

**Nepal Airlines Corporation**  
**Syllabus for Senior Technical Officer Grade- VII**  
**Aircraft Maintenance Service/ General Technical Group**  
**(Automobile/Mechanical Sub group)**  
**Open Competition**

**A. Stages and Procedure of Examination System**

चरण	विषय	अंकभार	परीक्षा प्रणाली	प्रश्न संख्या x अङ्क	समय
प्रथम चरण ८०%	लेखन शिप सेवा सम्बन्धी	१००	<b>Multiple Choice Questions</b> (वस्तुगत)	५० x २ = १००	४५ मिनेट
द्वितीय २०%	अन्तरवार्ता	२०	<b>मौखिक</b>		

**B. Material Contents**

**Part I – FUNDAMENTALS - 24 Marks (12 Questions)**

**Computer**

- *Historical development:* Classes of computer, historical development of computers, generation of electronics computers.
- Computer systems and organization: Computer hardware, computer software.

**Electrical**

- *Circuit elements:* functional behavior of resistors, capacitors and inductor: Voltage and current sources.
- *Series and parallel circuits:* Kirchhoff's law, network analysis. Single phase AC circuit analysis. Power and energy in AC Circuits, Three phase circuits analysis – basics.

**Electronics**

- *Introduction to instrumentation:* The oscilloscope and its operation, digital voltmeter, ammeter, ohmmeter.
- *Circuit concepts:* diodes and diode circuit, semi conductor devices.

**Mechanical**

- *Engineering Static:* Equivalent force systems; equilibrium, friction, cables and center of gravity.
- *Engineering Dynamics:* Velocity, acceleration and momentum; Newton's second law of motion. The moment law, work and energy.
- *Strength of Materials:* Concepts of stress, strain and stress- strain diagram; Hook's law.
- *Thermodynamics:* Properties of substances; first law of thermodynamics; Entropy and second law of thermodynamics; Thermodynamics cycles, gas compression and refrigeration and gas turbine engines – axial and centrifugal flow gas turbines.
- *Fluid Mechanics:* Introductory concepts; Fluid in motion; Continuity equation; Mass conservation Viscosity, Bernoulli's equation, Boundary layer; Laminar and turbulent flow.
- *Heat Transfer:* Steady state and transition; heat conduction; Heat transfer by radiation; convective heat transfer, free and forced convection.
- *Engineering Drawing:* Machine drawings; electrical and electronics diagram, Basic drawing concepts, different types of projections

## **Part II – MANAGEMENT- 16 Marks (8 Questions)**

- *Organization and management:* Principles of organization and management, organization behavior, management level and function, managerial roles, importance of management. Theory of management. Management information system, Motivation and leading people, Personnel Management.
- *Internal Organization of companies:* Policy and executive groups. Administrative and functional groups. Organization structure.
- *Industrial engineering and management:* Quality Assurance, Quality Control, Production systems and planning forecasting techniques.

## **Part III – MECHANICAL – 60 Marks**

### **Heat Engine: 20 Marks: (10 Questions)**

- Internal Combustion (I.C) Engine
- Classification of engine: Application design, working cycles
- Fuel system
- Basic engine parameters: Bore, stroke, crank angle, top and bottom dead center
- Engine operation cycle: four stroke, two stroke
- Engine components: Cylinder, piston, connecting rods, crankshaft, camshaft, valves, carburetor and fuel injection
- Ignition system: Spark ignition engine, electronic ignition engine, compression ignition engine.
- Cooling system
- Lubrication

### **Refrigeration and Air conditioning: 16 Marks (8 Questions)**

- Air Refrigeration System: Carnot Cycles and refrigerator, simple cooling and simple evaporation type of refrigeration system.
- Vapor compression system: Vapor compression refrigeration system with multiple evaporator and compressor.
- HCF Refrigerants and role in the ozone layer depletion, Properties of R134a.

### **Automobile Engineering: 24 Marks (12 Questions)**

- Power Unit: Principle of engine operation, classification of engine: four stroke/two stroke. SI/CI Stroke engine, Comparison between four strokes and two strokes engine. Comparison between SI and CI engine.
- Fuel system
- Cooling system
- Transmission system: Manual/ Auto transmission system, clutch, gearbox, universal joint, rear axle, front axle.
- Wheel and types / chassis
- Suspension system / Brakes
- Steering system
- Bearing and lubrications
- Vehicular pollution.
- Workshop layout and vehicle maintenance.

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