

महाराष्ट्र नागरी सेवा राजपत्रित संयुक्त परीक्षेमधील सन २०२३ पासून पारंपारिक/ वर्णनात्मक स्वरूपात घेण्यात येणा-या खालील परीक्षांकरीता प्रश्नपत्रिकेची रचना (Question Paper Structure) साधारणतः पुढीलप्रमाणे राहिल.

- १) महाराष्ट्र अभियांत्रिकी सेवा मुख्य परीक्षा गट- अ व ब (स्थापत्य/ यांत्रिकी/ विद्युत/ विद्युत व यांत्रिकी).
- २) निरीक्षक, वैधमापन शास्त्र, गट-ब मुख्य परीक्षा.
- ३) अन्न व औषधी द्रव्ये प्रशासकीय सेवा [सहायक आयुक्त (अन्न) तथा पदनिर्देशित अधिकारी, गट-अ (राजपत्रित) व अन्न सुरक्षा अधिकारी, गट-ब (राजपत्रित)] मुख्य परीक्षा.

*Time Allowed: Three Hours*

*Maximum Marks: 200*

*Medium – English*

*Type of Paper- Conventional*

### **Question Paper Specific Instructions**

***Please read each of the following instructions carefully before attempting questions:***

1. There are **EIGHT** questions divided in two sections, out of which **FIVE** are to be attempted.
2. Questions no. 1 and 5 are compulsory. Out of the remaining questions, **THREE** are to be attempted choosing at least **ONE** question from each Sections.
3. The number of marks carried by a question/sub question is indicated against it.
4. Keep in mind the word limit indicated in the question if any.
5. Wherever option has been given, only the required number of responses in the serial order attempted shall be assessed. Unless struck off, attempt of a question shall be counted even if attempted partly. Excess responses shall not be assessed and shall be ignored.
6. Candidates are expected to answer all the sub-questions of a question together. If sub-question of a question is attempted elsewhere (after leaving a few page or after attempting another question) the later sub-question shall be overlooked.
7. Any page or portion of the page left blank in the Answer Booklet must be clearly struck off.
8. Unless otherwise mentioned, symbol and notation have their usual standard meanings. Assume suitable data, if necessary and indicate the same clearly.
9. Neat sketches may be drawn, wherever required.
10. The medium of answer should be mentioned on the answer book as claimed in the application and printed on admission card. The answers written in medium other than the authorized medium will not be assessed and no marks will be assigned to them.

Note - Candidates will be allowed to use Scientific (Non-programmable type) calculators.

## Paper I & Paper II

Section A			Maximum Marks
<b>Question No. 1</b>	<b>Solve any five out of seven.</b>		40
	a	Short Question	
	b	Short Question	
	c	Short Question	
	d	Short Question	
	e	Short Question	
	f	Short Question	
	g	Short Question	
<b>Question No. 2</b>	a	Long Question	40
	b	Long Question	
	c	Short Question	
<b>Question No. 3</b>	a	Long Question	40
	b	Long Question	
	c	Short Question	
<b>Question No. 4</b>	a	Long Question	40
	b	Long Question	
	c	Short Question	
Section B			Maximum Marks
<b>Question No. 5</b>	<b>Solve any five out of seven.</b>		40
	a	Short Question	
	b	Short Question	
	c	Short Question	
	d	Short Question	
	e	Short Question	
	f	Short Question	
	g	Short Question	
<b>Question No. 6</b>	a	Long Question	40
	b	Long Question	
	c	Short Question	
<b>Question No. 7</b>	a	Long Question	40
	b	Long Question	
	c	Short Question	
<b>Question No. 8</b>	a	Long Question	40
	b	Long Question	
	c	Short Question	

- Note:**
1. Long question can be Derivative/Problem/Explain in detail diagram/ sketch question justifying the marks assigned to the question.
  2. Short question can be Definition/ short notes justifying the marks assigned to the question.

**निरीक्षक, वैधमापनशास्त्र, गट-ब (राजपत्रित) (मुख्य) परीक्षा**  
**Inspector of Legal Metrology, Group-B (Gazetted) (Main) Examination**

-: परीक्षा योजना :-

प्रश्नपत्रिकांची संख्या - दोन

पेपर क्र. १ - २०० गुण

पेपर क्र. २ - २०० गुण

मुलाखत - ५० गुण

एकूण - ४५० गुण

विषय	सांकेतांक	दर्जा	माध्यम	गुण	कालावधी	प्रश्नपत्रिकेचे स्वरूप
वैधमापनशास्त्र विषयक घटक पेपर-१	१०७४	पदवी	इंग्रजी	२००	तीन तास	पारंपारिक/ वर्णनात्मक
वैधमापनशास्त्र विषयक घटक पेपर-२	१०७५	पदवी	इंग्रजी	२००	तीन तास	पारंपारिक/ वर्णनात्मक

-: अभ्यासक्रम :-

पेपर – I

अनु. क्र.	घटक
<b>A</b>	<b>1</b> Bridges: Wheatstone, Kelvin, Megohm, Maxwell, Anderson, Schering and Wien for measurement of R, L, C and frequency, Q-meter. Measurement of voltage, current and power in single and three phase circuits; ac and dc current probes; true rms meters, voltage and current scaling, instrument transformers, timer/counter, time, phase and frequency measurements, digital voltmeter, digital multimeter; oscilloscope, shielding and grounding.
	<b>2</b> Piezoelectric- Hall effect, Sensors and associated signal conditioning circuits; Transducers, Classification of transducers, Resistance Potential Metre, Strain Gauges, Resistance Thermometers, thermistors, inductive transducers, LVDT, RVDT, Capacity Transducers, Piezoelectric, Photoelectric Transducers, Digital Transducers: Encoder, Shaft Encoder, Optical Encoder
	<b>3</b> Displacement (linear and angular), velocity, acceleration, force, torque, vibration, shock, pressure (including low pressure), flow (variable head, variable area, electromagnetic, ultrasonic, turbine and open channel flow meters) temperature (thermocouple, bolometer, thermistor, pyrometer and semiconductor); liquid level, pH, conductivity and viscosity measurement.
<b>B</b>	<b>1</b> Basic measurement concepts and errors measurement systems, Static and dynamic characteristics units and Standards of measurements systems, Types of errors, Accuracy and Precision, Reproducibility, Repeatability and Noise. SI units, Standards (R,L,C, voltage, current and frequency), Systematic and random errors in measurement, expression of uncertainty, Accuracy and Precision, Propagation of errors, linear and weighted regression.
	<b>2</b> Conversation of Energy and Momentum, Mass, Pressure, Forces, Motion, Fundamentals of statistics: Mean, Standard Deviation, Accuracy of Instruments, Error Analysis, Tolerance, Heat, Electricity and Magnetism, Waves ( Sound, Vibrating Strings, Wave Diffraction, Doppler Effect, Frequency, Reflection, Refraction, Refractive Index , Hook's Law, Light, Snell's Law, Longitudinal wave)

3	Gravity (Gravitational Potential, Newton's Law of Universal Gravitation, Universal Gravitation Constant, Buoyancy Related Error, Change in weight due to Altitude) Algebra Foundation, Geometry Foundation, Trigonometry
4	Functions and Responsibilities of International Organization of Legal Metrology (OIML), International Bureau of Weights and Measures ( BIPM) , International Standards Organization (ISO) Functions and responsibilities of Indian Organizations : National Physical Laboratories of India ( NPL), Bureau of Indian Standards (BIS), National Test House (NTH), Fluid Control Research Institute (FCRI)

## पेपर – II

अनु. क्र.	घटक
A	1 <b>Basic Concepts and Definitions:-</b> Weight, Force, Length, Density, Work, Energy, Temperature
	2 <b>Mensuration:-</b> Dimension, Area, Volume of Rectangular, Conical and Cylindrical, Spherical Bodies
	3 <b>System of Measurements and Interconversion:-</b> SI units of length, Volume, Mass, Weight, Energy, Large and Small units of length, Weight, Length and Volume; Bullion and Carot.
B	1 <b>Fundamental of Metrology:</b> Vernier and Micrometer Screw Gauge, Working, Least count, Levers:- Type and Applications, Scales and Tapes for measuring length (Flexible and Non Flexible)
	2 <b>Volume Measurement:</b> Measuring Flasks, Cups etc. their calibration, Liquid measuring Instruments, Petroleum Products Measurements, Automatic filling machines, example: Bottling of soft drinks. Storage Tanks Calibration and operation.
	3 <b>Weighing Machines (Mechanical):-</b> Spring balances, Scale balances:- effect of unequal arms, Weighbridge and platform machines, Crane type machines.
	4 <b>Weighing Machines (Electronic and Digital):-</b> Automatic Conveyor Belt type weighing (Belt weigher), Weigh Feeders, Nucleonic weighing machine. Load cell-Resistance strain gauge based instruments.
	5 <b>Other instruments:-</b> Thermometers, Manometers, Measurement of blood pressure, Flow Metre for water and other liquids; Distance metres, Speedometers; Electrical power and Energy Meters, PNG meters, Noise Metres, Breath Analyser, Lactometer and Moisture Meters.
	6 Laboratory Accreditation, Salient features and Procedures of ISO 17025, Functions and responsibilities of National Accreditation Board for Testing and Calibration Laboratories (NABL) and International Laboratory Accreditation Cooperation (ILAC) and the concept of MRA (Mutual Recognition Agreement) for Laboratories.

दिनांक – १४ डिसेंबर, २०२२

सचिव  
महाराष्ट्र लोकसेवा आयोग