

Nepal Airlines Corporation
Syllabus for Senior Technician (Grade - V)
Aircraft Maintenance Service (Avionics)
Open Competition

Stages and Procedure of Examination System

First Stage: Written Examination - Full Marks 200

Weightage Allocation and Marks Distribution

S.No.	Paper	Subject	Time	Full Mark	Section	Marks
1	I	General Knowledge, Institutional Awareness and Management	3 Hrs.	100	Section "A" General Knowledge	Multiple Choice Questions 25x2=50
					Section "B" Institutional Awareness and Management	Short Answer Questions 8x5=40 Long Answer Questions 1x10=10
2	II	Service Related	45 Min.	100	Multiple Choice Questions	50x2=100

Second Stage - Interview

Individual Interview

Full Marks - 30

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी वा दुबै हुनेछ ।
- प्रथम, द्वितीय र तृतीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- लिखित परीक्षामा यथासम्भव पाठ्यक्रमका सबै एकाइबाट प्रश्नहरू सोधिनेछ ।
- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर वापत २० प्रतिशत अङ्क कट्टा गरिनेछ तर उत्तर नदिएमा त्यस वापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तर पुस्तिकाहरू हुनेछन् । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डका उत्तर पुस्तिकामा लेख्नुपर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- यस भन्दा अगाडि लागू भएका माथि उल्लिखित सेवा/समूहको पाठ्यक्रम खारेज गरिएको छ ।
- पाठ्यक्रम लागू मिति :- २०७९।०५।०४

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S.No.	Paper	Subject	Time	Full Mark	Section	Marks
1	I	General Knowledge, Institutional Awareness and Office Management	3 Hrs.	100	Section "A" General Knowledge	MCQs 25x2=50
					Section "B" Institutional Awareness and Office Management	Short Questions 10x5=50
2	II	Service Related	45 Min.	100	Multiple Choice Questions	50x2=100

Second Stage - Interview

Individual Interview

Full Marks - 30

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी वा दुबै हुनेछ ।
- प्रथम, द्वितीय र तृतीयपत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
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- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- यस भन्दा अगाडि लागू भएका माथि उल्लिखित सेवा/समूहको पाठ्यक्रम खारेज गरिएको छ ।
- पाठ्यक्रम लागू मिति :-

Paper I

Subject: General Knowledge, Institutional Awareness and Office Management

Full Marks: 100

Time: 3hrs.

खण्ड (क) सामान्य ज्ञान- (वस्तुगत बहुवैकल्पिक प्रश्न २५x२=५० अङ्क)

१. सामान्य ज्ञान

- १.१ विश्वको भूगोल - महादेश, महासागर, ध्रुव, अक्षांश, देशान्तर, समय, दुरी, पर्वतश्रृंखला, भुकम्प, ज्वालामुखी, नदी, हिमनदी, ताल, जलवायु
- १.२ नेपालको भूगोल - धरातलिय स्वरूप, किसिम, विशेषता, जलवायु, हावापानी, जनजीवन
- १.३ नेपालको प्राकृतिक स्रोत र साधनहरु सम्बन्धी जानकारी
- १.४ नेपालको ईतिहास - नेपालको ईतिहासका महत्वपूर्ण घटनाहरु
- १.५ नेपाली समाजका परम्परा, सामाजिक मूल्य र मान्यता, कला, संस्कृति, रितिरिवाज, धर्म, जातजाति र भाषा भाषी, जनसंख्या
- १.६ नेपालको राजनैतिक विभाजन, संघ प्रदेश र स्थानीय तह सम्बन्धी सामान्य जानकारी
- १.७ नेपालको संविधान (भाग १ र ३) तथा अनुसूची १ देखि ९ सम्म
- १.८ मानव जीवनमा प्रत्यक्ष प्रभाव पार्ने विज्ञानका प्रमुख आविष्कार
- १.९ राष्ट्रिय तथा अन्तर्राष्ट्रिय महत्वपूर्ण समसामयिक घटनाहरु
- १.१० विभिन्न आधारभूत वैज्ञानिक परिमाण र तिनको मापन (Measurement) CGS, MKS, FPS, SI System) सम्बन्धी ज्ञान
- १.११ दूरसञ्चार सेवा तथा सूचना प्रविधिसँग सम्बन्धित नवीनतम् प्रविधि, उपकरण तथा आविष्कार

खण्ड (ख) - संस्थागत ज्ञान र कार्यालय व्यवस्थापन (विषयगत १० प्रश्न x ५=५० अङ्क)

२. संस्थागत ज्ञान (३० अङ्क)

- २.१ नेपालमा हवाई यातायातको विकासक्रम, नेपाल वायुसेवा निगमको परिचय, उद्देश्य र कार्यक्षेत्र
- २.२ नेपाल वायुसेवा निगमको कर्मचारीहरुको सेवा, शर्त सम्बन्धी विनियमावलीको विदा, आचरण तथा अनुशासन तथा विभागीय कारबाही सम्बन्धी सामान्य जानकारी
- २.३ भ्रष्टाचार निवारण ऐन, २०५९ को भ्रष्टाचार कसूर र सजाय सम्बन्धी परिच्छेद
- २.४ संस्कृति, पर्यटन तथा नागरिक उड्डयन मन्त्रालयको काम, कर्तव्य र अधिकार
- २.५ नेपाल नागरिक उड्डयन प्राधिकरणको काम, कर्तव्य र अधिकार

३. कार्यालय व्यवस्थापन सम्बन्धी (२० अङ्क)

- ३.१ कार्यालय व्यवस्थापनको अवधारणा र यसका पक्षहरु
- ३.२ कार्यालयमा प्रयोग हुने अत्यावश्यक सामग्रीहरु र तिनको प्रयोग

- ३.३ दर्ता, चलानी, फाइलिङ्ग, टिप्पणी र पत्र व्यवहार सम्बन्धी जानकारी
- ३.४ प्रतिवेदनका प्रकार र प्रतिवेदन लेखन
- ३.५ कार्यालयमा प्राप्त हुने गुनासाहरु र सोको सुनुवाइ
- ३.६ बजारीकरणका विधि र प्रविधिहरु (Marketing Tools & Techniques, Sales Promotion Strategy, Customer Attraction, Satisfaction and Retention)
- ३.७ सार्वजनिक सम्बन्ध र सञ्चार सीप (Public Relation and Communication Skills)
- ३.८ जिन्सी व्यवस्थापन (Inventory Management)
- ३.९ कार्यक्षेत्रमा समूह कार्य (Group/Team Work) र सकारात्मक धारणा (Positive Attitude)

Paper II

Service Related

Full Mark: 100 (Multiple Choice Questions 50x2)

Time: 45 minutes

Subject-Service Related

1. Fundamentals (15x2=30 Marks)

- 1.1. **Arithmetic:** Fractions, decimals, percentages, ratio, proportion, variation, power, roots and logarithms.
- 1.2. **Algebra:** Addition, subtraction, multiplication and division of like unlike terms, simple equations, transpositions of formulae
- 1.3. **Geometry and Mensuration:** Lines, angles, regular plane figures, regular solids. Areas of plane figures and surfaces of regular solids. Volumes of cubes, prisms and cylinders
- 1.4. **Trigonometry:** Sine, cosine and tangent ratios, Solution of right-angled triangles using trigonometrical ratios.
- 1.5. **Graphs:** Construction and interpretation of graphs of linear, simple exponential, sine and cosine functions.
- 1.6. **Vectors:** Vector and scalar quantities, summation and resolution of vector quantities.
- 1.7. **Mechanics:** U.S. British and metric systems of measurement the S.I. System and methods of conversion: measurement tolerances, mass, weight, moments, centre of gravity. Dynamics: force, speed, velocity, angular velocity, acceleration, inertia, momentum, torque, work, energy and power, Newton's Laws of Motion.
- 1.8. **Fluid-mechanics:** Pressure, density, specific gravity, Pascal's principle, Archimedes' principle Properties of fluids, Bernoulli's Theorem, Ventury meter, steady and unsteady flow, potential and kinetic energy effects in fluid flow.
- 1.9. **Heat and Thermodynamics:** Thermometers and temperature scales Celsius, Fahrenheit, Rankine and Kelvin. Conversion between scales, Quantity of heat: units of heat (calories, B.T.U., C.H.U.), heat capacity, specific heat. Heat transfer convection, radiation and conduction, expansion of solids and liquids: co-efficient of linear expansion of solids, bi-metallic strips, elementary thermodynamics, first and second laws, mechanical equivalent of heat, humidity, absolute and relative vapour pressure, Gases; Charles" and Boyle's Laws, internal energy of a gas, specific heat of gas, relationship between internal energy and heat.
- 1.10. **Electricity and Magnetism** Fundamentals, atoms and electrons, conductors and insulators electric currents, electromotive forces, difference of potential; electrical units; power; work and energy Ohm's Law, specific resistance series, parallel and combined DC circuits Kirchhoff's Laws, the Wheatstone bridge, Electromagnetic Induction: Faraday's Laws, Lenz's law, magnitude and direction of induced EMF, generators, induction coils, Inductance and capacitance: mutual inductance, self inductance, unit of capacitance, specific inductive capacity, condensers, dielectric strength, losses and efficiency, Simple A.C. principles: generation, measurement of A.C. current, voltage and frequency; simple transformers and rectifiers.

1.11. **Basic Computer knowledge**

2. Aircraft General Knowledge (5x2=10 Marks)

- 2.1 **Aircraft Flight:** Theory of flight, General principles, fixed wing and rotary wing advantages and disadvantages.
- 2.2 **Wing Design:** Aerodynamic and structural requirements. Aspect ratio, plan form, sweep-back, delta wings. Design for sub-sonic, transonic and supersonic.
- 2.3 **Engines** Piston engine, Turbine engine, types and their principles

3. Basic Electronics and Servomechanisms (20 Marks)

- 3.1 **Transformers and Rectifiers:** Principles of transformers; single-phase and three-phase transformers, Rectification: half-and full-wave rectification, metal rectifiers, bridge rectifiers; hard and soft tube rectifiers Semi-conductor rectification the PH junction.
- 3.2 **Magnetic Amplifiers:** Principles and construction of storable reactors and magnetic amplifiers, Bias, polarity sensitive inputs, auto-excitation, self-excitation, phase sensitive half-wave and full-wave outputs, polarity-sensitive output, push-pull output, Effects of stage gain and cascading on time response.
- 3.3 **Thermionic Tubes:** Multi-elements tubes. Thyratrons: triode and tetrode. Cathode-ray tubes: principles; elements-the electron gun, gas-focused tubes, electrostatic and electromagnetic focusing and deflection, connections, transistors, IC's.
- 3.4 **Servomechanisms:** Principles: open and closed loop controls systems. Components and operation of simple closed loop control system.

Servo-actuators and rate generators: principles and characteristics of types of motors and rate generators used in servo system.

System operation and response: response to displacement and rate command signal. Follow-up and rate feedback signals, Causes of hunting and methods of damping, Trouble-shooting servo-systems.

4. Electrical Systems and Equipment (10 Marks)

- 4.1. **D.C/A.C Power Supply:** Generators: shunt-wound and alternator-rectifier types, Voltage regulation types of regulators, cut-outs, reverse current relays, circuit protection, Typical D.C. power systems: current balancing, trouble-shooting, AC generators, Inverters, Starters, Switches, Motors, Batteries (Lead acid, Ni-Cd)
- 4.2. **Electrical Maintenance:** Function checking electrical systems. Soldering, crimping and repair techniques. Trouble Shooting, Power supplies during maintenance and testing, Fire precautions.

- 4.3. **Instrument Installation:** Presentations: round and linear indicators, head-down and head-up displays, digital displays, cathode-ray tubes. Mounting: panels, vibration protection, pneumatic instruments, pipe systems: installation, leak tests. Location of pitot heads, static vents, computer, black boxes. etc.

5. Basic Radio and Navigation Theory (30 Marks)

- 5.1 **Wave Propagation :** Radio waves : characteristics, propagation at LF, MF, HF, VHF; polarization , Properties of the ionosphere: refraction absorption, skip distance, reflection, fading, scatter, cyclic and irregular variations in the ionosphere; critical frequency, maximum usable frequency (muf), properties of the troposphere temperature inversion, Relationship between velocity of propagation frequency and wave length, Field strength: Frequency tolerance and stability.
- 5.2 **Antennae Fundamentals:** Half and quarter wave antennae. Current and voltage distribution, impedance, methods of feed, polarization, effective height, radiation patterns, reciprocity, parasitic elements, gain, bandwidth, side bands, advantages of SSB equipment, H.F. communication antennae. Variation of reactance with frequency for an antenna of fixed length. Antenna tuning and loading,. Antennae losses, magnitude of RF voltages, Types of insulators used at HF and precautions to be used with lead-ins.
- Transmissions lines and wave guides:** characteristics impedance, standing waves, WSR and its measurement, impedance matching, balances and unbalanced transmission lines, losses. Transfer of energy in wave guides, bends and joints, loss checks, VSWR checks
- Loop and sense antennae:** HF and VHF communication, typical polar diagrams
- 5.3 **Radio Transmitter:** Functions block diagram, stages.
- Oscillators: crystal controlled variable frequency; stability; modulation, types of modulators.
- RF amplifiers: A.B and C class amplifiers, use of triodes, tetrods and pentodes and equivalent solid state devices, instability effects, parasitic oscillations, harmonic generation, methods of biasing decoupling.
- Transmitters keying: on-off and frequency shift "chirps" and "clicks" tone-keyer circuitry.
- Power supplies: heater; bias and anode supplies, distribution, smoothing, decoupling, regulation.
- Radio receiver** Functional diagram and stages.
- 5.4 **Radio Aids to Navigation:** Direction finding: principles; ADF, Principles: VHF Omni-directional radio range. DME, VHF market system, instrument landing systems (ILS), radio altimeter.
- 5.5 **Radio Station Installation :** Mechanical aspects: standard radio racking system, methods of mounting and release, common plugs and sockets, precautions against vibration, shock, electrical faults, moisture, Radio junction box, and circuit breaker panel. Ventilation, cooling and dust precautions. Inter-unit cabling, power cabling, cable identification, routing charts, insulation. Selectors and switches: standard panels; radio instrument presentations, Location and mountings. Headsets and microphones, cabin speakers, Passenger addresses and inter-communication systems: studio amplifier. In-flight entertainment systems(Music/Video System).