

**Nepal Airlines Corporation**  
**Syllabus for Senior AME (A&C), Grade VIII**  
**Aircraft Maintenance Services**  
**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 5x10=50
					Section "B" Management	Long Answer 5x10=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 दुवै हुनेछ ।
- प्रथम, द्वितीय र तृतीयपत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- लिखित परीक्षामा यथासम्भव पाठ्यक्रमका सबै एकाइबाट प्रश्नहरू सोधिनेछ ।
- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको 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 ।
- 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

## Paper I

### Subject: Institutional Awareness and Management

Full Marks: 100

Time: 3hrs.

#### खण्ड (क) :- संस्थागत ज्ञान (५० अङ्क)

##### १. संस्थागत ज्ञान (३x१०=३० अङ्क)

- १.१ नेपाल वायुसेवा निगमको स्थापनाको उद्देश्य, संगठनात्मक संरचना, कार्यक्षेत्र, SWOT Analysis, समस्या र चुनौती
- १.२ नेपाल वायुसेवा निगमको पुनर्संरचनाको आवश्यकता र औचित्य
- १.३ नेपाल वायुसेवा निगमबाट प्रवाह हुने सेवाको गुणस्तर, गुणस्तर नियन्त्रण तथा सेवाग्राहीको सन्तुष्टि तथा सेवाको मूल्य निर्धारण सम्बन्धी व्यवस्था
- १.४ अन्य वायुसेवाहरू 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, कार्यहरू 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 सम्बद्ध निकायहरूसँगको सम्बन्ध र समन्वय

##### २. संविधान र सम्बद्ध कानूनहरू (२x१०=२० अङ्क)

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

#### खण्ड (ख) :- व्यवस्थापन (५० अङ्क)

##### 3. General Management 3x10=30 Marks

- 3.1 Modern Approaches to Management
- 3.2 Motivation, Leadership, Control, Coordination and Team Work
- 3.3 Role of Manager and Managerial Functions
- 3.4 Managerial Decision Making and Problem Solving
- 3.5 Managing Workforce Diversity

- 3.6 Succession Planning
- 3.7 Quality Management and TQM Techniques
- 3.8 Corporate Planning, Strategic Management and Corporate Social Responsibility
- 3.9 Forces of Organizational Change
- 3.10 Resistance to Change and Overcoming the Resistance to Change
- 3.11 Concept and Characteristics of Organizational Development
- 3.12 Stress Management
- 3.13 Crisis Management

**4. Management Information System (MIS)                      1x10=10 Marks**

- 4.1 Information and Decision Making
- 4.2 Role and Importance of MIS
- 4.3 Managers and Environment
- 4.4 Management as a Control System
- 4.5 System View of Business
- 4.6 Impact of Information System in the Organization and the Society
- 4.7 MIS as a Tool for Management Process
- 4.8 Basic Knowledge of IT
- 4.9 Role of IT in Employee and Organizational Performance
- 4.10 Use of IT in HRM and Accounting System of Nepal Airlines Corporation
- 4.11 ERP (Enterprise Resource Planning)

**5. Project Management and Project Evaluation                      1x10=10 Marks**

- 5.1 Project Concept, Objectives, Project Implementation Schedule, Project Implementation Alternative Solutions and Project Leadership
- 5.2 Preparation of Cost Estimate and Budget, Variation in Project Cost, Opportunity Cost Concept, Incremental Cost and Revenue Analysis, Cost Benefit Analysis, Present Value of Project Cost, Internal Rate of Return, Average Rate of Return and Investment, Network, Cost of Capital

Paper II  
Service Related

Full Mark: 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
- b) factor/human error, Murphy's law.
- c) Human factor performance and limitations, vision, hearing, information processing; attention & perception; memory, claustrophobia & fear of heights.
- d) Social psychology, social environment, responsibility individual & group; motivation and de-motivation, peer pressure, culture issues, team working, management, supervision and leadership.
- e) 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.
- f) Physical environment: Noise, fumes, illumination, climate & temperature, motion and vibration, confined spaces, working environment.
- g) Tasks: Physical work, repetitive tasks, visual inspection, complex systems
- h) Communication: within and between team , work logging and recording, keeping update, currency, dissemination of information.
- i) Human error: understanding human error, Error models & theories, Types of error in maintenance tasks: implications of error, avoiding and managing errors.
- j) Hazards in the workplaces
- k) Recognizing and avoiding hazards
- l) Dealing with emergencies
- m) j) Summary: Dirty dozen aviation errors (put safety first and minimize 12 common causes of mistakes in the aviation workplace)
- n) k) Hazard identification and Risk Management.
- o) l) Safety Management System.

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

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

- j) Air operators certificate ( AOC )
- k) Operators Responsibility
- l) Documents to be carried on board
- m) Aircraft placarding / Marking.
- n) Aircraft certification
- o) General certification rules
- p) ii) Type certification
- q) iii) Supplemental type certification
- r) iv) NCAR Part-21 Design/ Production Organization Approvals Documents:
  - C of A
  - C of R
  - Noise Certificate
  - Weight & Balance
  - Radio station License Approval (RML)
- s) NCAR Part-M Detailed understanding of Part M
- t) Applicable national and substantial requirements
  - Maintenance Program (CMP) (Customized Maintenance Programme)
  - Maintenance checks and inspection
  - MMEL, MEL, DDG, AD,
- u) SB, SI, Mods and repairs
- v) Maintenance documentation MM, SRM, IPC etc.
- w) Continuing Airworthiness
- x) Test flight, ETOPS, maintenance and dispatch requirements, All weather Ops.
- y) Cat 2/3 and minimum equipment requirements, RVSM/ RNAV.

**3. Aviation General Knowledge/ Aerodynamics (Structures and Systems ) (15x2=30 Marks)**

- a) Physics of the atmosphere, International Standard Atmosphere (ISA)
- b) Aerodynamics, Airflow, Boundary layer, laminar & turbulent flow, free stream flow, relative airflow, upwash and downwash, vortices, stagnation
- c) 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.
- d) 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
- e) Flight stability and dynamics:
- f) Longitudinal, lateral and directional stability
- g) 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.
- h) High lift devices: flaps , slats .

- i) Drag inducing devices: spoilers, speed brakes.
- j) Effects of wing fences. Boundary layer control using, vortex generators, stall wedges or edge devices.
- k) Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamics balance panels.
- l) High speed flight: speed of sound, subsonic flight, transonic flight, supersonic flight,
- m) Mach number, critical Mach number, compressibility buffet, shock wave, aerodynamic heating.
- n) Factors affecting airflow in engine intake of high speed aircraft. Effect of sweepback, critical Mach number.
- o) Aircraft Airframe structures: General concepts.
  - Fundamentals of structural systems; (Primary, secondary e.t.c.)
  - Zonal and station identification systems.
  - Drain and ventilation provisions.
  - Electrical bonding
  - Lightning strike protection provision.
- p) Fuselage (ATA 52/53/56)
  - Construction and pressurisation sealing.
  - Wings, stabilizer, pylon and undercarriage attachments.
  - Seat installation & cargo loading systems.
  - Doors and emergency exits.
  - Windows and windscreen
- q) Wings (ATA 57) Landing Gear (ATA 32)
  - Construction.
  - Fuel storage.
  - Landing gear, pylon, control surface, and high lift/ drag attachments
- r) Stabilizers (ATA 55): Control surface attachment
- s) Flight control surfaces (ATA 55/57)
  - Construction and attachment
  - Balancing- mass and aerodynamics
- t) Nacelles / Pylons (ATA 54) – Construction, firewalls, Engine Mounts.
- u) Air conditioning & cabin pressurization (ATA 21):  
Air supply – source – engine bleed, APU, Ground cart
- v) Air-conditioning – Aircycle and vapour cycle machine
  - Distribution system
  - Flow, temp & humidity control system
  - Pressurization
  - Control and indication including control and safety valves,
- w) Cabin pressure controllers.
  - Safety and warning devices.
  - Protection and warning devices.
- x) Hydraulic system: ATA 29/ General system layout, hydraulic fluids, hydraulic reservoirs and accumulators: pressure generation, electric, mechanical, pneumatic, emergency pressure generation, RAT ( Ram air Turbine ). Pressure control, power distribution, indication and warning system, interface with other systems. Hydraulic pipeline markings and pressure test.

- y) Fuel System: ATA 28/General layout, Fuel tanks, supply systems, dumping, venting and draining, cross feed, transfer, indication and warning, refueling, defueling, longitudinal balance of fuel system, fuel hazard, fuel tank preservation. N2 pressurization.
- z) 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.
- aa) 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. Gust lock systems, Balancing and rigging, Stall warning and protection system.
- bb) Fire system: ATA 26/Fire/smoke detection and warning system, fire extinguishing system, portable fire extinguisher.
- cc) Equipment Furnishing ATA 25/ Electronic emergency equipment requirements, Seat
- dd) Belts Harness, Galley installation.
- ee) Ice and Rain Protection;ATA30/Ice formation, classification and detection: anti-icing systems, electrical/hot air pneumatic and chemical, rain repellent, probe and drain heating, wiper system.
- ff) Instruments, Indication and recording: ATA31/Atmospheric pressure measuring devices- Pitot/Static systems Altimeters, VSI, ASI, Mach meter, Altitude reporting
- gg) /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.)
- hh) On board maintenance system ATA45/ Central maintenance components. Data loading system, Electrtronic library system, printing, structure monitoring(damage tolerance monitoring)
- ii) Landing Gear;ATA32/construction, shock absorbing, extension& retraction system normal/
- jj) emergency. indication and warning., wheels, brakes, antiskid and auto braking, tyres, steering.
- kk) Oxygen System; ATA36/system layout, cockpit/cabin, sources, storage, charging and
- ll) distribution. Supply regulator , indication and warning, chemical oxygen generators, precautions.
- mm) Pneumatic/; ATA36/System layout, Sources, Engine/APU. Compressors, reservoirs, ground supply, pressure control, distribution, Indication, warning, interfaces with other systems.
- nn) Water and Wastw; ATA38/ System layout, water supply and distribution, servicing and draining. Toilet system layout, flushing, servicing, corrosion aspects.
- oo) Aircraft Handling and Storage:
- pp) Aircraft taxiing, towing, and associated precautions.
- qq) Aircraft jacking, chocking, securing and associated safety procedures. Aircraft storage methods, refueling and defueling procedures, de-icing and anti-icing procedures,
- rr) Electric, Hydraulic and Pneumatic Ground Carts, Effect of environmental condition on aircraft handling and operation.

- ss) Disassemble, Inspection, repair and assembly techniques: Types of defects and visual inspection techniques, corrosion removal, assessment and re-protection.
- tt) General repair methods, SRM ( Structural Repair Manual )ageing, fatigue, and corrosion control program, NDT inspection, Dye penetrant, radiography, eddy current, ultrasonic and boroscopic methods, Inspection following lightning strike, HIRF penetration, ATA chapter 5 inspection following Heavy Landings, and flight through turbulence, etc.
- uu) Maintenance Procedures:
- vv) Maintenance planning, Modification procedures, Store procedure, Certification release procedure, interface with aircraft operation, Maintenance inspection by QC/QA.
- ww) Additional maintenance procedure, Control of Timex and life limited parts/components.

#### **4. Propulsion/ Gas Turbine Engine /Propeller (10x2=20 Marks)**

- a. Fundamentals:
- b. Potential energy, Kinetic energy, Newton's law of motion, Braytons cycle. The relation between force, work, power, energy , velocity, acceleration.
- c. Constructional arrangement and operation of turbojet, turbofan, turboshaft and turboprop.
- d. Engine performance: Gross Thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equipment shaft horsepower
- e. Specific fuel consumption: engine efficiency by pass ratio and engine pressure ratio (EPR).
- f. Pressure, temperature and velocity of the gas flow, Engine ratings, static thrust, influence of speed, altitude and hot climate, flat ratings, limitations, .
- g. Inlet: compressor inlet duct, effects of various inlet configuration, Ice protection.
- h. Compressors: axial and centrifugal types: constructional feature and operating principles and applications.
- i. Fan balancing : Operation : Causes and effect of compressor stall and surge;
- j. Method of airflow control; bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; compressor ratio,.
- k. Combustion section: constructional feature and principle of operation,.
- l. Turbine section: Operation and characteristic of different turbine blade types: blade to a disc attachment.
- m. Nozzle guide vanes; causes and effect of turbine blade stress and creep.
- n. Exhaust: constructional feature and principle of operation, convergent, divergent and variable area nozzles; engine noise reduction: thrust reversers.
- o. Bearing and seals: constructional feature and principle of operation.
- p. Lubricants and fuels:
- q. Properties and specification : fuel additive; safety precautions;
- r. Lubrication systems:, system operation, layout and components.
- s. Fuel systems: operation of engine control and fuel metering systems including electronic engine control (EECU), Full authority digital engine control (FADEC). Systems layout and components.
- t. Air systems: operation of engine air distribution and anti-ice control system, including cooling, sealing and external air services.
- u. Starting and ignition systems: operation of engine start systems and components; ignition systems and component, Maintenance safety requirements.

- v. Engine Indicating System:
- w. EGT/ITT .Exhaust gas temp./Inter turbine temp. indication.
- x. 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.
- y. Power Augmentation systems: operation and application. Water injection; water methanol; Afterburner systems.
- z. Turbo Prop engines: Gas Coupled/ Free turbine and gear coupled turbines: reduction gears: integrated engine and propeller Control; over speed safety devices.
- aa. Turboshaft engine: arrangement, drive systems, reduction gearing, couplings, control systems.
- bb. APU: Purposes, operation, Protective systems.
- cc. Power plant installation: Configuration of firewalls, Cooling, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains. Fire protection systems: operation of detection and extinguishing systems (different types)
- dd. 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 )
- ee. Monitoring: inspection of engine and components to criteria, tolerances and data specified by engine manufacturer: compressor washing/ cleaning: FOD
- ff. Engine storage and preservation: Preservation and de-preservation for the engine and accessories/ Systems.

### **5. Propeller (5x2=10 Marks)**

- a. Fundamentals: Blade element theory; High/ low blade angle, reverse angle, angle of attack, rotational speed, propeller slip:
- b. Aerodynamic, Centrifugal and thrust forces: Torque; Relative airflow on blade angle of attack; vibration and resonance.
- c. Propeller constructions: Construction method and materials used in wooden, composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly.
- d. Fixed Pitch, controlled pitch, Constant speeding propeller.
- e. Propeller pitch, controllable pitch, constant speeding propeller,.
- f. Propeller Pitch Control: Speed control and pitch change methods, mechanical and electric/ electronic: Feathering and reverse pitch, over speed protection.
- g. Propeller synchronization: synchronizing and syncrophasing equipment.
- h. Propeller ice protection: fluid and electrical de-icing equipment.
- i. Propeller Maintenance: static and dynamic balancing; blade tracking, assessment of blade damage, erosion, corrosion, impact damage, delamination; propeller treatment/ repair schemes; propeller engine running.
- j. Propeller storage and preservation: propeller preservation and de preservation.