Analog Integrated Circuits - Final Exam

An exam ticket consists on: 2 problems, one normal subject and 2 (or 3) short subjects.
The exam will take place in room N-II-1, on January 24, 2020, 14:00 hour.
Q&A – January 23 at 15:00 in room N-II-1 (or N-I-1 or NP18).

1.1 PROBLEMS:

1. Analysis and design of inverting and non-inverting amplifiers with ideal op-amp.
2. Voltage computing in circuits with ideal op-amps.
3. Current-voltage converters circuits with ideal op amps.
4. Effects of finite gain, input and output resistance in amplifiers with op amps.
5. Voltage offset and current offset (and bias) in circuits with op amps.

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6. Low frequency differentiator and ac integrator circuits with op amps.
7. Slew rate and bandwidth limitations in circuits with op amps.
8. Voltage threshold and Schmitt trigger comparators analysis and design.
9. Series voltage regulator with TL431 or LM317.

1.2 NORMAL SUBJECTS:

1. Ideal Op Amps: symbol, circuit model, ideal assumptions and implications; Inverting and non-inverting amplifiers.
2. Op Amp dc Effects and Limitations: low frequency model of op amp, effects of finite gain, offset voltage and currents.
3. Op Amp ac Effects and Limitations: open loop response, transition frequency, closed loop bandwidth, gain-bandwidth product, transient response, slew rate.

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4. Linear Op Amps Circuits: integrator (true and ac), differentiator (true and low frequency).
5. Nonlinear Op Amp Circuits; voltage comparators and applications: level detector and Schmitt triggers.
6. Waveform Generators: Op Amp astable multivibrator, Square and triangular generator.

1.3 SHORT SUBJECTS:

1. Voltage amplifier model, input and output loading effect.
2. Voltage controlled current sources with ideal op amps – floating load.
3. Howland current source.
4. Current voltage converter.
5. Linear combination circuits with ideal op amp.
6. The difference amplifier.

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7. All-pass phase lag circuit.
8. Single power supply operation of op amps – inverting configuration.
9. 555 timer: block diagram and operation.
10. Monostable multivibrator with 555.
11. Voltage regulators basic concepts, power relationships.
12. Switching regulator, buck circuit.
13. Signal processing, half-wave precision rectifier.

Observaţii: Consultaţii: 23.01 ora 15, sala N-II-1 (sau N-I-1, sau NP18);
Examen: 24.01 ora 14, sala N-II-1.
Linia punctata delimiteaza subiectele dim prima parte a materiei de celelalte. Biletul va contine un subiect (problema si teorie) din prima parte si un altul din partea a doua.