

12.

ELECTRONICS

Scheme			
Min. Pass Marks	36		Max. Marks : 100
Paper-I	3 hrs. duration		Max. Marks : 33
Paper-II	3 hrs. duration		Max. Marks : 33
Paper-III	3 hrs. duration		Max. Marks : 34
Practical Min.-18	5 hrs. duration		Max. Marks : 50
	Paper-I- Amplifier Circuits		
Max. Marks-33			Time : 3 Hours

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Syllabus : B.Sc. Part-II

Five questions are to be set taking one from each unit (each question will have an internal choice). Student will attempt all the five questions. 40% weightage will be given to problems and numericals.

Unit-1

Q-point, Stability of Q-point, Various Transistor biasing circuits, Thermal bias stability, An amplifier with feedback gain, Stabilization. Reduction of non linear distortion by negative feedback. Effect of feedback on input and output impedances.

Unit-2

Frequency response of linear amplifiers and noise distortion. current and voltage, series and parallel feedback. Examples of positive and negative feedback, Emitter follower. Differential amplifiers with balanced, unbalanced, single input and double input (DC and AC analysis), common mode rejection ratio.

Unit-3

Operational amplifiers, Differential amplifier, operational amplifiers as an integrator, differentiator, inverting amplifier, adder and subtractor amplifier, voltage comparator and logarithmic amplifier, Ideal and practical operational amplifier for offsets, input offset current and voltage, power supply using 741 operational amplifier, uses of operational amplifier as oscillator.

Unit-4

Class A, B and C operating conditions for power amplifiers, condition of maximum power transfer, special features of transistors used for power amplification. Need of impedance matching in power amplifier, shunt feed power amplifier, Efficiency, Distortion, power dissipation and power amplification, phase inverters of push-pull amplifier, Class A, AB and B push-pull amplifier using transistors.

Unit-5

Problems in amplifier circuit elements at high frequency, Equivalent circuit, wide band amplifiers, High and low frequency compensation, pulse response and testing of an amplifier. Tuned amplifiers (single and double tuned) and their uses as A.F. amplification in radio and TV receivers (No mathematical derivations, only qualitative description)

Paper-II- Rectifiers and Oscillators

Max. Marks 33

Time: 3 Hours

Five questions are to be set taking one from each unit (each question will have internal choice). Student will attempt all the five questions. 40% weightage will be given to problems and numericals.

Unit-1

Half wave, Full wave and bridge rectifiers, Definition of ripple factor. Efficiency, voltage regulation, smoothing filters, L-section and π - section filters and their cascading, Filter efficiency, Metal rectifiers, common power supply, voltage regulation and V.R. tubes.

Unit-2

Zener diode, Electronically regulated power supply, voltage multipliers, Trouble in low and high voltage power supply.

Barkhausen Criterion for maintained oscillations, grid biasing and self-sustained oscillations, Tuned grid, Tuned emitter oscillator (Mainly transistor type), crystal controlled oscillators, R-C phase shift oscillators, Designing, Considerations of Hartley and Wein bridge oscillators.

Unit-3

Bistable multivibrator, Monostable and Bistable multivibrator (Collector coupled), Improvement of multivibrator response, synchronization Triggering in relaxation oscillators.

Unit-4

Response of sinusoidal, Triangular and Rectangular waves to RC and LR circuits. Their uses as integrating and differentiating circuits.

Non-linear wave shaping circuits, Clipping and clamping circuits, slicer, limiter circuits, Limiting and clipping amplifier peaking circuits.

Unit-5

Terminology used to describe sweep generator, Fundamental sweep voltage generator, Transistor constant current sweep generator.

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References

1. Electron tube circuits J. Seeley
2. Engineering Electronics- Ryder
3. Hand book of Electronics-Gupta & Kumar
4. Applied Electronics - G.K. Mithal
5. Electronics - V.P. Arora

Paper-III-Digital Computer and Programming

Max. Marks-34

Time: 3 Hours

Five questions are to be set taking one from each unit (each question will have an internal choice). Student will attempt all the five questions. 40% weightage will be given to problems and numericals.

Unit-1

Variable resistor network, Binary ladder, D/A Converter, A/D converter, simultaneous conversion, A/D converter counter method, electromechanical A/D conversion, D/A and A/D conversion controls. Block diagram of a general purpose computer organization and control.

Unit-2

Central Processing Unit, I/O units, Arithmetic logic unit, Internal storage, Auxiliary storages like HDD, FDD, CD etc. Read only memory, Random Access Memory. Computer generations and classification.

Unit-3

Algorithm-Definition and properties of algorithm, flow chart, symbols of flow chart, converting a flow chart into a high level language. Examples of simple algorithms. Low level language viz. machine language, assembly language, high level language like BASIC.

Unit-4

BASIC: BASIC character set, numeric constants and variables, arithmetic operators, expressions and functions, character string constants and variables string operator, expressions and functions. Terminal features, system commands and editing, PRINT, REM, INPUT/OUTPUT statements.

Elementary BASIC programmes for numeric and string processing.

Unit-5

Flow of control, unconditional and conditional branching, relational logic operators, two way and multi way selection statements; nesting repetition statements.

Definite and indefinite loops, subscripted variables. Vectors and arrays, simple programme exercises. Function definition and invocation. Subroutine, modular programmes; entering and exiting subroutine. Files, random and sequential files. Simple programming exercises.

Experiments for Practical work

Note:

A candidate has to perform at least sixteen experiments in all taking eight experiments from each section 'A' and 'B'.

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In practical examination the candidate will be required to perform two experiments: one from section 'A' and the other from section 'B'. The distribution of marks will be as follows-

Time duration - 5:00 Hrs. Expts. (two) - 30 (15 for each expt) marks

Viva Voce - 10 marks

Practical record - 10 marks

Total - 50 marks

Section-A

1. To study high pass frequency filter.
2. To study low pass frequency filter.
3. To study RC differentiating circuit.
4. To study RC integrating circuit.
5. To study bridge rectifier with L & π filter.
6. To study transistor biasing circuits.
7. Study of counters and shift registers.
8. To study bistable multivibrator (collector coupled).
9. To study Exclusive OR (XOR) gate and verify its truth table.
10. Solution of simple equations using analog computer.

Section-B

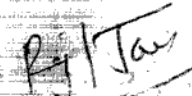
1. To study analog to digital convertor circuit.
2. To study digital to analog convertor circuit.

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Syllabus : B.Sc. Part-II :

3. To study negative feed back amplifier.
4. To study triode valve characteristics and calculate its parameters.
5. To study OP Amp as summing amplifier.
6. To study OP Amp as an inverter.
7. To study OP Amp as a non-inverter.
8. To study push-pull amplifier using transistor.
9. To study emitter follower and its frequency response.


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