

**Part—II :** Personality test carrying a maximum of 100 marks on the basis of the such of the candidates who qualify on the basis of written examination.

2. The following will be the subjects for the written examination :

Subject	Duration	Maximum marks
<b>SECTION--I</b>		
1. General ability test (Part A—General English) (Part B—General knowledge)	2 Hours	100
Note : Equal number allotted to each part of this paper.	2 Hours	200
2. Electrical/Mechanical/Electronics/Tele-Communication/Computer Engineering.		
	Total :	<u>300</u>

3. In personality test, special attention will be paid to assessing the candidate's capacity for leadership, initiative and intellectual curiosity, tact and other social qualities, mental and physical energy and integrity of character.

4. Conventional papers must be answered in English. All question papers will be set in English only.

5. Candidates must write the papers in their own hand. In no circumstances, will they be allowed the help of a scribe to write the answers for them.

6. Standard of the questions of General English will be that Senior Secondary (10+2) standard whereas that of conventional papers in various subjects would be that of conventional papers in various subjects would be that of Diploma level in relevant Engineering disciplines. There shall be no practical examination in any of the subjects.

7. The Commission have discretion to fix qualifying marks in any or all the subjects of the examination.

#### APPENDIX

##### Syllabus

1. General ability Test :

**Part (A) :** General English—The question paper in General English will be designed to test the candidate's understanding of English and workmanlike use of words—Level—Senior Secondary (10+2).

**Part (B) :** General knowledge—The paper in General studies will include knowledge of current events and of such matters as of everybody's observation and experience in their scientific aspects. The paper will also include questions on History of India and Geography.

2. Conventional paper in relevant Engineering Subjects :

## MECHANICAL ENGINEERING

### PART—I

#### 1. Principles of Mechanical Engineering

Study of hand tools for workshop practice, machine components. Transmission systems-belt, chain, rope and gear drives. Process equipments like compressors, blowers and fans. Automobiles and their components and auxiliary systems. Practice on welding, automobile maintenance and dismantling and assembling of machine components.

#### 2. Applied Mechanics

Static analysis of simple structures, virtual work, combined motion of rotation and translation, balancing of rotation masses, central force motion and satellite motion, transmission of power by belt and gear drives.

#### 3. Basics of Hydraulics

Properties of liquid, Hydraulic pressure and its measurement, flow of liquids, steady, unsteady, laminar and turbulent flows Orifice, mouthpiece and nozzles, flow through pipes, fundamentals of channel flow.

#### 4. Hydraulics Machinery

Flow measurements : different types of pumps ; reciprocating and rotary pumps ; operation and maintenance of pumps ; characteristic curves of pumps efficiency of pumps ; different types of turbines) Francis, Kaplan and Pelton turbines operation and maintenance of turbines ; flow through turbines, characteristic curves, work done and efficiency of turbines.

#### 5. Machine Drawing II

Drawing of gears, gear boxes, lathe and milling machine components, Drawing of miscellaneous machine parts of pumps, engines, compressors, etc.

#### 6. Fundamentals of Mechanical Engineering

Introduction to engineering thermodynamics, power generating equipments like boiler, turbines and I.C engines, Power transmission device : belt, rope and gear drives. Study of power plants, materials handling equipments, fabrication methods like riveting and welding.

#### 7. Materials and Material Science

Engineering materials, mechanical, thermal, chemical and manufacturing properties, structure of materials, alloys, phase diagram.

### PART—II

#### 1. Basics of Mechanical Engineering

Introduction to engineering thermodynamics, Power generating equipments like boiler, turbines and I.C engines. Power transmission devices. Introduction to fluid and fluids machineries.

#### 2. Machining Processes

Fundamentals of metal cutting , calculations of cutting forces and tool life, general purpose machine tools and their operations. Newer and advanced machining processes like EDM, ECM, and CNC machines.

#### 3. Thermal Engineering

Ideal gas compression and compressors, steam generators. Fuel and combustion. IC engines, cycles, calculation of efficiencies, open and closed gas turbine cycles. Introduction to heat and mass transfer. Refrigeration cycles. Testing of IC Engines, turbines and compressors. Determination of fuel properties.

#### 4. Refrigeration and Air Conditioning

Principles of refrigeration, air refrigeration systems, vapour compressed and absorption refrigeration system, refrigerating equipments, psychometry, refrigerants, Principles of air conditioning, humidification and dehumidification, summer and winter air conditioning, industrial and comfort air conditioning, effective temperature, ventilation requirements. Experiments related to vapour compression, vapour absorption systems, vortex tube, cooling tower.

#### 5. Power Plant Engineering

Types of Power plants, components of steam power plants, details of diesel generating set, gas turbine power plants, nuclear power plants, hydel power plants, non-conventional sources of power generation, load distribution and calculation of power tariffs. Design and drawing of plant layout, power plant equipments, and other related factors.