

TEACHING & EXAMINATION SCHEME
For the Examination – 2015
ELECTRONICS

B.Sc. Part II

THEORY

			Pd/W (45mts.)	Exam. Hours	Max. Marks 150
Elec. 201	Paper I	Amplifiers	2	3	50
Elec. 202	Paper II	Feedback systems	2	3	50
Elec. 203	Paper III	Communication Electronics	2	3	50
PRACTICAL			6	5	75
Total					225

B.SC. PART II

PAPER I : AMPLIFIERS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT 1 :

Transistor biasing, bias stabilization and Operating point, thermal instability, stability factor, fixed bias, collector to base bias, emitter bias, voltage divider bias with emitter bias and emitter by pass capacitor.

UNIT 2 :

Small signal transistor amplifier Small signal hybrid equivalent circuits at low frequencies, analysis of transistor amplifier using h - parameters, current gain, input impedance, voltage gain and output impedance, comparison of CE, CB, CC amplifiers, Maximum available power gain, cascading transistor amplifiers.

UNIT 3:

Frequency response of amplifier :Amplifier using triode, pentode, FET's, input capacitance, miller effect, bias methods, R.C. coupled amplifiers, voltage gain at low, mid and high frequencies, gain band width product. effect of cascading on gain and bandwidth.

UNIT 4:

Large signal (power) amplifier : Class A, Class B and class C operations, efficiencies, distortions, power amplification, push pull amplifiers using transistors, transistor phase inverter, Class C tuned amplifier, commercial AF amplifier.

UNIT 5 :

Wide band (or video) amplifier :Band width requirement, high frequency hybrid π circuits for transistors, pulse testing, rise time, sag, various compensation techniques

PAPER II : FEEDBACK SYSTEMS

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Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT 1:

Feedback : General theory of feedback, characteristics of negative feedback - gain, stability, distortion, noise, frequency response, effect of negative feedback on input and output impedances of an amplifier, Voltage feedback- series input, shunt input, current feedback- series input and shunt input.

Unit 2 :

Feedback amplifier: CE amplifier with current series and voltage shunt feedback, emitter follower, cathode follower and source follower, Cascade amplifier for tube, transistor and FET, Darlington pair, bootstrapping principle.

UNIT 3 :

Oscillators : Positive feedback and Barkhausen criterion, RC phase shift oscillator, Wein bridge oscillator, LC oscillators, tuned collector and tuned base, Hartley and Colpitt oscillators.

UNIT 4:

Operational Amplifier : Ideal operational amplifier, practical inverting and non inverting operational amplifiers, differential amplifier, common - mode rejection ratio (CMMR) emitter coupled differential amplifier, offset error voltages and currents, universal balancing techniques, input and output impedances of Op-Amp amplifier, oscillators using Op-Amp.

UNIT 5 :

Analog Computation : Basic building blocks of analog computer, solution of linear differential equations with constant coefficients, analog computer symbols, time and amplitude scaling technique, estimation of maximum values, combined time and amplitude scaling

PAPER III : COMMUNICATION ELECTRONICS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT 1:

Modulation : Need of a carrier frequency, AM, FM, PM, PCM, side bands, power consideration, collector and base modulation circuits. SSB transmission, FM by reactance variation using transistor, Armstrong PM system, block diagram of AM and FM transmitters

UNIT 2:

Demodulation : Demodulation of AM signals, square law demodulation, linear envelope detector, AGC, demodulation of FM signals, amplitude limiter, Foster-Seeley frequency discriminator, Ratio detector

UNIT 3:

Transmission line: Propagation constant, characteristic impedance, reflection on a line not terminated in characteristic impedance, reflection coefficient, open and short circuited lines, SWR, Impedance properties of $\lambda/4$ and $\lambda/2$ lines, stub matching.

UNIT 4:

Antennas :Dipole, quarter wave and half wave antenna and their radiation patterns, effect of ground, grounded antenna and antenna arrays

UNIT 5 :

Propagation of radio waves : Ground wave, sky wave and space wave propagation, structure of ionosphere, refraction and reflection of sky wave by ionosphere, refractive index, critical frequency, MUF, skip distance and fading.

Books Suggested :

Millman and Halkais : Electronic Devices and Circuits TMH

Mottershead : Electronics Devices and Circuits PHI, 1984

Ryder : Networks, Lines and Fields PHI 1983

Terman : Electronic and Radio Engineering, McGraw Hill

Kennedy: Electronic Communication Systems, McGraw Hill

EXPERIMENTS FOR PRACTICAL WORK

1. Characteristics of Pentode
2. Two Stage RC coupled Transistor Amplifier
3. Two Stage RC coupled FET Amplifier
4. Current series negative feed back Amplifier
5. Input and output impedance of an amplifier
6. Emitter Follower
7. Source Follower
8. Cathode Follower
9. Design of Filter Circuits
10. Cascading of filters circuits to simulated transmission lines
11. Study of Half Wave and Full wave rectifier with different filters.
12. To trace the out put of Half Wave and Full wave rectifier with different filters using CRO
13. SCR characteristics
14. Study of Darlington pair
15. Study of operational amplifier
16. Study of Differential amplifier
17. Study of Cascade Amplifier
18. Two stage RC coupled Tube Amplifier
19. Firing circuits using RC phase shift networks and UJT
20. Trouble shooting training