Student Exam No:_____

GANPAT UNIVERSITY

B.TECH SEM. IV ELECTRONICS & COMMUNICATION ENGINEERING

CBCS REGULAR EXAMINATION, MAY -2014

2EC403 ANALOG ELECTRONICS

TIME: 3 Hrs.] **[TOTAL MARKS: 70**

INSTRUCTIONS:

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

1 (A) Define following OP-AMP related terms and explain each in brief. 6

1. Input offset voltage
2. SVRR
3. Output short circuit current
4. Transient Response
5. Slew Rate
6. Channel Separation

(B) Write a short note on power supplies for integrated circuits. 4

(C) Give two reasons why an open loop op-amp is unsuitable for linear applications. 2

OR

1 (A) Draw and explain block diagram of typical OP-AMP. 4

(B) List advantages of introducing feedback concept with amplifier circuit. 4

(C) Draw and explain equivalent circuit of an OP-AMP. 4

2 (A) Explain instrumentation amplifier with transducer bridge and prove that output voltage is proportional to change in resistance of transducer. 4

(B) Find A_F, R_{iF} and R_{oF} ,f_F, and V_{OOT} for 741C OP-AMP non-inverting amplifier circuit with $A=2\times10^5$, $R_1=1K\Omega$, $R_i=2M\Omega$, $R_F=10K\Omega$, $R_o=75\Omega$, Supply voltage= $\pm15V$, Max. Output voltage swing=$\pm13V$. 4

(C) Explain peaking amplifier. 3

OR

2 (A) Prove that gain of the differential amplifier with single OP-AMP is same as that of the inverting amplifier. 4

(B) For the 741C OP-AMP inverting amplifier circuit with $R_1=1k\Omega$, $R_F=10k\Omega$, $A=2\times10^5$, $R_i=33M\Omega$, $R_o=75\Omega$, Supply voltage= $\pm15V$, Max. Output voltage swing=$\pm13V$, Calculate exact closed loop gain, Approximate closed loop gain, R_{iF}, R_{oF} ,f_F, and V_{OOT}. 4

(C) Explain non inverting comparator circuit with reference voltage of 2V. 3

3 (A) Design a low pass filter at a cutoff frequency of 1KHz with a passband gain of 2. Also using frequency scaling technique, convert 1 KHz cutoff frequency of this low pass filter to new cut off frequency of 1.6 KHz. 4

(B) Explain differentiator circuit with op-amp in detail. Also explain practical differentiator. 4

(C) Draw high frequency equivalent circuit of op-amp. Why capacitive effects are always present in high frequency op-amp equivalent circuit? 4

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SECTION-II

4 (A) Draw and explain voltage, current, transconductance and transresistance amplifier and compare the characteristics. 7

(B) Write the equations of input and output resistance of four topology of feedback amplifier with negative feedback and explain how we will get improvement in input and output resistance in feedback amplifier configuration using negative feedback. 5

OR

4 (A) Explain feedback concept in feedback amplifier using block diagram. 6

(B) Derive input and Output resistance equation of Voltage Series feedback amplifier with negative feedback. 6

5 (A) Explain working with necessary circuit diagram and waveforms of monostable multivibrator design using timer IC-555. For monostable multivibrator design using IC-555, the external components are RA= 15KΩ and C=0.1uF. Calculate the ON time of the load voltage waveform. 7

(B) Explain the working principle of shunt voltage regulator. 4

OR

5 (A) Draw functional block diagram of IC 555 timer and explain function of each pin. 6

(B) Explain working principle of oscillator. Also list the different type of RC and LC feedback oscillator with resonant frequency equation. 5

6 (A) Explain different types of multivibrators with waveform. Also write the application of its. 5

(B) Explain RC phase shift Oscillator and Wien bridge oscillator. 5

(C) What is load and line regulation in voltage regulator? Write equation for them. 2

END OF PAPER