

SYLLABUS FOR COMPUTER BASED RECRUITMENT TEST (CBRT)
FOR THE POST OF LECTURER IN INSTRUMENTATION AND CONTROL
UNDER
DIRECTORATE OF TECHNICAL EDUCATION (Government Polytechnic College)
(Advt No. 12 Year 2025)

I. English (Comprehension) - 10 marks

II. General Knowledge, Current Affairs of India and Goa - 10 marks

III. Logical Reasoning - 10 marks

IV. Core: - 30 marks

1. Engineering Mathematics & System Fundamentals

1. Differential Equations, Laplace & Fourier Transforms
2. Signals & Systems Analysis
3. Mathematical Modeling of Physical Systems

2. Electrical & Electronic Instrumentation

1. Measurement of Electrical Quantities & Calibration Standards
2. Analog & Digital Electronics (Op-Amps, ADC/DAC, Signal Conditioning)
3. Industrial Instrument Accuracy, Errors & Uncertainty Analysis

3. Sensors, Transducers & Smart Instrumentation

1. Industrial Sensors (Temperature, Pressure, Flow, Level)
2. Smart Sensors, IoT-based Instrumentation & Wireless Sensor Networks
3. Data Acquisition Systems & Industrial Signal Conditioning

4. Control Systems Engineering

1. Time & Frequency Response Analysis (Root Locus, Bode, Nyquist)
2. Stability Analysis & PID Controller Tuning Methods
3. State Space Analysis & Modern Control Techniques

5. Process Control & Safety Instrumented Systems

1. Process Dynamics & Advanced Control Strategies (Cascade, Ratio, Feedforward)
2. Safety Instrumented Systems (SIS) & Functional Safety – IEC 61508 & IEC 61511
3. Hazard & Risk Analysis (HAZOP, SIL Levels, LOPA)

6. Industrial Automation & Communication Standards

1. PLC, SCADA & DCS Architecture
2. Industrial Communication Protocols (Modbus, Profibus, Foundation Fieldbus, HART)
3. ISA Standards (ISA-5.1 Instrumentation Symbols & ISA-88/95 Models)

7. Embedded Systems & Industry 4.0

1. Microcontrollers & Industrial Interfacing
2. Industry 4.0 Concepts – Cyber-Physical Systems & Smart Manufacturing

3. AI & Machine Learning Applications in Control Systems

8. Industrial Standards & Regulatory Compliance

1. IEC, ISA & ISO Standards relevant to Instrumentation
2. Electrical Safety, Hazardous Area Classification (ATEX/IECEx Basics)
3. Documentation, Loop Diagrams, P&ID Interpretation

9. Teaching Methodology & Curriculum Development

1. Planning & Delivering Diploma-Level Lectures, Tutorials & Practicals
2. Laboratory Development, Experiment Design & Resource Material Preparation
3. Outcome-Based Education (OBE) & NBA/AICTE Guidelines

10. Student Evaluation, Mentorship & Industry Engagement

1. Student Assessment Techniques & Question Paper Design
2. Student Counselling, Mentoring & Academic Guidance
3. Industry Collaboration, Consultancy & Extension Services

Note:

Duration for C.B.R.T : 75 Minutes

Maximum Marks for C.B.R.T : 60 Marks