FURTHER DETAILS REGARDING MAIN TOPICS OF PROGRAMME No. 12/2019 (Item No.1)

INDUSTRIES EXTENSION OFFICER

INDUSTRIES AND COMMERCE

(Category No.125/2018)

Part I - CIVIL ENGINEERING

Materials: Brick – varieties and strength, characteristics of good brick. Cement – varieties and grade of cement and its uses. Steel – types of steel for reinforcement bars, steel structural sections. Aggregates – types & requirements of good aggregates. Concrete – grades of concrete as per IS code, water cement ratio. Workability, mixing, batching, compaction and curing.

Construction: Parts of building – foundation – types of foundations – spread footing, isolated footing, combined footing, Raft, pile and well foundations. Masonry – types rubble masonry, brick masonry, English bond and Flemish bond. (One brick wall).

Surveying: Chain surveying – principles, instruments, ranging and chaining survey lines, field work and field book, selection of survey stations, units of land area. bench mark Fundamental Concepts of GPS . Applications of GPS in Resource Surveys, Mapping and Navigation, Introduction to GIS ,Applications of GIS Modern survey – instruments – Total station, Electronics theodolite, Distomat.

Part II - INDUSTRIAL MANAGEMENT AND INDUSTRIAL ENGINEERING

Principles of Management, Principles of a good wage payment system, Quality planning and its developments, Project management techniques, Qualitative techniques in management, Material and sales management, Production planning and control, Method study, Inspection and quality control, Project Analysis

Part III - BASICS OF MECHANICAL ENGINEERING

Thermodynamics, Energy conversion devices, IC engines, turbo machines, refrigeration and air conditioning, power transmission devices in auto mobiles, engineering materials and manufacturing processes, machine tools, Emission standards

Part IV - ELECTRICAL ENGINEERING

Electric circuits: Kirchhoff's laws, Magnetic Circuits: MMF, field strength, flux density, reluctance comparison between electric and magnetic circuits

Electromagnetic Induction: Faraday's laws, lenz's laws- statically induced and dynamically induced emfs-self inductance and mutual inductance, coefficient of coupling

Alternating Current fundamentals: Generation of alternating voltages-waveforms, frequency, period. Concept of impedance, power and power factor in ac circuits-active, reactive and apparent power

Three phase systems: Generation of three phase voltages, advantages of three phase systems, star and delta connection (balanced only), relation between line and phase voltages, line and phase currents.

Generation of power: Conventional and non conventional

Electrical machines: Construction and working principle of single phase and three phase Transformers, DC Generator and motors and AC generators and motors.

Part V - ELECTRONICS ENGINEERING

Electronics Engineering Resistors, Inductors, Capacitors – Types, working principle and uses. Diodes- PN junction diode, Zener diode, photo diode, solar cell. Working principle of analog and digital multimeter, Function generator, UPS, GPS, GSM and GPRS, Bluetooth and Wifi.

Working principle of switches- SPST, SPDT and DPDT. Sensors and Relays : Types and uses. Public Address systems – Loud Speaker, Amplifiers and Microphones- Various types and comparison.
Microcontrollers- 8085- block diagram, assembly language programs without jump instructionsapplication of microcontrollers in industry.

Part V - COMPUTER SCIENCE ENGINEERING

Introduction to digital Computer- A simple model of computer with acquisition of data, storage of data, processing of data,output of processed data. Details of functional units of a computer, primary storage and secondary storage.

Data representation- Number systems – Binary numbers – representation of integers-representation of fractions – octal and hexadecimal representations -conversion from one system to another -representation of BCD numbers,Simple arithmetic operations.

Introduction to programming languages : Types of programming languages-high level language, assembly language and machine language, system software-operating systems-objectives of operating systems, compiler, assembler and interpreter (**concepts only)**

Problem Solving Strategies:-Problem analysis –formal definition of problem – solution – breaking a problem into sub problems-overview of the solution to the sub problems by writing step by step procedure (algorithm)-representation of procedure by flowchart.

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper