A_V \frac{R}{R+R^1}\right]$$

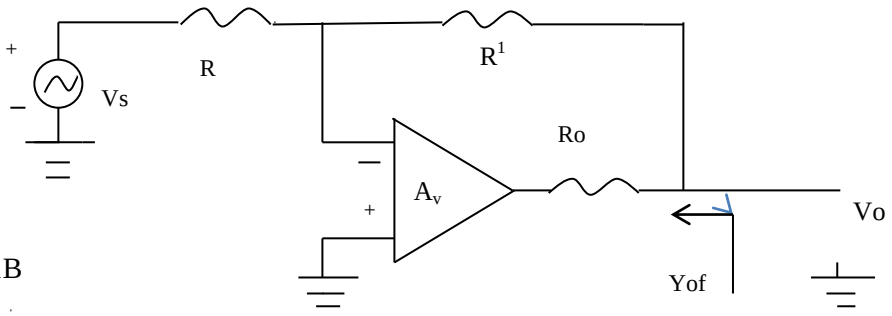

Fig Q1B

1C) Draw a non-inverting adder circuit using one Op-Amp to obtain the following expression. (6)

$V_o = V_1 + 2V_2$

2A) Draw the basic circuit of a logarithmic amplifier and obtain the expression of the output. How this circuit is modified with temperature compensation? Draw this circuit and derive the expression of the output. (8)

2B) A current of 1 to 20 mA is required in the stimulation of neuromuscular disorders in patients. Give a circuit which converts voltage into the above said current and derive the expression. (6)

2C) What is a sample and hold circuit? With the suitable diagram and waveforms explain a sample and hold circuit. (6)

3A) Draw the circuit of a function generator using OP-Amps to generate triangular and square waveforms. Explain its operation with waveforms and derive the expression of time period T of the waveforms. (8)

3B) A QRS detection system of ECG consist an active RC band pass filter as one of the stage. Design and draw a RC band pass filter to pass ECG signals for the following specifications. (6)

Center frequency=20Hz. Bandwidth=10Hz. Assume maximum gain=5 and $C_1=C_2=0.1\mu F$.

3C) What is delay equalizer? Give the delay equalizer circuit and explain its operation. (6)

4A) Draw the internal circuit diagram of timer IC. Explain the functions of each pin of the IC. (6)

4B) Design and draw the suitable circuits using timer IC to generate the following waveforms Vo_1 and Vo_2, shown in fig.Q4B, (8)

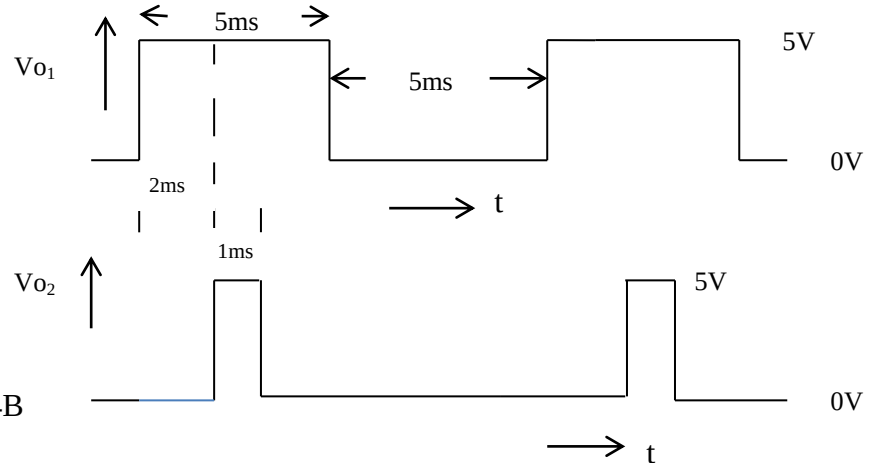

Fig.Q4B

4C) Draw the circuit of a 6 bit binary weighted DAC and explain its operation. (6)

5A) Design and draw a regulated power supply circuit using IC 7809 for the following specifications. Output voltage can be varied between 10 volts to 15 volts. The power supply can handle a load current of 1Ampere. The input to the power supply is 230 volts, 50Hz ac. Assume the ripple factor of the full wave bridge rectifier is 10%. (8)

5B) With appropriate diagram, explain the operation of a 4 bit successive approximation ADC. (6)

5C) Write a note switching regulators. (6)

6A) Write the internal diagram of VCO IC566. Explain the operation with suitable waveforms and give the expression of frequency of output waveform fo. (8)

6B) Draw the circuit of a two phase dynamic MOS shift register. Explain its operation. (6)

6C) Write a note on Phase Locked Loops. (6)