

### PPSC Assistant Environmental Engineer Exam Pattern 2022

| Name of the Topic  | No of Questions | No of Marks |
|--|-----------------|-------------|
| Questions from the Subject<br>(Part A<br>of Syllabus)  | 100             | 400         |
| Questions from General<br>Knowledge<br>& Current Affairs, General<br>Mental<br>Ability, Logical Reasoning &<br>Quantitative Aptitude (Part B of<br>Syllabus) | 20              | 80          |
| <b>Total</b>   | <b>120</b>      | <b>480</b>  |

- The examination paper will be presented in the form of MCQ type.
- Part-A carries 400 Marks for 100 Questions.
- Part-B carries 80 Marks for 20 Questions.
- Each question carries 4 Marks and, for each correct answer candidate will get 4 Marks.
- There will be a Negative Marking for wrongly answered i.e. for each incorrect answer, 1 Mark will be deducted.

## ANNEXURE (VII)- Syllabus

### Part-A

#### **Air Pollution**

Air quality and emission standards Control Technologies: Particulate matter control technologies and various particulate equipments. Air pollution control by thermal and catalytic combustion. Emissions control of sulfur dioxide, nitrogen oxides and organic substances. Atmospheric dispersion of air pollutants, temperature inversions, Estimation of pollutants by Gaussian plume model

Control of Automobile Emissions: Automobile pollution of internal combustion engines, petrol engines, spark ignition engines, diesel emissions. Particulate matter and control technologies for diesel engines. Alternative use of fuels to control pollution. Recent focus on global warming and control of Green house Gases, ozone depletion and phasing out of chlorofluorocarbons. Acid rain and photochemical reactions

#### **Solid Waste Management**

Waste generation, need and requirements for management and planning. Solid waste-types i.e. municipal waste, urban, rural and industrial wastes. Special wastes i.e. tyres, household hazardous, demolition, domestic; sewage sludge and municipal; slaughterhouse; agricultural; radioactive, electronic, mining, hazardous and biomedical wastes. Integrated Solid waste Management; Solid waste characterization: ultimate and proximate analysis; Waste reduction at source, volume reduction and collection techniques.

Treatment and disposal techniques: Open and ocean dumping. Landfill : Sanitary land filling methods, operation and design. Recycling of Aluminum, glass, plastic, paper, etc. Biological waste treatment: Composting: aerobic and anaerobic composting. Thermal treatment for volume reduction technologies: incineration gasification, pyrolysis, open burning, etc

Treatment Methods for water & waste: Sources and characterization of water pollution. Primary Treatment: gravity separator, equalization tanks, Sedimentation, Flotation Secondary Treatment – Design of: Upflow Anaerobic, Sludge Blanket (USAB) reactor, Activated Sludge process – Rotating Biological Contactors (RBC), Trickling Filters; Natural Treatment - Wetland Systems, Waste

Tertiary Treatment systems: Disinfection, etc. Sludge and solid wastes treatment: Identification of hazardous wastes – disposal and waste minimization, waste management.

Hydraulic Design of Sewers: Introduction, Hydraulic formulae. Minimum and maximum velocity of flow. Hydraulic elements of circular sewers, egg shaped sewers and other sewer sections.

#### **Hydrology and Ground Water**

Hydrologic cycle, Scope and Applications Precipitation: Types Forms, Measurement by rain gauge and other methods, Design of rain gauges station, Mean precipitation, Presentation of rainfall data, Estimation of missing rainfall data. Test for consistency of record, Analysis of rainfall data, Intensity-depth-area relationship, Duration Frequency curves, Depth-Area-Duration curves, Frequency analysis of rainfall data, Abstractions

applications & limitations, Distribution graph, Synthetic and Instantaneous unit hydrograph. Reservoir Planning: Types of reservoir, Storage zones, Selection of reservoir site, Mass curve analysis for reservoir capacity, Reservoir yield and its determination for a given reservoir capacity, Reservoir sedimentation and its control, Reservoir evaporation and Methods for its reduction Floods: Estimation of peak flood, Methods of flood control, Flood control economics and Flood routing, Ground Water: Role of Ground Water in hydrological cycle, Distribution of Ground Water, Types of aquifers, Aquifers parameters. Well Hydraulics: Darcy's law, Types of aquifers, Steady flow towards fully penetrating well, Equation of motion and its applications to ground water flow problems, Determination of aquifer constant in various types of aquifers, Types of tube wells.

### **Environmental and Ecological Studies**

Concept of Biosphere – Lithosphere, Hydrosphere, Atmosphere. Need for public awareness. Natural Resources – Renewable and non-renewable resources. Natural resources and associated problems. a) Forest resources : use and over exploitation, deforestation and its impact. b) Water resources; use and overutilization of surface and ground water and its impact. c) Mineral resources : use and effects on environment on over exploitation. d) Food resources: Effects modern agriculture, fertilizer-pesticide problem, water logging and salinity. e) Energy resources : Growing energy needs, renewable and non-renewable energy sources, use of alternate energy resources. f) Role of an individual in conservation of natural resources for sustainable development. Ecosystem and its components: Definition, structure and function; producer, consumer and decomposer. Types of Ecosystems. Food Chains, food web and ecological pyramids. Biodiversity and conservation. Genetic, species and ecosystem diversity, value of biodiversity. Hot spots of biodiversity. Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of Biodiversity. Environmental Pollution: a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazard. Role of an individual in prevention of pollution. Solid waste management: vermicomposting. Disaster management: Floods, earthquake, cyclone and landslides. Social issues and the Environment. Water conservation rain water harvesting, water shed management. Climate changes, global warming, acid rain, ozone layer depletion. Environmental Protection Laws in India. Environmental Protection Act. Air (Prevention and control of pollution) Act. Water (Prevention and Control of pollution) Act. Wild life Protection Act. Forest Conservation Act. Issues involved in the enforcement of environmental legislations. Environment Impact Assessment

**Part-B****General Knowledge, Logical Reasoning & Mental Ability****(a) General Knowledge & Current affairs**

General Knowledge and Current affairs of National and International importance including:

- (i) Economic issues.
- (ii) Polity issues.
- (iii) Environment issues.
- (iv) Geography.
- (v) Science and Technology.
- (vi) Any other current issues.
- (vii) (a) History of India with special reference to Indian freedom struggle movement.  
(b) History of Punjab- 14th century onwards.

**(b) Logical Reasoning, Mental Ability & Quantitative Aptitude.**

- (i) Logical reasoning, analytical and mental ability.
- (ii) Basic numerical skills, numbers, magnitudes, percentage, numerical relation appreciation.
- (iii) Data analysis, Graphic presentation charts, tables, spreadsheets.