

## CLASS XII

*There will be one paper of three hours duration of 100 marks*

*The paper will be divided into two parts.*

**Part I:** *will consist of short answer questions. This part will be compulsory.*

**Part II:** *will consist of **eight** questions. Candidates will be required to answer **five** questions.*

1. Distribution of electric power. Idea of a simple distribution system. Mention of the local power system should be made.
2. The D.C. generator and motor. Use of split-ring commutators; constructional features. Shunt series and compound field connections and their characteristics. Starting of D.C. motors. Ideas on back e.m.f.
3. The A.C. motor. Ideas on A.C. motors (single phase only). The rotating field. Methods of shunting; capacitance start, split phase start. Single-phase induction motor types.
4. Wires, cables and electrical wiring. Construction of various types in domestic and industrial use. (Solid and stranded cables – how insulated and protected. Flexes). Selection of cable sizes, voltage drop and simple calculation on current-carrying capacity. (Linking of size of cables and flexes with maximum current flow particularly in relation to the circuits below. Regulation B 23 (voltage drop). Brief description of the wiring systems. Simple circuitry. (Separation of lighting and power circuits. Layout of lighting circuits. Switch in phase line. Dual switching of lamps. Layout of power circuits - ring and spur types - limitations). Introduction to rules and regulations, both local and that of I.E.E. (Sequence of equipment). Effects of overloading. Protection of circuits and individuals by (a) fuses and trips, (b) earthing of metal, (c) mechanical protection of cables. Regulations for bathrooms. Commonsense appreciation of dangerous practices. (Simple testing).
5. Electrical accessories. Structure and uses of various types of switches, power outlets, lamp holders, ceiling roses and junction boxes. [Familiarity with these is expected (but no questions will be set needing detailed knowledge of structure). Where and how they are used].
6. Introduction to electronics. Concept of electron flow. Common components employed in electronic circuits; resistors, capacitors and inductors; their structure, types and uses.
7. Diodes. Thermionic diode; semiconductor diode. Structure of vacuum diode and semiconductor diode.
8. Power supply for electronic apparatus. Mains transformer. The diode; half wave, full wave and bridge rectifiers, voltage doubler. Filters; RC filters, chokes, bleeder resistance and its functions.
9. Vacuum triode. Structure of the vacuum triode valve. The control grid. Triode valve characteristics. Triode parameters; anode resistance, mutual conductance and amplification factors; relationship between the above parameters. Triode as a voltage amplifier. Bias voltage, cathode resistor and cathode bypass capacitor.
10. Transistor. The junction transistor: PNP and NPN types. Introduction to various methods of construction; their characteristics including handling procedures and precautions.
11. Transistor amplifier. Introduction to the common-base, common emitter and common collector amplifiers. Comparison of the voltage, current and power gains and input and output resistances

(elementary approach only). Phase relationship. Bias stabilization.

12. The amplifier. A typical amplifier voltage and power amplification. Matching of the power output stage to a speaker.
13. Apparatus for reproducing and recording sounds. Range of hearing, recording and reproducing. Characteristics of microphones; carbon, crystal, moving-coil and ribbon types. The common types

of gramophone pick-ups. The earphone, crystal and magnetic tapes. The moving-coil loudspeakers; permanent magnet. Electrostatic speaker.

14. Common types of electronic measuring instruments. Valve voltmeters, transistorised voltmeter, signal generator, oscilloscope, use and care of the above instruments.