**NTDCL Syllabus (Last Date of Application submission 22-04-2024)**

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| --- | --- | --- | --- |
| **Sr.** | **Part** | **Weightages** | **Details** |
| 1. | General Ability | 17% | Pakistan Studies, Islamic Studies Ethics/Islamic Studies, General Knowledge, Current Affairs |
| 2. | Subject Ability | 83% | Post Relevant /Subject Related |

**Subjective Ability Syllabus**

## **Deputy Manager (Corporate Accounts)**

1. Companies Act 2017.
2. IFRS Introduction plus processes of (IAS 1, IAS 7, IFRS 16)
3. Preparation and Presentation of Financial Statements
4. Cost Volume Profit Analysis, Capital Expenditure Planning and Evaluation
5. Financial Analysis including Ratios, Horizontal Analysis, Vertical Analysis
6. Budgeting Complete and Differential Analysis
7. Nature and Functions of Management
8. Financial Management Decisions, Risk Management
9. PPRA Rules 2004.

## **2. ASSISTANT MANAGER (LEGAL)**

1. Contract Act 1872
2. Companies Act 2017
3. Public Sector Companies (Corporate Governance Rules) 2013
4. State-owned Enterprises Act 2023.
5. Civil Procedure Code, 1908
6. NEPRA Act 1997, Rules and Regulations
7. Land Acquisition Act 1894..
8. Code of Criminal Procedure 1898.
9. Electricity Act, 1910.
10. Pakistan Penal Code 1860.
11. The Industrial Relation Acts 2012

## **3. ASSISTANT MANAGER (CIVIL)**

1. Civil Engineering Materials
2. Engineering Drawing
3. Foundation Design & Engineering
4. Structural Analysis
5. Plain & Reinforced Concrete
6. Construction Engineering
7. Construction Management
8. Transportation Planning & Engineering
9. Surveying & Levelling
10. Quantity Surveying & Estimation
11. Soil Mechanics
12. Fluid Mechanics

## **4. ASSISTANT MANAGER (corporate accounts)**

1. Companies Act 2017.
2. IFRS Introduction
3. Preparation and Presentation of Financial Statements
4. Cost Volume Profit Analysis
5. Financial Analysis including Ratios, Horizontal and Vertical Analysis
6. Nature and Functions of Management
7. PPRA Rules 2004.

## **5. ASSISTANT MANAGER (AUDIT) OR AUDIT OFFICER**

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| --- | --- | --- | --- | --- |
|  | **Sr.** | **Concepts** | **Weightage / Questions** |  |
|  | 1 | Definition & Core Principles of Internal Auditing. Code of Ethics for Internal Auditors - - - issued by The Institute of  Internal Auditors | **20** |  |
|  | 2 | International Standards for the Professional  Practice of Internal Auditing - - issued by The Institute of Internal Auditors |
|  | 3 | Internal Audit Charter and Plan |
|  | 4 | Concept of Governance, Risk Management  & Controls | **20** |  |
|  | 5 | Engagement Planning, Field Work, Quality Assurance, Audit Report & Follow-up | **33** |  |
|  | 6 | Concept and Red Signals of Fraud |
|  | 7 | Public Sector Companies (Corporate  Governance) Rules, 2013 | **10** |  |
|  | 8 | PPRA Rules 2004. |
|  |  | **Total** | **83** |  |

## **6. ASSISTANT MANAGER (MECHANICAL)**

1. **Fluid Mechanics:**

Basic Concepts and Properties of Fluids, Manometry, Fluid Statics, Buoyancy, Equations of Motion, Bernoulli’s equation and applications, Viscous ﬂow of incompressible ﬂuids, Laminar and Turbulent ﬂows, Flow through pipes and head losses in pipes

1. **Thermodynamics and Heat transfer**:

Thermodynamic systems and processes; properties of pure substance; Zeroth, First and Second Laws of Thermodynamics; Entropy, Irreversibility, and availability; analysis of thermodynamic cycles related to energy conversion: Rankine, Otto, Diesel and Dual Cycles; ideal and Real gases; compressibility factor; Gas mixtures. Modes of heat transfer, Steady and unsteady heat conduction, Thermal resistance, Fins, Free and forced convection, Correlations for convective heat transfer, Radiative heat transfer: radiation heat transfer coeﬃcient; boiling and condensation; Heat exchanger performance analysis

1. **IC Engines, Refrigeration, and Air conditioning:**

SI and CI Engines, Engine Systems and Components, Performance Characteristics and Testing of IC Engines; Fuels; Emissions, and Emission Control, Vapour compression refrigeration, Refrigerants and Working cycles, Compressors, Condensers, Evaporators, and Expansion devices, Other types of refrigeration systems like Vapour Absorption, Vapour jet, thermoelectric, and Vortex tube refrigeration, Psychometric properties and processes, Comfort charts, Comfort and industrial air conditioning, Load calculations, and Heat pumps.

1. **Turbo Machinery:**

Reciprocating and Rotary pumps, Pelton wheel, Kaplan and Francis Turbines, velocity diagrams, Impulse and Reaction principles, Steam and Gas Turbines, Theory of Jet Propulsion – Pulse Jet and Ram Jet Engines, Reciprocating and Rotary Compressors – Theory and Applications

1. **Power Plant Engineering**:

Rankine and Brayton cycles with regeneration and reheat, Fuels and their properties, Flue gas analysis, Boilers, steam turbines, and other power plant components like condensers, air ejectors, electrostatic precipitators, and cooling towers – their theory and design, types and applications;

1. **Renewable Sources of Energy**

Solar Radiation, Solar Thermal Energy collection – Flat Plate and focusing collectors their materials and performance. Solar Thermal Energy Storage, Applications – heating, cooling, and Power Generation; Solar Photovoltaic Conversion; Harnessing of Wind Energy, Bio-mass and Tidal Energy – Methods and Applications, Working principles of Fuel Cells.

1. **Engineering Mechanics:**

Analysis of System of Forces, Friction, Centroid and Centre of Gravity, Dynamics; Stresses and Strains-Compound Stresses and Strains, Bending Moment and Shear Force Diagrams, Theory of Bending Stresses- Slope and deﬂection-Torsion, Thin and thick Cylinders, Spheres.

1. **Engineering Materials**:

Basic Crystallography, Alloys, and Phase diagrams, Heat Treatment, Ferrous and Non-Ferrous Metals, Non-metallic materials, Basics of Nano-materials, Mechanical Properties and Testing, Corrosion prevention, and control.

1. **Mechanisms and Machines:**

Types of Kinematics Pair, Mobility, Inversions, Kinematic Analysis, Velocity and Acceleration Analysis of Planar Mechanisms, CAMs with uniform acceleration and retardation, cycloidal motion, oscillating followers; Vibrations –Free and forced vibration of undamped and damped SDOF systems, Transmissibility Ratio, Vibration Isolation, Critical Speed of Shafts. Gears – Geometry of tooth proﬁles, Law of gearing, Involute proﬁle, Interference, Helical, Spiral, and Worm Gears, Gear Trains- Simple, compound, and Epicyclic; Dynamic Analysis – Slider – crank mechanisms, turning moment computations, balancing of Revolving & Reciprocating masses, Gyroscopes –Eﬀect of Gyroscopic couple on automobiles, ships, and Aircrafts, Governors.

1. **Design of Machine element**

Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as riveted, welded, and bolted joints. Shafts, Spur gears, rolling and sliding contact bearings, Brakes, clutches, ﬂywheels.

1. **Manufacturing, Industrial, and Maintenance Engineering:**

Metal casting-Metal forming, Metal Joining, Machining, machine tool operations, Limits, ﬁts and tolerances, Metrology and inspection, computer Integrated manufacturing, FMS, Production planning and Control, Inventory control, and operations research – CPM-PERT. Failure concepts and characteristics-Reliability, Failure analysis, Machine Vibration, Data acquisition, Fault Detection, Vibration Monitoring, Field Balancing of Rotors, Noise Monitoring, Wear and Debris Analysis, Signature Analysis, NDT Techniques in Condition Monitoring.

1. **Mechatronics and Robotics:**

Microprocessors and Microcontrollers: Architecture, programming, I/O, Computer interfacing, Programmable logic controller. Sensors and actuators, Piezoelectric accelerometer, Hall eﬀect sensor, Optical Encoder, Resolver, Inductosyn, Pneumatic and Hydraulic actuators, stepper motor, Control Systems: Mathematical modeling of Physical systems, control signals, controllability, and observability. Robotics, Robot Classiﬁcation, Robot Speciﬁcation, and Notation; Direct and Inverse Kinematics; Homogeneous Coordinates; and Arm Equation of the Four Axis SCARA Robot

## **7. ASSISTANT MANAGER (HUMAN RESOURCE)**

1. Principles of Management
2. Fundamentals of Business Management
3. Business Communication
4. Public Administration & Management
5. Human Resource Management
6. Training & Development
7. Recruitment & Selection
8. Compensation & Performance Management
9. Strategic Human Resource Management
10. Change Management
11. Organizational Development
12. Corporate Governance
13. Organizational Behaviour
14. Industrial Relation
15. Labour Laws
16. Leadership & Change Management
17. IT in Business (Computer Applications & ERP)
18. Fundamentals of Economics

## **8. ASSISTANT MANAGER (security)**

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| --- | --- |
| **Description** | **Weightage** |
| * Types of Security / Surveillance * Layers of Security * Security during movement of Foreigners. * Security / protection of VVIP / VIPs | 20 |
| * Security ofInstallations. * Security of Residential Areas. * Security of Personnel, Officials, Documents and Information. * Types of Security Equipment. * Responsibilities / Function of QRF | 15 |
| * Investigation and interrogation * Protocols of Access Control System * Handling of Various public Protests * Key Features of Security Plan of an Installation | 15 |
| * Types of Patrolling * Counter Terrorism Measure / Drills * Use of Technology in Security * Latest barriers in security (Use, Types) | 20 |
| * Fire Prevention & Safety * First Aid | 13 |