



GEMI® GUJARAT ENVIRONMENT MANAGEMENT INSTITUTE (GEMI)

(An Autonomous Institute of Government of Gujarat)

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Syllabus for the Advertisement Number 01-05/2023

1. Syllabus for the post of Assistant Environmental Engineer's examination

Sr. No	Particular	Marks (Total Marks 100)
1	<p>Environmental Chemistry: Beer - Lambert's Law - Limitations - UV visible spectroscopy - basic principles - application - Atomic absorption spectroscopy - Principles - applications Gas chromatograph - Principles and applications, distribution of microorganisms - Water, Air and Soil, Indicator organisms, coliforms - fecal coliforms, E. coli, Streptococcus, Clostridium, Ecotoxicology - toxicants and toxicity, factors influencing toxicity, effects - acute, chronic, bio concentration, bioaccumulation, bio magnification, bioassay, bio monitoring.</p> <p>Principles of Physical Chemistry: Reversible reactions, equilibrium constant, Le-Chatelier principle. Reaction rate Order and molecularity, kinetic equations of different orders, reversible and consecutive reactions. Catalysis-type, characteristics, activation energy, mechanism of catalyst action, acid base catalysts. Photo catalysis. Adsorption-classification, adsorption of gases on solids, adsorption from solutions, ion exchange adsorption, applications, Longmuir theory</p>	15 Marks

	<p>Environmental quality measurement laboratory:</p> <p>Physical and chemical characteristics of water - pH, Electrical conductivity, Turbidity, Alkalinity, Acidity, Hardness, Sulphates, Fluorides, Nitrates. Analysis of solids content of water: Total solids, suspended solids, volatile solids, non volatile solids, Residual chlorine analysis, Optimum coagulant dose, Break point Chlorination.</p> <p>Concept of dissolved oxygen, BOD and COD - Ambient air quality Analysis: Determination of SPM, CO, NO_x and SO_x.</p> <p>Soil Analysis: pH, Conductivity, Cation exchange capacity, Sodium Adsorption ratio</p>	
2	<p>Physico-chemical process for water and wastewater treatment: Water Quality-Physical, chemical and biological parameters of water- Water Quality requirement - Potable water standards -Wastewater Effluent standards -Water quality indices. Water purification systems in natural systems-Physical processes-chemical processes and biological processes-Primary, Secondary and tertiary treatment-Unit operations-unit processes.</p> <p>Mixing, Clarification - Sedimentation; Types; Aeration and gas transfer - Coagulation and flocculation, coagulation processes - stability of colloids - destabilization of colloidstransport of colloidal particles, Clariflocculation.</p> <p>Adsorption, adsorption equilibria- adsorption isotherms, Disinfection - chlorine dioxide; chloramines; ozonation; UV radiation</p>	15 Marks

	Ion Exchange-processes, Application Membrane Processes, Reverse osmosis, Ultrafiltration, Electrolysis.	
3	<p>Solid and hazardous waste management: Types and Sources of solid and hazardous wastes - Need for solid and hazardous waste management - Legislations on management and handling of municipal solid wastes, hazardous wastes, and biomedical wastes.</p> <p>Handling and segregation of wastes at source - storage and collection of municipal solid wastes - Analysis of Collection systems - Need for transfer and transport - Transfer stations - labeling and handling of hazardous wastes.</p>	10 Marks
4	<p>Air quality management: Air pollutants - Sources and classification of pollutants and their effect on human health vegetation and property- Effects - Reactions of pollutants and their effects-Smoke, smog and ozone layer disturbance - Greenhouse effect - Ambient and stack sampling.</p> <p>Atmospheric diffusion of pollutants - Transport, transformation and deposition of air contaminants - Air sampling & pollution measurement methods - Ambient air quality and emission standards - Air pollution indices</p>	10 Marks
5	<p>Ground Water Contamination & Pollution Transport:</p> <p>Introduction: Ground water and the hydrologic cycles, Ground water as a resource, Ground water contamination, Ground water as a Geotechnical problem, Ground water and geologic processes, Physical properties and principles, Darcy's Law, Hydraulic Head and Fluid Potential Piezometer and Nests, Hydraulic conductivity and permeability</p>	5 Marks

6	<p>Environmental impact assessment: Evolution of EIA - Concepts - Methodologies - Screening - Scoping - Base line studies - Mitigation - Matrices - Check list.</p> <p>Rapid and Comprehensive EIA - Legislative and Environmental clearance procedures in India - Prediction tools for EIA.</p> <p>Assessment of impacts - Air - Water - Soil - Noise - Biological.</p> <p>Socio cultural environment - Public participation - resettlement and rehabilitation.</p>	10 Marks
7	<p>International Conventions on environment - Stockholm, Rio - 1992, Johannesburg, Rio - 2012; Montreal Protocol, Kyoto Protocol</p>	5 Marks
8	<p>Environmental Legislation and Management System:</p> <p>Introduction : Indian Constitution and Environmental Protection - National Environmental policies - Precautionary Principle and Polluter Pays Principle - Concept of absolute liability - multilateral environmental agreements and Protocols - Montreal Protocol, Kyoto agreement, Rio declaration - Environmental Protection Act, Water (P&CP) Act, Air (P&CP) Act - Institutional framework (SPCB/CPCB/MOEF)</p> <p>Water (P & Cp) Act, 1974: Power & functions of regulatory agencies - responsibilities of Occupier, Provision relating to prevention and control, Scheme of Consent to establish, Consent to operate - Conditions of the consents - Outlet - Legal sampling procedures, State Water Laboratory - Appellate Authority - Penalties for violation of consent conditions etc. Provisions for closure/directions in apprehended pollution situation.</p>	10 Marks

	<p>Air (P & Cp) Act, 1981: Power & functions of regulatory agencies - responsibilities of Occupier, Provision relating to prevention and control, Scheme of Consent to establish, Consent to operate - Conditions of the consents - Outlet - Legal sampling procedures, State Air Laboratory - Appellate Authority - Penalties for violation of consent conditions etc. Provisions for closure/directions in apprehended pollution situation.</p> <p>Environment (Protection) Act 1986: Genesis of the Act - delegation of powers - Role of Central Government - EIA Notification - Siting of Industries - Coastal Zone Regulation - Responsibilities of local bodies mitigation scheme etc., for Municipal Solid Waste Management - Responsibilities of Pollution Control Boards under Hazardous Waste rules and that of occupier, authorization - Biomedical waste rules - responsibilities of generators and role of Pollution Control Boards</p> <p>Basic Knowledge of Industrial Safety</p>	
9	Reasoning and Logic, Basic Mathematics	5 Marks
10	General Knowledge question on State, National and International issues. Current Events including Politics, Sports, Culture, Literature, Awards, Films, Science, Space Research, Current News, Finance, Budget	15 Marks

Note:

- ❖ **There shall be negative marking. For each incorrect answer, 0.25 marks will be deducted from the candidates' total marks. No negative marks will be awarded, if the "E" option is selected.**

2. Syllabus for the post of Senior Scientific Assistant's examination

Sr. No	Particular	Marks (Total Marks 100)
1	Method for Preservation and Analysis of Water and Wastewater for Temperature, pH, Color, Specific Conductance, Turbidity, Alkalinity, Total Solids, Total Dissolved Solids, Total Suspended Solids, Oil and Grease, Dissolved Oxygen, Biochemical Oxygen Demand, Calcium, Magnesium and Total Hardness, Sodium and Potassium, Fluoride, Ammoniacal Nitrogen, Total Kjeldahl Nitrogen, Heavy Metals	20 Marks
2	Use, Calibration and Principle of Laminar Air Flow, Incubators, pH Meter, Conductivity Meter, UV Visible Spectrophotometer, Flame Photometer, Gas Chromatograph	15 Marks
3	Toxicity for Fish, Toxicity Factor, Bio assay Test on Fish	5 Marks
4	Washing and Sterilization, Inoculation Techniques, Incubation, Multiple Tube Fermentation Technique for members of coliform group, Membrane Filter Technique for members of Coliform group	5 Marks
5	Quality Control, Quality Assurance and safety measures in Laboratory. Measurement Uncertainty, Z Score, National Accreditation Board for Testing and Calibration Laboratories (NABL), Good Laboratory Practices, Preparation of Analysis Report	10 Marks
6	Ambient Air Quality Monitoring - Criteria Parameters NO _x , SO _x , PM _{2.5} , PM ₁₀	10 Marks
7	Soil Parameters	5 Marks

	pH, Conductivity, Carbonate, Bicarbonate, Organic Carbon, Sodium, Potash, Phosphorus and Heavy Metals	
8	Acid Rain, Global Warming, Ozone Depletion, Green House Gases and Oil Spills	5 Marks
9	Basic concepts of National Environment Policy - 2006, Water (Prevention and Control of Pollution) Act, 1974, Air (prevention and control of pollution) act, 1981 and Environment Protection Act 1986	5 Marks
10	Reasoning and Logic, Basic Mathematics	5 Marks
11	General Knowledge question on State and National issues. Current Events including Politics, Sports, Culture, Literature, Awards, Films, Science, Space Research, Current News, Finance, Budget. Basic question on Constitution of India	15 Marks

Note:

- ❖ There shall be negative marking. For each incorrect answer, 0.25 marks will be deducted from the candidates' total marks. No negative marks will be awarded, if the "E" option is selected.

3. Syllabus for the post of Clerk cum Typist's examination

કલાર્ક કમ ટાઇપીસ્ટની જગ્યા માટેની પરીક્ષા માટેનો અભ્યાસક્રમ નીચે મુજબનો રહેશે.

અ.નં	વિષય	ગુણ
૧	ગુજરાતી ભાષા અને વ્યાકરણ	૩૦
	રૂઢીપ્રયોગોનો અર્થ અને વાક્યમાં પ્રયોગ	
	કહેવતોનો અર્થ	
	સંધિ વિગ્રહ અને જોડાણ	
	જોડણી	
	સમાસનો વિગ્રહ અને ઓળખ	
	વિરુદ્ધાર્થ અને સમાનાર્થી	
	કર્તરીમાંથી અને કર્મણી અને કર્મણીમાંથી કર્તરીમાં રૂપાંતર	
	છંદ અને અલંકાર	
	વિશેષણ, ક્રિયા વિશેષણ, કૃદંત, નિપાત	
	ગુજરાતી લિંગ વ્યવસ્થા	
૨	અંક ગણિત (ધોરણ દસ (૧૦) ના સ્તરનું રહેશે.)	૨૦
૩	English Grammar	૨૫
	Tenses	
	Voice: Active and Passive	
	Narration: Direct and Indirect.	
	Transformation of Sentences: Assertive to Negative	
	Interrogative, Exclamatory and Vice-versa	
	Use of Articles and Determiners	
	Use of Prepositions	
	Correction of sentences including subject, Verb, Agreement	
	Degree of Adjectives, Connectives and Words wrongly used	
	Glossary	
	Synonyms	
	Antonyms	
	One word substitution	
	Forming new words by using prefixes and suffixes	
૪	સામાન્ય જ્ઞાન અને બુદ્ધિ કૌશલ્ય	૨૫
	સામાન્ય જ્ઞાનના પ્રશ્નો રાજ્ય, રાષ્ટ્રીય અને આંતરરાષ્ટ્રીય મુદ્દાઓ પર તથા વર્તમાન ઘટનાઓ જેમાં રાજનીતિ, રમતો, સંસ્કૃતિ, સાહિત્ય, એવોર્ડ, ફિલ્મ્સ, વિજ્ઞાન, વર્તમાન સમાચાર, ફાઇનાન્સ, બજેટ વગેરે જેવા વિષયો પરના રહેશે. આ ઉપરાંત બુદ્ધિ કૌશલ્ય માટેના તાર્કિક પ્રશ્નો રહેશે.	
	કુલ	૧૦૦

Note:

- ❖ પરીક્ષામાં નેગેટીવ માર્કીંગ રાખવામાં આવેલ છે. દરેખ ખોટા જવાબ માટે, ઉમેદવારના કુલ ગુણમાંથી પ્રશ્ન દીઠ ૦.૨૫ ગુણ બાદ કરવામાં આવશે. પરંતુ ઉમેદવાર દ્વારા જો E વિકલ્પ પસંદ કરવામાં આવશે તો નેગેટીવ માર્ક્સ આપવામાં આવશે નહીં.