राष्ट्रीय प्रौद्योगिकी संस्थान दिल्ली
NATIONAL INSTITUTE OF TECHNOLOGY DELHI
(शिक्षा मंत्रालय, भारत सरकार के अधीन एक स्वायत्त संस्थान)
(An autonomous Institute under the aegis of Ministry of Education (Shiksha Mantralaya), Govt. of India)
Plot No. FA7, Zone P1, GT Karnal Road, Delhi-110036, INDIA
दूरभाष/Tele: +9111-33861000, 1001, 1005, वेबसाइट/Website: www.nitdelhi.ac.in

F. No: NITD/01/Admn/606/2025-26 Dated: 12.12.2025

Pattern of Examination (Written Test and Proficiency Test) and Evaluation Criteria for all the Advertised Non-Teaching Positions vide Advt. No.: 08/2025

A. PATTERN OF EXAMINATION AND EVALUATION CRITERIA OF WRITTEN EXAMINATION (PART A, PART B, AND PART C):

1. Pattern of Examination and evaluation Criteria (Part A, Part B, and Part C):
   a. The written examination will consist of one paper divided into three parts:

Part	Type	Content	No. of Questions	Marks
A	Objective Type	General Knowledge Test	20	20
B	Objective Type	Domain Knowledge Test	60	60
C	Descriptive Type	Assessment of Practical and Experimental Knowledge	5	20
			85	100

2. Cutt-off / Merit Criteria:
   i. Cut-off / Merit will be drawn on the basis of marks obtained by candidates out of 100 marks in the written examination (Part A, Part B, and Part C).

   ii. Based on the merit as referred in Point 2 (i) above, candidates will be shortlisted in the ratio of 1:6 (i.e. a maximum Six candidates will be shortlisted for each advertised post), in order of merit, for each advertised post, subject to securing the following minimum qualifying marks in the written examination:
      a). UR / EWS: Minimum 60 marks out of 100 marks (60%)
      b). OBC: Minimum 55 marks out of 100 marks (55%)
      c). SC / ST / (PwD / PwBD): Minimum 50 marks out of 100 marks (50%)

3. Number of Questions and Marking Scheme:
   i. Written Test – Part – A shall consist of 20 questions, carrying 01 mark each, and therefore this Part shall be of maximum 20 marks. The evaluation shall be carried out as follows:
      a). 01 (one) mark will be awarded for each correctly attempted question.
      b). 0.25 marks will be deducted as negative marking for each incorrectly attempted question.
      c). No marks shall be awarded for any question that remains unattempted or left unanswered.

   ii. Written Test – Part – B shall consist of 60 questions, carrying 01 mark each, and therefore this Part shall be of maximum 60 marks. The evaluation shall be carried out as follows:
      a). 01 (one) mark will be awarded for each correctly attempted question.
      b). 0.25 marks will be deducted as negative marking for each incorrectly attempted question.
      c). No marks shall be awarded for any question that remains unattempted or left unanswered.

iii. Written Test – Part – C shall consist of 05 questions, carrying 04 marks each, and therefore this Part shall be of maximum 20 marks.
   a). No negative marking will be applicable in Part C.

4. Timing allotment for the examination (Written Examination):
   i. The Written Test (comprising Part A, Part B, and Part C) shall be of 2 hours and 30 minutes (150 minutes) duration for all the positions.

5. In case of bunching / bracketing of candidates in the result of the Written Test, the merit shall be decided in the following order:
   i. Desirable Qualifications: Candidates who possess the desirable qualification(s) prescribed for the post shall be given preference.
   ii. Age Seniority: If the tie remains unresolved, the candidate senior in age shall be given preference.
   iii. Alphabetical Order of Name: If the tie still persists, preference shall be given to the candidate whose name comes first in alphabetical order.
   iv. Draw of Lots: If all the above criteria fail to break the tie, the merit order shall be decided through draw of lots.

B. <u>PATTERN AND EVALUATION CRITERIA OF PROFICIENCY TEST:</u>

1. Proficiency Test:
   i. Candidates shortlisted in the ratio of 1:6 for each advertised post, as per the criteria specified in Point 2 under (A), shall be called to appear for the Proficiency Test.

2. The Proficiency Test shall carry a total of 50 marks and will be qualifying in nature, with the following qualifying marks:
   i. UR / EWS: Minimum 27.5 marks out of 50 marks (55%).
   ii. OBC / SC / ST / (PwD / PwBD): Minimum 25 marks out of 50 marks (50%).

3. Timing allotment for the examination (Proficiency Test):
   i. The Proficiency Test shall be of 1 hour (60 minutes) duration for all the advertised posts.

Sd/-
(Prof. (Dr.) Hitesh Sharma)
Registrar, NIT Delhi

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Syllabus of the Written Test (Part A, Part B and Part C) and the Proficiency Test for the Non-Teaching Positions Advertised vide Advt. No.: 08/2025

SENIOR TECHNICIAN (MECHANICAL ENGINEERING), PAY LEVEL – 04

Written Test – Part – A (Objective Type – General Knowledge Test) 20 Marks

i. Maths & Numerical Ability: Average, Time and Work, Simple Interest, Compound Interest, Decimal Fractions, Problems on Numbers, Square Root and Cube Root, Time and Distance, Simplification, Numerical Computation etc.
ii. Logical Reasoning: Number Series Compilation, Missing Number Finding, Continuous Pattern Series, Matching Definitions, Missing Character Finding, Coding and Decoding, Logical Sequence of Words, Arithmetic Reasoning, Numerical Reasoning, Data Reasoning and Data Interpretation. etc.
iii. Language & Comprehension: Antonyms, Synonyms, Spelling Check, Common Error Detection, One word substitution, Grammatical error, Idioms and Phrases, Sentence Correction and Completion, Spotting Errors, Sentence Improvement, Sentence Formation, etc.
iv. General knowledge and Current Affairs: NEP 2020, Academic Bank of Credit, Indian Economy, Indian Polity, Indian Constitution, Indian Geography, Days and Years, Basic General Knowledge, Current Affairs, Important Government Schemes, etc.
v. Computer Fundamentals, MS Word, MS Excel, MS Power Point, Internet, Email System, etc.

Written Test – Part – B (Objective Type – Domain Knowledge Test) 60 Marks

i. Mathematics: Sets, Relations and Functions, Algebra, Coordinate Geometry, Calculus, Statistics and Probability, Vectors and Three - Dimensional Geometry, Linear Programming.
ii. Physics: Physical World and Measurement, Kinematics, Laws of Motion, Work, Energy and Power, Motion of System of Particles and Rigid Body, Gravitation, Properties of Bulk Matter, Behaviour of Perfect Gases and Kinetic Theory of Gases, Oscillations and Waves, Electrostatics, Current Electricity, Magnetic Effects of Current and Magnetism, Electromagnetic Induction and Alternating Currents, Electromagnetic Waves, Optics, Dual Nature of Radiation and Matter, Atoms and Nuclei.
iii. Chemistry: Some Basic Concepts of Chemistry, Structure of Atom, Classification of Elements and Periodicity in Properties, Chemical Bonding and Molecular Structure, Chemical Thermodynamics, Equilibrium Redox Reactions, Organic Chemistry: Basic Principles and

Techniques, Hydrocarbons, Solutions, Electrochemistry, Chemical Kinetics, d -and f -Block Elements, Coordination Compounds.

iv. Basic Mechanical Engineering

v. Thermodynamics: General – System open and closed system, thermodynamic properties, process, change of state, cycle. Zeroth law. First law of thermodynamics – conservation of energy, different forms of energies – internal energy, heat, work, kinematic energy, potential energy, application of first law to closed system and open system. Thermodynamic cycles: Otto, diesel and dual combustion cycle. Standard efficiency mean effective pressure.

vi. Manufacturing Processes: Mechanical properties, stress – strain curve for ductile and brittle material etc. Normal and shear stress, Stresses in varying cross sectional area, Composite bars on axial loading. Manufacturing Processes: Importance of manufacturing processes and classification. Casting: Types of mould, pattern, moulding materials, allowances, sand casting and die casting, casting defects. Metal forming processes: plastic deformation, hot forming and cold forming, basic working principles of rolling and forging processes, Metal cutting: Introduction, generating and forming, working principle, function & specification of simple lathe machine, shaper machine and introduction to CNC machine. Welding: Principles of welding, types of welding – Gas welding, Arc welding, resistance welding, equipment & tools, types of welded joints, brazing & soldering and welding defects.

vii. Computer Literacy: Computer Organization, Basic knowledge of Computer Applications, Input/output Devices, Computer Software-Relationship between Hardware and Software, Operating Systems, MS Word, MS Excel, Power Point etc. Internet, MS-DOS, Data Entry, Software knowledge, applications of computers in mechanical engineering, Digital Signature, Application of information technology in Government for e-Governance, mobile/Smartphone, Information tasks.

Written Test – Part – C (Descriptive Test – Assessment of Practical and Experimental Knowledge) 20 Marks.

Candidates will be expected to explain the principles, operation, and applications of the following workshop instruments, tools, machines, and processes:

a) Usage of Vernier Calipers for accurate measurement of the dimensions of a given object.
b) Application of Micrometer Screw Gauge for precise measurement of length, thickness, and diameter.
c) Study and identification of different components of a Lathe Machine, including its operational aspects.
d) Study and identification of components of a Milling Machine, understanding its working principles.
e) Measurement of surface roughness using the Talysurf instrument.

f) Making a Butt joint using two mild steel (M.S.) pieces by gas welding – concept, procedure, and applications.

g) Making a Lap joint using two M.S. pieces by arc welding – process and safety considerations.

h) Cutting of V-groove, dovetail, or rectangular groove using a Shaper Machine – methods and setup.

i) Keyway machining operation using the Milling Machine – objectives and accuracy considerations.

j) Preparation of a basic Lathe Job – 1 using the Lathe Machine – tools used, process steps, and precautions.

k) Preparation of Lathe Job – 2, involving more advanced turning operations – finishing techniques, measurements.

l) Preparation of a given job using the Milling Machine – selection of cutter, job mounting, and precision.

m) Preparation of a job using the Slotting Machine – working principle and applications.

n) Surface finishing of a square section job using a Surface Grinding Machine – setup, precision, and finish quality.

o) Preparation of a U-Fit joint from given mild steel pieces – marking, cutting, filing, and fitting process.

p) Measurement of surface hardness using the Brinell Hardness Test – understanding test principles and interpretation of results.

q) Measurement of surface hardness using the Rockwell Hardness Test – scales used and comparative analysis.

r) Preparation of a free-hand technical drawing of a 3D model on an A2 size drawing sheet – orthographic and isometric views.

s) Maintenance and updating of consumable and non-consumable stock registers for workshop and laboratory materials.

t) Correct usage and maintenance of laboratory logbooks for tracking the use and service of various equipment.

u) Systematic storage and management of workshop tools and components, ensuring proper identification and easy retrieval.

v) Basic understanding of repair and maintenance of laboratory and workshop equipment, including preventive maintenance practices.

Proficiency Test (Skill Based Assessment of Practical and Experimental Knowledge) 50 Marks

General Nature

a) To use Vernier Calipers for the measurement of the dimensions of a given object.
b) To use the Micrometer Screw Gauge for the measurement of dimensions (length, thickness, diameter) of a given object.
c) To study different components of the Lathe machine.
d) To study different components of the Milling machine.
e) Surface roughness measurement by Talysurf instrument.
f) To make a Butt joint using the given two M.S pieces by gas welding.
g) To make a lap joint, using the given two M.S. pieces and by arc welding.
h) Cutting of V Groove/ dovetail / Rectangular groove using a shaper.
i) Keyway Machining using milling machine.
j) To prepare the given job using the lathe machine (Lathe Job – 1).
k) To prepare the given job using the lathe machine (Lathe Job -2).
l) To prepare the given job using milling machine.
m) To prepare the given job using slotting machine.
n) Finishing of a surface on a surface –grinding machine (take square section).
o) To make a U-Fit from the given mid steel pieces.
p) To measure surface hardness using the Brinell hardness test.
q) To measure surface hardness using the Rockwell hardness test.
r) To prepare free-hand drawing of a 3D model on an A2 drawing sheet.

i. Laboratory Maintenance

a) Maintenance of consumable and non-consumable stock registers.
b) Maintenance and usage of laboratory log-books for using various equipment.
c) Managing the storage of various components in related places.
d) Basic idea of repairing/maintenance of laboratory equipment.