नेपाल सरकार
गृह मन्त्रालय
प्रहरी प्रधान कार्यालय
(मानवश्रोत एवं प्रशासन विभाग, भर्ना तथा छनौट महाशाखा)
नक्साल, काठमाण्डौं ।

प्राबिधिक प्रहरी निरिक्षक (हातहतियार उपसमूह, जनरल मेकानिकल इन्जिनियर) तर्फको खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम ।

पाठ्यक्रमको रुपरेखा:- यस पाठ्यक्रमको आधारमा निम्नानुसार दुई चरणमा परिक्षा लिईने छ :-

प्रथम चरण:- लिखित परीक्षा (Written Examination) **पूर्णाङ्क** :- २५०
द्वितीय चरण:- अन्तरवार्ता (Interview) **पूर्णाङ्क** :- ३५

प्रथम चरण:- लिखित परीक्षा योजना (Examination Scheme)

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या xअङ्कभार	समय
प्रथम	जनरल मेकानिक्स ईन्जिनियरिङ्ग	१००	४०	बस्तुगत बहुउत्तर (MCQs)	५०x२=१००	४५ मिनेट
द्वितीय	जनरल मेकानिक्स ईन्जिनियरिङ्ग	१००	४०	विषयगत (Subjective)	१०x१०=१००	३ घण्टा
तृतीय	नेपाल प्रहरी सेवा सम्बन्धि	५०	२०	बस्तुगत बहुउत्तर	१०x१=१०	१ घण्टा १० मिनेट
				विषयगत	लामो उत्तर १x१० = १० छोटो उत्तर ६x५ = ३०	

द्वितीय चरण

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तरवार्ता	३५	मौखिक

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. प्रथम, द्वितीय र तृतिय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

३. यो पाठ्यक्रमको योजना अनुसार लिखित परीक्षाको प्रथम र द्वितिय पत्रको विषय वस्तु एउटै हुनेछ ।

४. प्रथम पत्रको पाठ्यक्रमका ईकाईहरुवाट सोधिने प्रश्नहरुको संख्या निम्नानुसार हुनेछ:-

प्रथम पत्रका ईकाई	१	२	३	४	५	६	७	८	९	१०
प्रश्न संख्या	३	७	४	७	५	६	५	४	५	४

५. द्वितीय पत्रको पाठ्यक्रमको ईकाईहरुबाट सोधिने प्रश्नहरुको संख्या १० वटा हुनेछ र प्रत्येक प्रश्नको अङ्कभार १० अङ्क हुनेछ, पाठ्यक्रमका जुन सुकै खण्डबाट पनि प्रश्न सोध्न सकिनेछ।

६. यस पाठ्यक्रममा जे सुकै कुरा लेखिएको भएता पनि पाठ्यक्रममा परेका ऐन नियमहरु तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएमा वा संशोधन भई हटाईएका वा थप गरि संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा रहेको सम्झनु पर्दछ।

७. बस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर वापत २० (बिस) प्रतिशत अङ्क कट्टा गरिनेछ। तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन।

८. प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको अन्तर्वार्ता परीक्षामा सम्मिलित गराइने छ।

९. अन्तर्वार्ताको अंकभार सम्बन्धमा प्रहरी सेवाको पदमा नियुक्ति र बढुवा गर्दा अपनाउनु पर्ने सामान्य सिद्धान्त, २०६९ को अनुसूची-१९ मा व्यबस्था भए बमोजिम हुनेछ।

१०. पाठ्यक्रम लागू मिति :- २०७५/१०/२३ गते।

CURRICULUM OF EXAMINATION

For
Technician Inspector of Nepal Police (Arms)
[B.E. in General Mechanical or Equivalent degree]

(प्रथम पत्र: जनरल मेकानिकल विषय सम्बन्धी पाठ्यक्रम)

1. Work Shop technology & Metrology 10 %

1.1 Basic tools & Basic hand operations
1.2 Machine tools & its working principle: Lathe, Shaper, Milling, Grinding Machines
1.3 Metal joining: Soldering, Brazing, Gas welding, Arc welding, TIG, MIG
1.4 Liner Measurement: Block Gages, Length Bars, Comparators
Errors in measurement

2. Thermodynamics & heat engines 20 %

2.1 Basic concepts: Thermodynamic system, Thermodynamic property, Pure substance, Zeros law
2.2 First law of Thermodynamics: control mass & control volume formulation
2.3 Second law of Thermodynamics: Heat engine, Refrigerator & Heat pump, Kelvin Planck & Claudius statements, entropy
2.4 Refrigeration: Reversed car not cycle, Vapor compression cycle, Absorption refrigeration systems, Refrigeration & their properties
2.5 Air conditioning: Psychometric properties & psychometric chart, Heating, cooling, humidification & dehumidification process, air conditioning systems
2.6 Thermodynamic cycles: car not cycle, Otto cycle, Diesel cycle, bray ton cycle, Rankin cycle
2.7 IC engines: Classifications, components, two stroke & four stroke operations, performance of IC engines, Ignition system, cooling system, Lubrication system
2.8 Modes of heat transfer: Conduction, convection & Radiation

3. Fluid Mechanics 10%

3.1 Fluid properties: Viscosity, Surface tension, Compressibility, Vapor pressure
3.2 Fluid Statics: Pressure variations in static fluid, Pressure head, Manometer, Force on submerged surfaces
3.3 Equations of Fluid Flow: Types of flow, Continuity equation, Bernoulli's equation & Momentum equation
3.4 Viscous Effects: Reynolds number, Boundary Layer, Frictional resistance to flow in pipes
3.5 Flow measurement: Pitot-static tube, Orifice, Venturimeter, Nozzle, and Rotameter

4. Hydraulic & Electric Machines 10 %

4.1 Water turbines: Pelt on, Francis, Kaplan & cross flow (working principle & characteristic)
4.2 Pumps: Centrifugal pump & reciprocating pump (working principle & characteristics), Hydraulic ram

4.3 DC Motors: Shunt field, series field & compound field motors, speed characteristics
4.4 DC Generators: Shunt, series & compound field machines & voltage/speed/load characteristics, Effects of variable load, variable torque
4.5 Synchronous & Induction Machines: Basic structure of synchronous machines, Generator on isolated load, Generator on large system, synchronous motor

5. Material Science & Metallurgy 10 %

5.1 Types of Materials: Material Selection
5.2 Imperfections in Atomic arrangement: Slip & Twinning, Dislocation, Points & Surface defects
5.3 Mechanical Properties & Testing: Tension, Impact, Fatigue, Hardness Test
5.4 Cold working & hot working
5.5 Types of Steel
5.6 Phase transformation & Heat treatment: Iron-Carbon equilibrium diagram, hardening, Tempering, Annealing & Normalizing

6. Machine Component Design & Drawing 10 %

6.1 Types of Projection
6.2 Production Drawing
6.3 Terminologies of Mechanisms, Mobility & Degrees of Freedom
6.4 Design process
6.5 Factors affecting choice of materials for design: Strength, Toughness, Durability, hardness
6.6 Loading: Tensile, compressive, shearing, bending, bearing & torsion
6.7 Common types of failure: Theories of failure, stress concentration Effects, ductile & brittle materials, factor of safety

7. Industrial Engineering & Management 15 %

7.1 Role of production/Operation management & system concepts
7.2 Plant location & plant layout design
7.3 Production planning & control: Selection of materials, methods & manpower
7.4 Network methods: PERT, CPM
7.5 Inventory control: Inventory costs & inventory models
7.6 Forecasting Techniques: Requirements of forecasting, Time series & Moving average methods, Regression analysis
7.7 Quality management: Importance of quality, statistical process control
7.8 Statistical Analysis: Measurement of central tendency, Deviation, Distribution

8. Engineering Economics 10 %

8.1 Types of engineering economics decisions
8.2 Time value of Money: simple interest, compound interest, continuous compound interest
8.3 Project Evaluation Techniques: Payback period method, NPV methods, Future value analysis, IRR methods

8.4 Benefit & cost analysis: cost benefit ratio, breakeven analysis
8.5 Corporate tax system in Nepal
8.6 Depreciation & its types

9. Professional Practice 5 %

9.1 Ethics & professionalism: Perspective on morals, codes of ethics & guidelines of professional engineering practice
9.2 Legal aspects of professional engineering in Nepal: Provision for private practice & employee engineers
9.3 Contract
9.4 Tendering law & contract documents

(द्वितीय पत्र: जनरल मेकानिकल विषय सम्बन्धी पाठ्यक्रम)

Section A - 30 Marks

1. Work Shop technology & Metrology 10 %

1.1 Basic tools & Basic hand operations
1.2 Machine tools & its working principle: Lathe, Shaper, Milling, Grinding Machines
1.3 Metal joining: Soldering, Brazing, Gas welding, Arc welding, TIG, MIG
1.4 Liner Measurement: Block Gages, Length Bars, Comparators Errors in measurement

2. Material Science & Metallurgy 10 %

4.1 Types of Materials: Material Selection
4.2 Imperfections in Atomic arrangement: Slip & Twinning, Dislocation, Points & Surface defects
4.3 Mechanical Properties & Testing: Tension, Impact, Fatigue, Hardness Test
4.4 Cold working & hot working
4.5 Types of Steel
4.6 Phase transformation & Heat treatment: Iron-Carbon equilibrium diagram, hardening, Tempering, Annealing & Normalizing

3. Machine Component Design & Drawing 10 %

5.1 Types of Projection
5.2 Production Drawing
5.3 Terminologies of Mechanisms, Mobility & Degrees of Freedom
5.4 Design process
5.5 Factors affecting choice of materials for design: Strength, Toughness, Durability, hardness
5.6 Loading: Tensile, compressive, shearing, bending, bearing & torsion
5.7 Common types of failure: Theories of failure, stress concentration Effects, ductile & brittle materials, factor of safety

Section B - 20 Marks

6. Thermodynamics & heat engines 10 %

2.1 Basic concepts: Thermodynamic system, Thermodynamic property, Pure substance, Zeros law
2.2 First law of Thermodynamics: control mass & control volume formulation
2.3 Second law of Thermodynamics: Heat engine, Refrigerator & Heat pump, Kelvin Planck & Claudius statements, entropy
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2.8 Modes of heat transfer: Conduction, convection & Radiation

7. Hydraulic & Electric Machines 10 %

3.1 Water turbines: Pelt on, Francis, Kaplan & cross flow (working principle & characteristic)
3.2 Pumps: Centrifugal pump & reciprocating pump (working principle & characteristics), Hydraulic ram
3.3 DC Motors: Shunt field, series field & compound field motors, speed characteristics
3.4 DC Generators: Shunt, series & compound field machines & voltage/speed/load characteristics, Effects of variable load, variable torque
3.5 Synchronous & Induction Machines: Basic structure of synchronous machines, Generator on isolated load, Generator on large system, synchronous motor

Section C - 30 Marks

6. Industrial Engineering & Management 10 %

6.1 Role of production/Operation management & system concepts
6.2 Plant location & plant layout design
6.3 Production planning & control: Selection of materials, methods & manpower
6.4 Network methods: PERT, CPM
6.5 Inventory control: Inventory costs & inventory models
6.6 Forecasting Techniques: Requirements of forecasting, Time series & Moving average methods, Regression analysis
6.7 Quality management: Importance of quality, statistical process control
6.8 Statistical Analysis: Measurement of central tendency, Deviation, Distribution

7. Engineering Economics 10 %

7.1 Types of engineering economics decisions
7.2 Time value of Money: simple interest, compound interest, continuous compound interest
7.3 Project Evaluation Techniques: Payback period method, NPV methods, Future value analysis, IRR methods
7.4 Benefit & cost analysis: cost benefit ratio, breakeven analysis
7.5 Corporate tax system in Nepal
7.6 Depreciation & its types

8. Professional Practice 10 %

8.1 Ethics & professionalism: Perspective on morals, codes of ethics & guidelines of professional engineering practice
8.2 Legal aspects of professional engineering in Nepal: Provision for private practice & employee engineers
8.3 Contract
8.4 Tendering law & contract documents

Section D - 20 Marks

9. Environmental engineering 10 %

9.1 Air pollution: Causes & effects
9.2 Water pollution: Causes & effects, waste water treatment
9.3 Industrial waste: Collection & disposal
9.4 Indoor air quality: Indoor pollutions, effects of indoor pollutants & control of indoor pollution
9.5 Global impacts: Greenhouse effects, Acid rain, Montreal protocol

10. Energy Resources 10 %

10.1 Energy consumption scenario of Nepal
10.2 Solar energy & its applications: Solar thermal, solar photovoltaic
10.3 Biomass energy
10.4 Hydroelectricity

-समाप्त-