



# All India Institute of Medical Sciences, Jodhpur

## Indicative Syllabus for the Post of Manager/Supervisor/Gas Officer

(Syllabus is only indicative. The questions can assess any aspect of knowledge, aptitude, attitude and practical skills, which is expected from a trained person to work efficiently at the advertised post)

### **Section A**

40% Questions covering the following topics:-

**General Intelligence & Reasoning:** It would include questions of non-verbal type. The test will include questions on similarities and differences, space visualization, problem solving, analysis, judgment, decision making, visual memory, discriminating observation, relationship concepts, figure classification, arithmetical number series, non-verbal series etc. The test will also include questions designed to test the candidate's abilities to deal with abstract ideas and symbols and their relationship, arithmetical computation and other analytical functions.

**Quantitative Aptitude:** This paper will include questions on problems relating to Number Systems, Computation of Whole Numbers, Decimals and Fractions and relationship between Numbers, Fundamental arithmetical operations, Percentages, Ratio and Proportion, Averages, Interest, Profit and Loss, Discount, use of Tables and Graphs, Mensuration, Time and Distance, Ratio and Time, Time and Work, etc.

**Computer Knowledge:** Candidates' understanding of the Basics of Computer Knowledge, its parts, functions, emails, MS office, etc.

### **Section B**

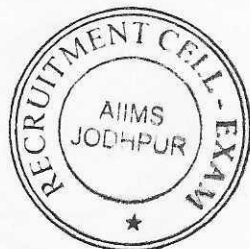
60% Questions to be based on Manager/Supervisor/Gas Officer responsibilities and basic Mechanical Engineering from the following topics:-

**(The questions should be evaluating practical skills of experience Medical Gas Pipeline Workers. Even questions with photographs and steps of technician to identify the tool, gas cylinder, correct step of procedure etc. can be asked rather than only theoretical knowledge.)**

1. Names and brief description of the Hand tools identification of gas cylinders. Different types of welded joints and necessary preparation required for these. Welding symbols as applied to drawing. Safety precautions, Hand tools used for molding. The description, use and care of hand tools.
2. Piping materials and specifications of W.I. & Steel pipes, Pipe threads, Pipe fittings, Specifications of fittings. Brief description of different types of pipe joints. Pipe fittings, flanges, unions, valves etc. Different types of pipes lay out systems. Different types of pipe joints.
3. Working principle of valves and their description.



4. Mechanical faults on terminal outlets line regulators zone valve boxes and faults on electrically controlled line pressure alarms.
5. Oxygen acetylene welding procedure of medical gas pipe line using inert gas shielding.
6. Installation, maintenance and repair of liquid oxygen plant and high pressure cylinder manifolds.
7. Types of Gas Manifolds
  - AUTO - CHANGE MANIFOLDS
  - CUSTOMS - BUILT MANIFOLDS
  - STATIONARY MANIFOLDS
8. Manifold Selection Criteria
  - What gas/gas mix, CGA
  - Liquid or high pressure cylinders
  - What is the end use application
  - Required line pressure to application (PSIG)
  - Required maximum flow rate to application (SCFH)
  - Is interruption of gas service acceptable
  - Is notification of changeover or gas outage required
  - Total number of cylinders
9. How to Properly Size a Manifold
  - Calculate maximum possible usage
  - Determine duty cycle (Hours per day of gas use)
  - Determine total gas usage per day
  - Determine gas volume of cylinders to be used
  - Determine number of cylinders needed per day
  - Determine frequency of cylinder change outs desired
  - Determine size of each manifold service bank
10. MANIFOLD ASSEMBLIES:
  - Simplex Manifolds
  - Simplex Manifold Configurations
  - Standard Configuration
  - Crossover Configuration
11. Mechanical Properties of Metals  
Concept of stress and strain diagram, Bending and Shear Stress, Poission's ratio, Thermal Stresses, Testing of materials, testing of hardness, Impact strength. Elastic and Plastic deformation, Neno and smart material, Corrosion and protection.
12. Machine Design  
Principal of the design of machine elements such as bolted, riveted and welded joints.
13. Fluid Mechanics and Thermal Science  
Fluid properties, fluid states, buoyancy, differential equation of continuity and momentum, Bernoulli's equations, flow through pipes and head losses in pipes, bends and fittings, Mode of heat transfer.



14. Engineering Application  
Air and gas compressors, Vapour and gas power cycle, Vapour and gas refrigeration and heat pump cycles. Properties of moist air.
15. Machine Design  
Design of static and dynamic loading, failure theories, fatigue strength, principal of design for bolted, riveted and welded joints.
16. Medical Gases  
Types of medical gases and their production, medical air, Quality control of medical gases, Storage and distribution of medical gases, Gas Cylinder rules 2004, Colour coding of cylinders.

