महाराष्ट्र औद्योगिक विकास महामंडळ

(महाराष्ट्र शासनाचा अंगिकृत व्यवसाय)

अभ्यासक्रम / विषय सूची (भाग-१)

माध्यम - मराठी	प्रश्नपत्रिकेचे स्वरुप - वस्तुनिष्ठ बहुपर्यायी
दर्जा - पदवी	प्रश्न संख्या - २००
गुण - २००	कालावधी - दोन तास

पदाचे नाव : कार्यकारी अभियंता (स्थापत्य), (विद्युत व यांत्रिकी), उप अभियंता (स्थापत्य), (विद्युत व यांत्रिकी), व सहाय्यक अभियंता (स्थापत्य), (विद्युत व यांत्रिकी),

अ.क्र.	अभ्यासक्रम / विषय	गुण
अ)	**सामान्य ज्ञान**	४० गुण
	१) महाराष्ट्राचा इतिहास (१८५७-१९९०)	
	२) महाराष्ट्राचा भूगोल	
	३) माहितीचा अधिकार कायदा -२००५	
	४) भारतीय राज्यघटना	
	५) संगणक व माहिती तंत्रज्ञान	
ब)	**जागतिक तसेच भारतातील चालू घडामोडी व सामान्य विज्ञान** राजकीय, औद्योगिक, आर्थिक, सामाजिक, शैक्षणिक, भौगोलिक, खगोलशास्त्रीय, सांस्कृतिक, वैज्ञानिक इत्यादी व सामान्य विज्ञान	४० गुण
क)	**बुध्दीमापन विषयक प्रश्न** उमेदवार किती लवकर व अचूकपणे विचार करु शकतो याचा अंदाज घेण्याच्या दृष्टीने सदर प्रश्न विचारण्यात येतील.	४० गुण
ड)	**औद्योगिक विकास विषयक प्रश्न**	४० गुण
	१) महाराष्ट्राचे औद्योगिक धोरण - २०१३	
	२) म.औ.वि. अधिनियम - १९६१	
	३) नवीन भूसंपादन कायदा - २०१३	
	४) महाराष्ट्र प्रादेशिक नगररचना अधिनियम १९६६	
इ)	**मराठी भाषा ज्ञान (दर्जा - १२ वी)**	२० गुण
	सर्व सामान्य शब्दसमूह, वाक्यरचना, व्याकरण, म्हणी व वाक्प्रचार यांचा अर्थ व उपयोग तसेच उताऱ्यावरील प्रश्नांची उत्तरे.	
ई)	**इंग्रजी भाषा ज्ञान (दर्जा - १२ वी)**	२० गुण
	Common Vocabulary, Sentence structure, Grammar, Use of Idioms and phrases & their meaning and comprehension of passage.	
	एकूण	**२०० गुण**

टिप : वरील अभ्यासक्रम / विषयांची यादी उदाहणा दाखल असून याशिवाय त्यासंबधी इतरही प्रश्न विचारले जाऊ शकतात.

Maharashtra Industrial Development Corporation

(A Government of Maharashtra Undertaking)

Syllabus / Topic (Part -2)

Medium - English	Natrure - Objective Type (MCQ)
Standard - Degree Level	No. of Question - 200
Marks - 200	Time 2 Hours

Name of Post : Executive Engineer (Electrical & Mechanical)
Deputy Engineer (Electrical & Mechanical)
Assistant Engineer (Electrical & Mechanical)

Sr.No.	Details of syllabus	Marks
1	**Energy Scenario:** Indian & Maharashtra energy scenario. Conventional & non-conventional energy sources. Energy conservation act 2001 & its features, Electricity act 2003, safety regulation 2010, Schemes of Bureau of Energy efficiency, Indian Electricity rules 1956, Solar power generation, wind power generation	10
2	**Fundamentals of electrical engineering:** DC & AC, series & parallel circuits, network theorems, transients in AC network, star delta transformation, solutions of balance & unbalance three phase circuits.	15
3	**Electrical machines :** Single phase/three phase transformers, efficiency & regulation, parallel operation, auto transformer, single phase/three phase induction motors, generators, parallel operation of generators, motor starting, characteristics & applications.	25
4	**Power systems:** Basic power generation concept, transmission & distribution system & performance, cable performance, insulation, power factor correction, improvement & benefits, power tariffs, fault analysis of symmetrical & unsymmetrical systems, sources of harmonics & its mitigation, power quality problems such as sags, unbalance & their mitigations.	25
5	**Electrical measurements** : Measuring instruments, types, analog & digital measurements of voltage, current, power parameters,, instrument transformers, digital voltmeter, multimeters, megger, earth tester.	10
6	**LT distribution system** : Layout of sub-station, selection for indoor & outdoor installation, LT panel design, RMU, compact sub-station, selection of busbars, MCBs, LT breakers, isolators, relays, CTs, cables, wires, sizing & erection for different location, earthing types & design, lightning arrester technologies, selection, related Indian, standards, cable fault locator & cable jointing.	25
7	**Pumps & pumping system:** Pumps types & performance characteristics, evaluation, efficient system operation, flow control strategies, energy conservation opportunities, pumping system for sewage & effluent, sizing of pumps, fans & compressors.	25
8	**Lighting system :** Light source, choice of lighting, luminance requirement, energy conservation avenues, light emitting diodes, metal halides, fluorescent tube lights, compact fluorescent lights, street lighting, lighting system design for different installations, Knowledge of lift act & rules, safety equipments & parts, in lift & their applications, DG, Ups, battery, different technologies, specifications, sizing calculations, maintenance, testing & commissioning, industrial, residential & commercial wiring, safety norms & codes.	25
9	**Protection & switchgears :** Circuit breakers, types, testing of breakers, protective relays, Protection of transformers & generators, static relays, fuses, etc.	15

10	**Refrigeration & air conditioning :** Principles of refrigeration, types of refrigeration, common refrigerants & properties, compressor types & application, selection of suitable refrigeration system, energy efficiency in refrigeration plant, energy saving opportunities	15
11	**Internal combustion engine :** Basic engine nomenclature, engine classification, working of engine, two stroke/four stroke, spark ignition/compression ignition engine, combustion of CI engine, ignition system, performance of SI & CI engine, cooling & lubrication system, fuel used, measurement of engine power,, specific fuel consumption, thermal efficiency.	10
	Total	200

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Syllabus / Topic (Part -2)

Medium - English
Standard - Degree Level
Marks - 200

Natrure - Objective Type (MCQ)
No. of Question - 200
Time 2 Hours

Name of Post : Executive Engineer (Civil)
Deputy Engineer (Civil)
Assistant Engineer (Civil)

Sr.No.	Details of syllabus	Marks
1	**Structural Engineering Mechanics:** Bending moment and shear force in statically determinate beams. Simple stress and strain relationship: Stress and strain in two dimensions, principal stresses, stress transformation, Mohr's circle. Simple bending theory, flexural and shear stresses, unsymmetrical bending, shear centre. Thin walled pressure vessels, uniform torsion, buckling of column, combined and direct bending stresses. **Structural Analysis:** Analysis of statically determinate trusses, arches, beams, cables and frames, displacements in statically determinate structures and analysis of statically indeterminate structures by force/ energy methods, analysis by displacement methods (slope deflection and moment distribution methods), influence lines for determinate and indeterminate structures. Basic concepts of matrix methods of structural analysis. **Concrete Structures:** Concrete design- basic working stress and limit state design concepts, analysis of ultimate load capacity and design of members subjected to flexure, shear, compression and torsion by limit state methods. Basic elements of prestressed concrete, analysis of beam sections at transfer and service loads. **Steel Structures:** Analysis and design of tension and compression members, beams and beam-columns, column bases. Connections simple and eccentric, beam' column connections, plate girders and trusses. Plastic analysis of beams and frames. Rivet and Bolted Connections.	20
2	**Geotechnical Engineering** **Soil Mechanics:** Origin of soils, soil classification, three-phase system, fundamental definitions, relationship and interrelationships, permeability & seepage, effective stress principle, consolidation, compaction, shear strength. **Foundation Engineering:** Sub-surface investigations- scope, drilling bore holes, sampling, penetration tests, plate load test. Earth pressure theories, effect of water table, layered soils. Stability of slopes, infinite slopes, finite slopes. Foundation types foundation design requirements. Shallow foundations-bearing capacity, effect of shape, water table and other factors, stress distribution, settlement analysis in sands & clays. Deep foundations pile types, dynamic & static formulae, load capacity of piles in sands & Clays, negative Skin friction	20
3	**Water Resources Engineering** **Fluid Mechanics and Hydraulics:** Properties of fluids, principle of conservation of mass, momentum, energy and corresponding equations, potential flow, applications of momentum and Bernoulli's equation, laminar and turbulent flow, flow in pipes, pipe networks. Concept of boundary layer and its growth. Uniform flow, critical flow and gradually varied flow in channels, specific energy concept, hydraulic jump. Forces on immersed bodies, flow measurements in channels, tanks and pipes. Dimensional analysis and hydraulic modelling. Kinematics of flow, velocity triangles and specific speed of pumps and turbines.	30

4	**Hydrology:** Hydrologic cycle, rainfall, evaporation, infiltration, stage discharge relationships, unit hydro graphs, flood estimation, reservoir capacity, reservoir and channel routing. Well hydraulics.	10
5	**Irrigation:** Duty, delta, estimation of evapo-transpiration. Crop water requirements. Design of: lined and unlined canals, waterways, head works, gravity dams and spillways. Design of weirs on permeable foundation. Types of irrigation system, irrigation methods. Water logging and drainage, sodic soils.	10
6	**Environmental Engineering** **Water requirements:** Quality standards, basic unit processes and operations for water treatment. Drinking water standards, water requirements, basic unit operations and unit processes for surface water treatment, distribution of water. Sewage and sewerage treatment, quantity and characteristics of wastewater. Primary, secondary and tertiary treatment of wastewater, sludge disposal, effluent discharge standards. Domestic wastewater treatment, quantity of characteristics of domestic wastewater, primary and secondary treatment Unit operations and unit processes of domestic waste water, sludge disposal. **Air Pollution:** Types of pollutants, their sources and impacts, air pollution meteorology, air pollution control, air quality standards and limits. **Municipal Solid Wastes:** Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal). **Noise Pollution:** Impacts of noise, permissible limits of noise pollution, measurement of noise and control of noise pollution.	30
7	**Transportation Engineering** **Highway Planning:** Geometric design of highways, testing and specifications of paving materials, design of flexible and rigid pavements.	25
8	**Traffic Engineering:** Traffic characteristics, theory of traffic flow, intersection design, traffic signs and signal design, highway capacity	10
9	**Surveying** Importance of surveying, principles and classifications, mapping concepts, coordinate system, map projections, measurements of distance and directions, leveling, theodolite traversing, plane table surveying, errors and adjustments, curves.	15
10	**Building Materials & Construction** **Construction Materials:** Properties of concrete, basics of mix design, aggregates, admixtures; stones, bricks and flooring tiles; cement; cement mortars; damp-proofing and water proofing materials, termite proofing, paints, epoxy coatings and resins, materials for low cost housing. **Building components and their functions:** Brick masonry, types of floors & roofs, ventilators, introduction to repairs and retrofitting in buildings. Building orientation, circulation, grouping of areas, privacy concept and design of energy efficient building; provisions of National Building Code, building estimates and specifications, cost of works, valuation.	30
	Total	200