Nepal Airlines Corporation
Syllabus for Superintendent AME, Grade IX
Aircraft Maintenance Service
Internal 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	Institutional Awareness and Management	3 Hrs.	100	Section "A" Institutional Awareness	Long Answer 4x10=40
					Section "B" Management	Long Answer 6x10=60
2	II	Service Related	45 Min.	100	Multiple Choice Questions	50x2=100

Second Stage - Interview

Individual Interview — Full Marks - 30

द्रष्टव्य :

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

Paper I

Subject: Institutional Awareness and Management

Full Marks: 100

Time: 3hrs.

खण्ड (क) :- संस्थागत ज्ञान (४० अङ्क)

१. संस्थागत ज्ञान (२x१०=२० अङ्क)

१.१ नेपाल वायुसेवा निगमको स्थापनाको उद्देश्य, संगठनात्मक संरचना, कार्यक्षेत्र, SWOT Analysis
१.२ नेपाल वायुसेवा निगमको पुनर्संरचनाको आवश्यकता र औचित्य
१.३ नेपाल वायुसेवा निगमले प्रवाह गर्ने सेवाको गुणस्तर, गुणस्तर नियन्त्रण तथा सेवाग्राहीको सन्तुष्टि तथा सेवाको मूल्य निर्धारण सम्बन्धी व्यवस्था
१.४ अन्य वायुसेवाहरु सँगको प्रतिस्पर्धा, चुनौती तथा भावी कार्यदिशा
१.५ अन्तर्राष्ट्रिय नागरिक उड्डयन संगठनको स्थापना, लक्ष्य तथा उद्देश्य
१.६ नेपाल नागरिक उड्डयन प्राधिकरणको स्थापना, लक्ष्य, उद्देश्य, कार्यहरु र नियमनकारी भूमिका
१.७ नेपालमा सार्वजनिक संस्थानको आवश्यकता, उद्देश्य, स्वायत्तता, उत्तरदायित्व, समस्या र चुनौती
१.८ संस्थागत सुशासनको अवधारणा र नेपाल वायुसेवा निगमको संस्थागत सुशासनको अवस्था
१.९ आवधिक योजनामा हवाई क्षेत्र
१.१० नेपाल वायुसेवा निगमको नेपाल सरकार तथा सम्वद्ध निकायहरुसँगको सम्बन्ध र समन्वय

२. संविधान र सम्वद्ध कानूनहरु (२x१०=२० अङ्क)

२.१ नेपालको संवैधानिक विकासक्रम र वर्तमान संविधान
२.२ नेपाल वायुसेवा निगम ऐन, २०१९
२.३ नेपाल वायुसेवा निगमका कर्मचारीहरुको सेवा, शर्त सम्बन्धी विनियमावली र आर्थिक विनियमावली
२.४ सार्वजनिक खरिद ऐन, २०६३ र सार्वजनिक खरिद नियमावली २०६४
२.५ भ्रष्टाचार निवारण ऐन, २०५९
२.६ सूचनाको हक सम्बन्धी ऐन, २०६४ र सूचनाको हक सम्बन्धी नियमावली, २०६५
२.७ आवश्यक सेवा सञ्चालन ऐन, २०१४
२.८ सुशासन (व्यवस्थापन तथा सञ्चालन) ऐन, २०६४ र सुशासन (व्यवस्थापन तथा सञ्चालन) नियमावली, २०६५
२.९ उपभोक्त संरक्षण ऐन, २०७५

खण्ड (ख) :- व्यवस्थापन (६० अङ्क)

3. General Management (2x10=20 Marks)

3.1 Application of public management for developing professionalism - knowledge management, time management, technology management, change management, team management, resource management, productivity management, conflict management, disaster management, stress management, strategic management
3.2 Human resource management and its dimensions

3.3 Concept and principles of leadership and motivation, organization behaviour, group dynamics, work culture
3.4 Team building and synergy creation
3.5 Problem solving and decision-making, dialogue and negotiation skills
3.6 Communication skill and interpersonal relation
3.7 Management of staff performance, staff development techniques Coaching/Counseling/ Mentoring
3.8 Handling complains and grievances
3.9 Planning and control system
3.10 Unionism and labour relation management
3.11 Total Quality Management (TQM)

4. Project Management (1x10=10 Marks)

4.1 Concept of project planning, management and processes
4.2 Recent project planning approaches
4.3 Project cycle
4.4 Linkage between plans, programs and projects
4.5 project feasibility study-demand/need forecasting and analysis
4.6 Project negotiation
4.7 Project organization
4.8 Project implementation plan (PERT, CPM, Network diagram, Gantt chart)
4.9 Roles and responsibilities of a project manager
4.10 Procurement and contract management-goods, services and works
4.11 Project monitoring and evaluation techniques
4.12 Project operation and maintenance, Project proposal preparation

5. Marketing Management (1x10=10 Marks)

5.1 Role of marketing in service industries
5.2 Marketing strategies - product/service strategies
5.3 Pricing, placing and promotion strategies
5.4 Demand supply forecasting, market survey, pricing decisions, promotion decisions, market leader
5.5 Market competition, marketing processes and strategies of NAC
5.6 Marketing management issues and challenges of NAC

6. Risk Management (1x10=10 Marks)

6.1 Concept, identification and measurement of risk
6.2 Types of risks (Business, Project, System, Market)
6.3 Risk analysis and risk factors
6.4 Techniques of managing risks
6.5 Emergency management

7. Contemporary Issues (1x10=10 Marks)

7.1 Current organization and management issues and existing challenges of NAC
7.2 General organization structure of Nepal Airlines Corporation and need of restructuring
7.3 Outsource principle and current trend
7.4 Voluntary retirement schemes, employee layoff and its impact
7.5 Inter organizational relations
7.6 Collective decision processing

Paper II

Subject: Service Related

Full Marks: 100 (Multiple Choice Questions 50x2)

Time: 45 Minutes

1. Human Factors **10x2=20 Marks**

a) General; Need to take Human Factor into account, incidents attributable to human factor/human error, Murphy's law.
b) Human factor performance and limitations, vision, hearing, information processing; attention & perception; memory, claustrophobia & fear of heights.
c) Social psychology, social environment, responsibility individual & group; motivation and de-motivation, peer pressure, culture issues, team working, management, supervision and leadership.
d) Factors affecting performance: Fitness/health, stress:-domestic and work related, time pressures and deadlines, workload, overload & under load, sleep and fatigue, shift work, alcohol, medication, drug abuse.
e) Physical environment: Noise, fumes, illumination, climate & temperature, motion and vibration, confined spaces, working environment.
f) Tasks: Physical work, repetitive tasks, visual inspection, complex systems
g) Communication: within and between team, work logging and recording, keeping update, currency, dissemination of information.
h) Human error: understanding human error, Error models & theories, Types of error in maintenance tasks: implications of error, avoiding and managing errors.
i) Hazards in the workplaces
a) Recognizing and avoiding hazards
b) Dealing with emergencies
j) Summary: Dirty dozen aviation errors (put safety first and minimize 12 common causes of mistakes in the aviation workplace)
k) Hazard identification and Risk Management.
l) Safety Management System.

2. Aviation Legislation **10x2=20 Marks**

a) Regulatory framework
Role of ICAO/ Role of CAA Nepal (CAAN)
General understanding of CAAN Regulations
Relationship between NCAR Part -145, NCAR-Part 66, NCAR Part-147 and NCAR Part –M
Relationship with other Aviation Authorities
b) NCAR Part 66- Certifying Staff- Maintenance
c) NCAR Part 145 – AMO, CAMMOE, Approved maintenance organization(Continuing Airworthiness Management and Maintenance Organization
Exposition)- Organization Structure, management and working procedure- general understanding

d) Commercial Air Transportation
Air operators certificate (AOC)
Operators Responsibility
Documents to be carried on board
Aircraft placarding / Marking.

e) Aircraft certification
   i) General certification rules
   ii) Type certification
   iii) Supplemental type certification
   iv) NCAR Part-21 Design/ Production Organization Approvals Documents:
      a. C of A
      b. C of R
      c. Noise Certificate
      d. Weight & Balance
      e. Radio station License Approval (RML)

f) NCAR Part-M Detailed understanding of Part M

g) Applicable national and substantial requirements
   a. Maintenance Program (CMP) (Customized Maintenance Programme)
   b. Maintenance checks and inspection
   c. MMEL, MEL, DDG, AD, SB, SI, Mods and repairs, Maintenance documentation MM, SRM, IPC etc.

h) Continuing Airworthiness
Test flight, ETOPS, maintenance and dispatch requirements, All weather Ops., Cat 2/3 and minimum equipment requirements, RVSM/ RNAV.

3. Aviation General Knowledge/Aerodynamics (Structures and Systems) 20x2=40 Marks

a) Physics of the atmosphere, International Standard Atmosphere (ISA)

b) Aerodynamics, Airflow, Boundary layer, laminar & turbulent flow, free streamflow, relative airflow, upwash and downwash, vortices, stagnation
Terms: camber, chord, mean aerodynamic chord, profile & parasite drag, induced drag, centre of pressure, angle of attack, wash in and wash out, fitness ratio, wing shape and aspect ratio, thrust, weight, aerodynamic resultants, generation of lift and drag, lift coefficient, drag coefficient, polar curve, stall (angle of attack), Aero foil contamination including ice, snow, frost.

c) Theory of flight: relationship between lift, weight, thrust & drag. Glide ratio, steady state flights performance, theory of the turn, influence of load factor, stall, flight envelope and structural limitations, lift augmentation

d) Flight stability and dynamics:
Longitudinal, lateral and directional stability

e) Theory of flight
   - Aeroplane aerodynamics and flight control.
   - Operation and effect of roll control, ailerons and spoilers.
   - Pitch control, elevators, stabilizers, variable incidence stabilizers and canards;
   - Yaw control, rudder limiters.
   - High lift devices: flaps, slats.

- Drag inducing devices: spoilers, speed brakes.
- Effects of wing fences, Boundary layer control using, vortex generators, stall wedges or Edge devices.
- Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs,
- Spring tabs, mass balance, control surface bias, aerodynamics balance panels.
- High speed flight: speed of sound, subsonic flight, transonic flight, supersonic flight,
- Mach number, critical Mach number, compressibility buffet, shock wave, aerodynamic heating.
- Factors affecting airflow in engine intake of high-speed aircraft. Effect of sweepback, critical mach number.

f) Air conditioning & cabin pressurization (ATA 21)
- Air supply – source – engine bleed
- APU

g) Air-conditioning – Aircycle and vapour cycle machine
- Distribution system
- Flow, temp & humidity control system
- Pressurization
- Control and indication including control and safety valves, cabin pressure controllers.
- Safety and warning devices.
- Protection and warning devices.

h) Electric System: ATA 24

General layout., DC power generation, batteries, AC power generation, emergency power, voltage regulation, power distribution, inverters, transformers, rectifiers, Circuit protection, external GPU

i) Flight Controls: ATA 27

Primary controls, aileron, elevator, rudder, spoiler, trim control, Active load control, high lift devices, speed brakes. System operation manual/ hydraulic/ pneumatic/electrical/fly by wire. Artificial feel, yaw damper, mach trim, ruder limiter. Stall warning and protection system.

j) Fire system: ATA 26

Fire/smoke detection and warning system, fire extinguishing system, portable fire extinguisher.

k) Equipment Furnishing ATA 25

Electronic emergency equipment requirements

l) Ice and Rain Protection;ATA30

Ice formation, classification and detection: anti-icing systems, electrical/hot air pneumatic and chemical, rain repellant, probe and drain heating, wiper system.

m) Instruments, Indication and recording: ATA31
Atmospheric pressure measuring devices-Pitot/Static systems Altimeters, VSI, ASI, Mach meter, Altitude reporting/alerting system, Air data computers, Pressure and temperature gauges, fuel quantity indicating system, Gyro principles, Artificial horizon. Turn and slip indicator, directional gyro, compass system, GPWS,FDR, EFIS. Instrument warning system including master warning system and centralized warning system, Stall warning system and angle of attack indicating system. Vibration measurement and indication, EICAS(Engine indicating and crew alerting system). VEMD (Vehicle and engine multifunction display).

n) On board maintenance system ATA45
Central maintenance components, Data loading system, Electronic library system, printing, structure monitoring (damage tolerance monitoring)

o) Landing Gear: ATA32
Retraction system normal/ emergency., indication and warning., wheels, brakes, antiskid and auto braking, tyres, steering.

p) Oxygen System; ATA36
System layout, cockpit/cabin, sources, storage, indication and warning, chemical oxygen generators, precautions.

q) Pneumatic/ ATA36
System layout, Sources, Engine/APU; Distribution, Indication, warning, interfaces with other systems.

r) Water and Waste, ATA38
System layout, water supply and distribution, Toilet system layout, flushing, servicing, corrosion aspects.

4. Propulsion/ Engine /Propeller 10x2=20 Marks

a. Starting and ignition systems: operation of engine start systems and components; ignition systems and component, Maintenance safety requirements.

b. Engine Indicating System:
- EGT/ITT, Exhaust gas temp. /Inter turbine temp. indication.
- Engine thrust indication: engine pressure ratio EPR, engine turbine discharge pressure, or jet pipe pressure systems. Oil pressure and temperature; fuel pressure and flow; engine speed; vibration measurement and indication; torque, power.

c. APU: Purposes, operation, Protective systems:
Engine monitoring and ground operation: procedure for starting and ground runup, interpretation of engine power output and parameters; Trends (including oil analysis, vibration and boroscope)

d. Propeller:
   - Propeller synchronization: synchronizing and syncrophasing equipment.
   - Propeller ice protection: fluid and electrical de-icing equipment.