Syllabus of Electronics for the Post of PGT Electronics

1. **Basic Electricity I. Sources of electrical power**

II. Internal Impedance of source.
III. Concept of voltage & current source.
IV. Electrical power.

2. Network Theorems

I. Kirchhoff's current & voltage law.
II. Thevenin's Theorem.
III. Norton's Theorem.
IV. Maximum power transfer Theorem.

3. AC Fundamentals

I. Generation of AC, the sine wave, alternating current.
II. Voltage and current values for a sine wave.
III. Amplitude, Frequency, Period, Wavelength, Phase angle, Time factor in Frequency &Phase.
IV. Non-Sinusoidal AC waveforms, 50 Hz AC power time (Phase , neutral and ground).
V. Concept of Impedance & Reactance. 4. Electrical Instruments

4. Permanent magnet moving coil mechanism (PMMC).

II. DC ammeters.
III. DC voltmeters.
IV. Multi range ammeter & voltmeter.

5. Study of Components

i) Resistors: Fixed and moveable.
ii. Capacitors: Concept of capacitance, different types of dielectrics, electrolytic &Non-Electrolytic types & their properties.
iii. Series & Parallel combination of capacitors.
iv. Charging & discharging of capacitors.
v. Concept of time constant.
vi. Transformer: transformer equation, turn ratio, types of transformers and it's application.
vii. Relay: Construction and operation of electro-magnetic relay.
viii. Switches: Study of different types of switches.
ix. Batteries: Rechargeable cells, NiCd and Li cells, solar cells.

6. Study of Semiconductors

a) Characteristics of conductors, non-conductors and semiconductors
b) Intrinsic and extrinsic semiconductors
c) P-N junction and its forward and reverse bias characteristics
d) P-N junction diode and its characteristics
e) Types of rectifiers using semiconductor diode

7. Study of Transistors

a) NPN and PNP transistors
b) Alpha and Beta of transistors
c) C-B, C-C, C-E types of amplifiers
d) Output characteristics of C-E type
e) Biasing methods of C-E amplifier
f) Single stage C-E amplifier
g) Multi stage amplifiers

8. Study of semiconductor components

a) Different types of diodes
b) UJT, MOSFET transistors

9. Oscillators a) Basic concept of Oscillators

b) Different types of Oscillators

10. Electronic Instruments: CRT, CRO, DMM, and function generators- Block diagrams and working with applications.

11.DC Power Supplies: Rectifiers, filters, Zener/transistor/3-terminal regulators, and SMPS.

12. Transducers: Study of various sensors and transducers- Resistive, Capacitive and LVDT, Opto coupler, Loud speaker, Gas sensor.

13. Operational Amplifiers: Linear and non-linear applications of Op-Amps.

14. Modern Electronic Communication: Modulation and communication systems, , AM and FM concepts and bandwidth basics, Satellite communication, FAX machine, Fibre optic communication Cellular communication. RADAR. Digital communication. Networking in communication, Computer networking.

15. Study of Integrated Circuits: Special purpose ICs like IC 555, 741, and 317.

16.Number Systems & Codes: Binary, decimal, octal, hexadecimal, number conversions, and arithmetic.

17.Logic Gates: Boolean algebra and basic/universal logic gates.

18.Logic Families & IC Specifications: Characteristics and specifications of TTL and CMOS families.

19.Combinational Logic Circuits: Multiplexers, demultiplexers, encoders, and decoders.

20.Flip-Flops, Registers & Counters: Sequential logic, registers, and various counter designs

21.A-D and D-A Conversions: Analog-to-Digital and Digital-to-Analog converters need -Basic precision type, R-2R type DAC, ADC- Flash type, counter type and SAR type.

22. Computer Fundamentals: Basic architecture and fundamentals

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