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)
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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

TECHNICAL ASSISTANT (AEROSPACE ENGINEERING), PAY LEVEL – 06

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. Atmosphere: Properties, standard atmosphere. Classification of aircraft. Airplane (fixed wing aircraft) configuration and various parts. Pressure altitude; equivalent, calibrated, indicated air speeds; Primary flight instruments: Altimeter, ASI, VSI, Turn-bank indicator. Angle of attack, sideslip; Roll, pitch & yaw controls. Aerodynamic forces and moments.
ii. Airplane performance: Drag polar; take-off and landing; steady climb and descent; absolute and service ceiling; range and endurance, load factor, turning flight, V-n diagram. Winds: head, tail and cross winds.
iii. Static stability: Stability and control derivatives; longitudinal stick fixed and free stability; horizontal tail position and size; directional stability, vertical tail position and size; lateral stability. Wing dihedral, sweep & position; hinge moments, stick forces.

iv. Basic Fluid Mechanics: Conservation laws: Mass, momentum and energy (Integral and differential form); Dimensional analysis and dynamic similarity;

v. Potential flow theory: sources, sinks, doublets, line vortex and their superposition. Elementary ideas of viscous flows including boundary layers.

vi. Airfoils and wings: Airfoil nomenclature; Aerodynamic coefficients: lift, drag and moment; Kutta Joukoswki theorem; Thin airfoil theory, Kutta condition, starting vortex; Finite wing theory: Induced drag, Prandtl lifting line theory; Critical and drag divergence Mach number.

vii. Compressible Flows: Basic concepts of compressibility, One-dimensional compressible flows, Isentropic flows, Fanno flow, Rayleigh flow; Normal and oblique shocks, Prandtl-Meyer flow; Flow through nozzles and diffusers.

viii. Wind Tunnel Testing: Measurement and visualization techniques. Shock - boundary layer interaction.

ix. Strength of Materials: Stress and strain: Three-dimensional transformations, Mohr's circle, principal stresses, Three-dimensional Hooke's law, Plane stress and strain. Failure theories: Maximum stress, Tresca von Mises. Strain energy. Castigliano's principles. Statically determinate and indeterminate trusses and beams. Elastic flexural buckling of columns.

x. Flight vehicle structures: Characteristics of aircraft structures and materials. Torsion, bending and shear of thin-walled sections. Loads on aircraft.

xi. Vibration of beams: Theory of elasticity: Equilibrium and compatibility equations, Airy's stress function.

xii. Propulsion Basics: Thermodynamics, boundary layers, heat transfer, combustion and thermos-chemistry. Aerothermodynamics of aircraft engines: Thrust, efficiency, range. Brayton cycle, Engine performance: Ramjet, turbojet, turbofan, turboprop and turboshaft engines. After burners.

xiii. Turbomachinery: Axial compressors: Angular momentum, work and compression, characteristic performance of a single axial compressor stage, efficiency of the compressor and degree of reaction, multi-staging. Centrifugal compressor: Stage dynamics, inducer, impeller and diffuser. Axial turbines: Stage performance.

xiv. Rockets: Thrust equation and specific impulse, rocket performance. Multi-staging. Chemical rockets. Performance of solid and liquid propellant rockets.

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) Measurement and flow visualization devices such as Pitot tube, manometers, pressure transducers, thermocouples, hot-wire anemometer, smoke generator, and wind tunnel balances.

b) Electrical and electronic instruments including the full operational usage of multimeter, power supply units, tachometers, and digital data acquisition systems.
c) Use and interpretation of workshop measurement tools such as Vernier Calipers, micrometers, and other common instruments.
d) Identification and appropriate usage of connectors and sensors used in aerospace laboratory experiments, including pressure taps, strain gauges, thermocouple junctions, and accelerometers.
e) Measurement of pressure distribution in a converging-diverging duct.
f) Visualization of flow patterns (laminar and turbulent) using smoke or dye in a water channel.
g) Measurement of the force exerted by a fluid jet on a hemispherical or curved plate.
h) Determination of the coefficient of discharge using a rectangular notch.
i) Analysis of thermal conduction through a composite wall.
j) Estimation of convective heat transfer coefficient under different thermal conditions.
k) Measurement of emissivity of a given material using appropriate setup.
l) Measurement of surface roughness using a Talysurf instrument.
m) Measurement of surface hardness of a specimen using Brinell and Rockwell hardness tests.
n) Preparation of free-hand technical drawings of a 3D model on an A2 drawing sheet.
o) Creation of CAD drawings of engineering profiles such as airfoils or sections based on provided data.
p) Generation of orthographic projections from a given 3D model using CAD software.
q) Creation of a 3D model from a given 2D drawing of aircraft components using CAD software.
r) Analytical evaluation of the Brayton cycle using MATLAB, EES, or any programming language.
s) Maintenance and accurate updating of consumable and non-consumable stock registers in laboratories.
t) Proper usage and maintenance of laboratory logbooks for recording equipment usage and experiments.
u) Safe handling, systematic storage, and efficient management of models, sensors, and instruments.
v) Basic knowledge of troubleshooting and performing preventive or corrective maintenance on laboratory equipment.

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

i. Familiarization with the operation and use of the following laboratory instruments:

a) Pitot tube, manometers, pressure transducers, thermocouples, hot-wire anemometer, smoke generator, wind tunnel balances.

b) Multimeter (all operations), power supply (full operation), tachometer, digital data acquisition system.

c) To use Vernier Calipers, micrometer, and other workshop instruments.

d) Recognition and use of various connectors and sensors used in aerospace experiments (pressure taps, strain gauges, thermocouple junctions, accelerometers).

ii. Experiments as per the following:

a) Measurement of pressure distribution on a converging-diverging duct.

b) Visualization of flow patterns (laminar/turbulent) using smoke or dye in water channel.

c) To measure the force exerted by a jet on a hemispherical curved plate.

d) To determine the coefficient of discharge of a rectangular notch.

e) Conduction through composite wall.

f) Estimation of Convection heat transfer coefficient.

g) Emissivity measurement of a given material.

h) Surface roughness measurement by Talysurf instrument.

i) To measure surface hardness of the provided specimen using Brinell and Rockwell hardness test.

j) To prepare free-hand drawing of a 3D model on an A2 drawing sheet.

k) CAD drawing of profiles (airfoil/engineering sections) from given data.

l) To prepare orthographic projections of a given 3D model on the CAD software.

m) To prepare 3D model of a given 2D drawing of aircraft parts on the CAD software.

n) Analysis of Brayton cycle using MATLAB / EES/any programing language.

iii. Performance evaluation related to laboratory maintenance:

a) Maintenance of consumable and non-consumable stock registers in labs.

b) Usage of laboratory logbooks for various equipment.

c) Proper handling, storage, and management of models, sensors, and instruments.

d) Basic idea of repairing/maintenance of laboratory equipment.