

**DETAILED SYLLABUS FOR THE POST OF JUNIOR INSTRUCTOR
(TECHNICIAN POWER ELECTRONICS SYSTEM - TPES) IN
INDUSTRIAL TRAINING DEPARTMENT**

(CAT.NO. : 555/2021)

Total Marks 100

Module 1 **(5 marks)**

Safety and environment, use of fire extinguishers, artificial respiratory resuscitation.

Module 2 **(5 marks)**

Idea of trade tools & its standardization, basics of electricity, cable testing and electrical parameter. Different types & combination of cells , Operation and maintenance of batteries

Basics of AC and Electrical Cables

- Identify the phase, Neutral and Earth on power socket, use of testers to monitor AC power
- Construct a test lamp and use it to check mains healthiness
- Measure the voltage between phase and ground and rectify earthing
- Identify and test different AC mains cables.
- Prepare terminations, skin the electrical wires/cables using wire stripper and cutter
- Measure the gauge of the wire using SWG and outside micrometer
- Refer table and find current carrying capacity of wires

Module 3 **(15 marks)**

Passive and active electronic components. Unregulated and regulated power supplies, oscillator and wave shaping circuits.

Soldering and de-soldering of various types of electrical and electronic components on through-hole PCBs. Soldering and De-soldering of discrete SMD components. Measure the resistor value by colour code and verify the same by measuring with multimeter.

Module 4 (15 marks)

Computer system assembling, OS installation, MS office. Internet, browse, mail ID creation, search engines.

Basics of power electronic components- SCR, TRIAC, DIAC, IGBT and MOSFET. Construct and test power control circuits. Identify different power electronic components, their specification and terminals.

Module 5 (10 marks)

Various types of LEDs, LED displays and interface them to a digital counter and test. Introduction to ICs 741 & 555.

- Identify different types of diodes, diode modules and their specifications
- Test the given diode using multimeter and determine forward to reverse resistance ratio
- Measure the voltage and current through a diode in a circuit and verify its forward characteristic
- Identify different types of transformers and test
- Identify the primary and secondary transformer winding and test the polarity
- Construct and test a half wave, full wave and Bridge rectifier circuit
- Measure ripple voltage, ripple frequency and ripple factor of rectifiers for different load and filter capacitors
- Identify and test Zener diode
- Construct and test Zener based voltage regulator circuit
- Calculate the percentage regulation of regulated power supply

Module 6 (8 marks)

Digital Storage Oscilloscope and various functions.

Module 7 (10 marks)

Introduction to 8061 microcontroller. Instruction set of 8051 microcontroller.

Module 8 (10 marks)

Three phase rectifier, chopper, SMPS, inverters and UPS. Electrical control circuits used in industries.

Module 9 (12 marks)

Installation and setup of fibre-optic communication system. Electro-pneumatic circuits. Operation of different process sensor. Speed control of DC machine and single phase and 3- phase AC machines. Install, configure and check the performance of AC and DC drive to control the speed. Speed control of servo motor

Module 10 (10 marks)

Electro-Pneumatic actuators. PLC, Operation of different indication on PLC modules and wire different field devices of PLC and configure the system and perform the suitable function

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper