HINDUSTAN PETROLEUM CORPORATION LIMITED

Regd. Office: 17, Jamshedji Tata Road, Mumbai - 400020.
CIN NO: L23201MH1952GOI008858

SYLLABUS FOR COMPUTER BASED TEST
SAFETY OFFICERS POSITIONS

1. SAFETY, HEALTH AND ENVIRONMENT MANAGEMENT

1.1 INTRODUCTION

1.1.1 Management and management principles and types of management

1.1.2 Management Principles: General principles of management, managerial role, authority, responsibility and power, span of management, delegation and decentralization of authority.

1.1.3 Safety, Health and Environment Management (SHE), Occupational Safety, Health and Environmental Safety Management – Principles and Practices

1.1.4 Role of Management in industrial safety

1.1.5 Organization behaviors and Human factors contributing to accident

1.2 PLANNING FOR SAFETY

1.2.1 Planning for safety: Definition, Purpose, Nature, Scope and procedure, Range of planning, varietyof plans.

1.2.2 Strategic planning and tools of implementation. Management by objectives and its role in safety, health and management (SHE). Policy formulation and implementation

1.3 ORGANIZING FOR SAFETY

1.3.1 Organizing: Definition, need, nature and principles. Organizing for safety, Health and Environment Organization structure, functions and responsibilities

1.3.2 Safety Committee: Structure and functions

1.3.3 Line and Staff functions for safety, Health and Environment

1.4 DIRECTING FOR SAFETY

1.4.1 Direction: Definition, process, principles and techniques

1.4.2 Leadership: Role functions and attributes of a leader.

1.4.3 Communication: Purpose, process, types and channels, essential rules for communication. Two-way communication. Barriers in communication, essentials of effective communication. Communication and group dynamics.

1.5 MONITORING FOR SAFETY, HEALTH AND ENVIRONMENT

1.5.1 Occupational Safety, Health and Environment Management System, Bureau of Indian Standardson Safety and Health: 14489-1998 and 15001-2000, ILO and EPA standards 8

1.6 PRINCIPLES OF ACCIDENT PREVENTION

1.6.1 Definition: Incident, Accident, Injury, Dangerous occurrences, Unsafe Acts, Unsafe Conditions, Hazards, Error, Oversight, Mistakes etc

1.6.2 Accident Prevention: Theories/Models of accident occurrences. Principles of accident prevention. Accident and Financial implication

1.7 SAFETY, HEALTH AND ENVIRONMENT (SHE) EDUCATION AND TRAINING

1.7.1 SHE: Element of training cycle, Assessment of needs. Techniques of training, design and

development of training programs. Training methods and strategies types of training. Evaluation and review of training programs

1.7.2 Competence Building Technique (CBT), Concept for training, Safety as a online function. Role of Multi-media communication, Applications of Computers. Relevance of WTO regarding safety, Health and Environment

1.8 EMPLOYEE PARTICIPATION IN SAFETY

1.8.1 Employee Participation: Purpose, areas of participation, methods. Role of trade union in Safety Health and Environment Protection. Safety Promotion and Safety Awards and Suggestion Schemes, Safety Competitions, Safety Incentives Publicity schemes, Audio visual publicity, Other Promotional methods.

1.9 GLOBAL WARMING AND MITIGATION MEASURES

1.9.1 Global Warming and Mitigation measures

1.9.2 Human behavior: Individual differences, behavior as function of self and situation, perception of danger and acceptance of risk, knowledge, and responsibility vis-à-vis safety performance, theories of motivation and their application to safety, role of, supervisors and safety departments in motivation

1.9.3 Conflict & Frustration: Identification of situations leading to conflict and frustration and techniques of management

1.10 MANAGEMENT INSFORMATION SYSTEM FOR SAFETY

1.10.1 Sources of information on Safety, Health and Environment Protection. Compilation and collation of information, Analysis and use of modern 9 methods of programming, storing and retrieval of MIS for safety, health and environment

1.10.2 QCC HS computer software application and limitation 1.10.3 Status and future goals of computer utilization in Safety, Health and Environment (SHE) services in industries.

2. SAFETY ENGINEERING-I

2.1 MACHINE OPEATION AND GUARDING

Principles in machine guarding - Ergonomics of machine guarding - Type of guards, their design and selection - Guarding of different types of machinery including special precautions for wood working, paper, rubber and printing machinery, machine, tools etc. - Built-in safety devices, maintenance and repairs of guard's incidental safety devices and tools

2.2 SAFETY IN THE USE OF MACHINES

2.2.1 Safety in the use of 1) Power Presses (all types) 2) Sharing 3)Bending 4) rolling 5) Drawing 6)Turning 7) Boring 8)Milling, shaping 9) Planning broaching, Planting 10) grinding 11) CNCS

2.2.2 Need of Selection and care of cutting tools

2.2.3 Preventive maintenance, Periodic checks for safe operation

2.2.4 Associated hazards and their prevention

2.3 MATERIAL HANDLING AND STORAGE OF MATERIALS

2.3.1 Manual: Kinetics of manual material handling, maximum loads that could be carried. Lifting and carrying of objects of different shapes, size and weight. Safe use of accessories for manual handling storage of materials. Safety in stacking and unstacking, floor loading conditions. Lay-out conditions for safety in storage, Ergonomics of manual handling and storage.

2.3.2 Mechanical: Lifting machinery, Lifts and Hoists; Safety aspects in design and construction, testing, use and care, signaling, inspection and maintenance. Safety in design and construction, operation, inspection and maintenance of industrial trucks, lifting tackles and loose gears, conveyors. Safety

features, safe locations, testing, inspection and maintenance of lifting tackles, safe working load for all mechanical material handling equipment. The competent persons in relation to safety legislation –duties and responsibilities

2.4 WORKING AT HEIGHTS:

2.4.1 Working at heights: Incidence of accidents. Safety features associated with design constructionand use of stairways, ramps, working platforms, gangways, ladders of different types, and scaffolds of different types including Boatswain's chair and safety harness, working on roofs other safety requirements while working at heights.

2.4.2 Working in Confined Spaces

2.4.3 Working Underground

2.5 HANDTOOLS AND PORTABLE TOOLS

Main causes of tool accidents and Control of tool accidents. Centralized and personal tool issue system. Purchase, storage and supply of tools. Inspection, maintenance and repairs of tools. Detectable causes of tool failures. Tempering, safe ending, and dressing of certain tools. Safe use of various types of hand tools used for metal cutting, wood cutting, miscellaneous cutting work, other hand tools such as torsion tools, shock tools, non-sparking tools. Portable power tools and their selection, inspection, maintenance, repair and safe use.

2.6 PLANT DESIGN AND HOSUEKEEPING

Plant layout and design and safe distance. Need for planning and follow up. Safety and good. Typical accidents due to poor housekeeping. Disposal of scrap and other trade wastes. Prevention of spillage. Marking of aisles space and other locations. Use of color as an aid for good housekeeping. Housekeeping contests. Cleaning methods. Employee assignment. Inspections and check-lists. Benefits of good housekeeping. Role of preventive maintenance in safety and health. Importance of standards and codes of practice for plant and equipment.

2.7 INDUSTRIAL LIGHTING & ILLUMINATION

Purpose of lighting. Benefits of good illumination - Phenomenon of lighting and safety - Lighting and the work - Sources and types of artificial lighting - Principles of good illumination - Recommended optimum standards of illumination - Design of lighting installation - Maintenance, standards relating to lighting and color

2.8 VENTILATION AND HEAT STRESS

Purpose of ventilation - Physiology of heat regulation - Thermal environment and its measurement - Thermal comfort - Indices of heat stress - Thermal limits or comfort, efficiency and freedom from health risk - Natural ventilation - Mechanical Ventilation - Air conditioning - Control of heat exposuresat source, dilution and local ventilation – Recommended values for air changes required for various areas as per Factories Act, 1948 and national standards IS3103-1975 code of practice for Industrial ventilation, national building code Part VIII, Building Services

2.9 NOISE AND VIBRATION

Continuous and impulse noise - The effect of noise on man - Measurement and evaluation of noise - Noise isolation - Noise absorption techniques, Silencers - Practical aspect of control of noise - Vibration: Effects, measurement and control measures such as vibration damping

2.10 ELECTRICAL HAZARDS

2.10.1 Hazards of electrical energy - Safe limits of amperages, voltages - Safe distance from lines - Capacity and protection of conductors - Joints and connections - Means of cutting off power - Overload and short circuit protection - No load protection - Earth fault protection - Earth insulationand continuity tests - Earthing standards - Protection against surges and voltage fluctuation

2.10.2 Hazards arising out of 'Borrowed' neutrals - other precautions - Safety in the use of portable electrical apparatus - Types of protection for electrical equipment in hazardous atmosphere – Electrical area classification - Criteria in their selection, installation, maintenance and use

2.11 STATIC ELECTRICITY

2.11.1 Introduction, Electro-static charging – where charging can occur contact electrification. Electro Static discharges (Sparks). Electro static hazards and their control. Earthing and bonding. Recommended earthling resistance for control of electricity.

2.12 LIGHTING ARRESTORS

2.12.1 Definition, lightning splash, lightning strokes, lightning protection systems. Characterizationof health effects of lightening stroke (electrical effects, side flashers, thermal effects, mechanical effects. Function of lightning. Where lightning protection is required – System design, material of construction, component of a lightning arrestors, earth terminal / network.

2.13 Safety check list for buying new machinery for the plant.

3. SAFETY ENGINEERING-II

3.1 AGRO INDUSTRY / SUGAR INDUSTRY

3.1.1 Agro Industry / Sugar Industry

3.1.2 Harvesting and activities related to harvesting, such as preparation of crop by cleaning,trimming, grading, drying, decorticating, retting, cooling or bulk packaging. includes cotton picking

3.2 Metal industry

3.2.1 Manufacture of basic metals: Ferrous and Non ferrous

3.2.2 Metallurgy: Foundry, Steel plant

3.2.3 Hazards in the process of melting (Furnaces) Casting, forging, working on hot rolling and cold rolling, N.D.Test and Heat treatment

3.3 Automobile industry

3.3.1 Automobile manufacturing activity like pattern making, melting, molding, machining, forging, chipping, grinding, heat treatment N.D. Test, pollution control measures

3.4 TEXTILE INDUSTRY

3.4.1 Introduction to textile process involving cotton, jute and manmade fiber. Significant hazardsand Preventive measures.

3.5 CONSTRUCTION INDUSTRY

3.5.1 Basic Philosophy peculiarities and parameters governing the safety in construction such as site planning and layout, safe access, good housekeeping, safety in the use of construction machinery, signs and indication liaison for safety with local authorities, structural soundness accident and hazards their cause and effects

3.6 IT INDUSTRY

3.6.1 Manufacture of computers, Radio, Television and communication equipment and apparatus

3.6.2 Manufacture of electronic valves and tubes and other Electro-Magnetic Devices

3.6.3 Safety in semiconductor industry

3.7 SAFETY IN DOCKS

3.7.1 Safety in docks

3.7.2 Handling of cargo

3.7.3 Container Operation
3.7.4 Lifting appliance
3.7.5 Responsibility of different agency for safety, health and environment involved in dock work

3.8 Boiler safety
3.8.1 Safety in Boilers
3.8.2 Safety Precautions and operations of boilers
3.8.3 Different types of boilers when not in use
3.8.4 Preservations of boilers when not in use
3.8.5 Steam pressure, Pressure gauge
3.8.6 Treatment of feed water etc.

3.9 Environment Management
3.9.1 Environment Protection
3.9.2 Principles and Practices for Prevention and control of air pollution, water pollution, solid and hazardous waste management.
3.9.3 ISO 14001 EMS system
3.9.4 Cleaner technologies

3.10 Permit to work
3.10.1 Work permit Application, Adoption and Enforcement

3.11 welding safety
3.11.1 Welding, Gas cutting
3.11.2 Precautions in welding, gas cutting, brazing, soldering, and other operations

4. QUALITY CONTROL IN OCCUPATION SAFETY, HEALTH AND ENVIRONMENT

4.1 PLANT AND EQUIPMENT SAFETY APPRAISAL AND CONTROL TECHNIQUES
4.1.1 Plant Safety rules and Procedures, Safe operating systems, Safety Checklists, Plant safety inspections. Safety sampling - Safety survey - Job Safety Analysis - Safety Inventory system - Product safety - Safety tag systems - Total Loss control and Prevention

4.2 HAZARD IDENTIFICATION TECHNIQUES
Hazard and Risk analysis: Quantitative and Qualitative: Failure Mode and Effect Analysis (FMEA) & Maximum Credible Accident Analysis (MCAA) - Fault tree analysis- Event Tree analysis- Example of each HAZAN – HAZOP – Managerial Oversight review technique (MORT), Incident Recall technique -Critical Incident review technique – Safety integrity levels (SIL) etc

4.3 ACCIDENT AND INCIDENT INVESTIGATION, REPORTING AND ANALYSIS
Accident and Incident Investigation: Philosophy, Purpose, Process and types of Investigation. Identifying the key factors and the immediate and basic causes. Corrective action. Agencies investigating accident. Accident Reporting: Report forms, writing reports, essential elements Accident and Incident analysis: Standard classification of factors associated with accidents. Methodsof collecting and tabulating data, Record keeping.

4.4 MEASUREMENT AND EVALUATION OF PERFORMANCE
4.4.1 Definition of Accident, Reportable, Non-Reportable, Fatal, Non fatal
4.4.2 Near miss accident - Lost time accident - Disabling injury - Accidents reportable under the factories Act and ESI act - Frequency rate - Severity rate - Incidence rate - Frequency severity index – Safe score
4.4.3 Temporary disablement and permanent disablement - Partial and total disablement - Time charges schedules in workmen’s compensation Act 1928 and the National and International Standards.

4.5 MAJOR ACCIDENTS HAZARDS CONTROL

4.5.1 Major Accident Control: Definition, Major Accident Hazards, Identification and Assessment of MAH Units. Role of Government, Role of Management, Local authorities and Public

4.6 Safety audit system

4.6.1 Preparation and Assessment of Safety audit

4.6.2 Report of BIS 14489:1998, Safety Report, Standards, ILO Code of Practice for Major Accident control

4.7 Major hazard control

4.7.1 Major Accident Control System: Local, State, National and International.

5. INDUSTRIAL HYGIENE AND OCCUPATIONAL HEALTH

5.1 ILO CONVENTION AND RECOMMENDATION

5.1.1 ILO Convention and Recommendation concerning Occupational health and Safety

5.1.2 Relevant conventions and recommendation of ILO in the furtherance of Safety, Health and Environment (SHE). SHE a human right issue. Trade policy affecting OHS

5.1.3

Year	Conventions and Recommendations
1981	155 – OHS 164 - OHS
1985	161 – OHS 171 – OHS
1988	167 – Safety and Health in construction 175 – Safety and Health in Construction
1990	170 – Chemicals 177 – Chemicals
1993	174 – Prevention of major industrial accidents 181 – Prevention of major industrial accidents

5.2 THE FACTORIES ACT, 1948 AND THE FACTORIES RULES Factories Act - Provisions under the factoriesact and rules made there under with amendments - Case Laws under the factories act

5.2 SOCIAL SECURITY – LEGISLATIONS

5.2.1 Workmen's Compensation Act and Rules

5.2.2 ESI Act and Rules. Contract Labor (Abolition and Regulation) Act

5.2.3 Public Liability Insurance Act

5.2.4 Social Accountability 8000 SA - 8000

5.3 SAFETY, HEALTH AND ENVIRONMENT (SHE) RELATED IMPORTANT LEGISLATION: SALIENT FEATURE:

5.3.1 Sections pertaining to SHE

5.3.2 Indian Boilers Act, 1923 with allied Regulations, 1961;Indian electricity Act 2003 and Rules; Indian explosives Act,1984 and Rules; Petroleum Act and Rules; Gas cylinders rules; Calcium carbide rules; The Insecticides Act and rules

5.3.3 Radiation protection rules; Hazardous material transportation rules;

5.3.4 Static and mobile (Unfired) pressure vessel rules,1981 as amended in 2000

5.3.5 The Dockworkers (Safety, Health and Welfare) act 1996 and rules and regulations

5.3.6 The Building and other construction workers (regulation of employment and conditions of service) Act, 1996

5.3.7 The Building and other construction workers (Regulation of employment and conditions of service) Central Rules, 1998

5.3.8 The Building and other construction workers Welfare Cess Act, 1996 Cess Rules, 1998

5.4 ENVIRONMENT PROTECTION LEGISLATIONS:

5.4.1 Water (Prevention and control of pollution) Act 1974 and rules – Air (Prevention and Control of Pollution) Act, 1981 and 1982 and Rules. Motor vehicles act, 1988 as amended in 2000, The Central Motor Vehicles Rules, 1989 as amended in 2000 and transport of hazardous good rules

5.4.2 Environment protection act 1986 (Amended) and rules - MSIHC Rules –Noise Pollution Act, 1998, Bio-Medical Waste, Hazardous Waste management rules

5.4.3 Chemical Accidents (Emergency Preparedness, Planning and Response) Rules, 1986.

6. INDUSTRIAL HYGIENE AND OCCUPATIONAL HEALTH

6.1 INDUSTRIAL HYGINENE

6.1.1 Definition of Industrial Hygiene, industrial Hygiene: Control methods, Substitution, Changing the process, isolation, wet method, local exhaust ventilation, personal hygiene, housekeeping and maintenance, waste disposal, special control measures

6.1.2 Introduction to chemical hazards - Dangerous properties of chemicals, dust, gases, fumes, mist, vapors, smoke and aerosols

6.1.3 Route of entry to human system, recognition, evaluation and control of basic hazards, Concepts of dose response relationship, Bio-chemical action of toxic substances

6.1.4 Concept of threshold limit values - Air sampling strategies - Personal exposure monitoring

6.1.5 Work environment monitoring - Biological sampling & analysis

6.2 PERSONAL PROTECTIVE EQUIPMENT

6.2.1 Need for personal protective equipment, Selection, applicable standards, supply, use, care and maintenance of respiratory and non-respiratory personal protective equipment

6.2.2 Non-respiratory personal protective devices: Head Protection, Ear Protection, Hand Protection, Face and eye protection, Hand Protection, Foot Protection, Body Protection

6.2.3 Respiratory Personal protective devices: Classification of Hazards, Classification of respiratory personal protective devices, Selection of respiratory Personal protective devices

6.2.4 Instructions and training in the use, maintenance and care of Self containing breathing apparatus. Training in the use of breathing apparatus (Open circuits and Close unit)

6.2.5 Testing procedures and standards

6.3 OCUPATIONAL HEALTH 6.3.1 Definition : As per WHO

6.3.2 COMMON OCCUPATIONAL DISEASES:

- Occupational involving risk of contracting these disease - Mode of causation of the diseases and its effects - Diagnostic methods
- Biological Monitoring - Methods of prevention - Compensation for occupational diseases
- Evaluation of injuries
- Occupational Health Management Services at the work place
- List of Notifiable diseases Schedule III of Factories Act – 1948

6.3.3 OCCUPATIONAL HEALTH HAZARDS

6.3.3.1 Adverse health effects of noise, vibration, cold, heat stress, improper illumination, thermal radiation , Ionizing and Non-ionizing radiations

6.3.3.2 Permissible threshold exposure limits – Short term and long term effects of exposures -

Preventive and control measures.

6.4 Common Occupational Diseases

6.4.1 Common Occupational Disease as per the Schedule III of the Factories Act 6.4.2 Pre-employment, Periodical medical examination of workers. medical surveillance for control of occupational disease and health records

6.4.3 Fundamentals of First – aid-burns, fractures, Suffocation, Toxic ingestion – Bleeding wounds and Bandaging, Artificial respiratory, techniques

6.5 OCCUPATIONAL HEALTH HAZARDS

6.5.1 Physiology of respiration, cardiac cycle, muscle contraction, nerve conduction system etc. Assessment of workload based on Human Physiological reactions. Permissible limits of load for manual lifting and carrying. Criteria for fixation limits

6.5.2 Working Posture: Its effects on cardio-vascular and musculo-skeletal system and implicationson health. Nutrition and its importance in manual work. Nutritional requirements and nutritional of diet 24

6.5.3 Assessment of work capacity fatigue and rest allowances. Physiological test for assessment of occupational health. Nutrition: Nutritional requirements and the Diets for exercise, work and physical fitness

6.5.4 Aerobic work capacity (Physical work capacity), methods of its determination (Use of bicycle, ergo meter, treadmill, step-stool ergo meter). Factors affecting aerobic capacity and work performance

6.5.5 Environmental Physiology

6.6 ERGONOMICS

6.6.1 Introduction to Ergonomics, Definition, Aims and Scope, Man-machine (Job), Environment System, Constituents of Ergonomics, Application of Ergonomics in industry for safety, Health and Environment

6.6.2 Ergonomics of Automation / Assembly, visual fatigue, Ergonomics of rehabilitation while assigning alternate jobs. Anthropometry and fundamental of bio-mechanics: basic and applied aspects: Anthropometric measurements and their usefulness in industry

6.6.3 Ergonomic design of work station: Concept of workstation and its design. Improving safety and productivity through work station design. Technical and engineering control measures. Economics consideration.

7. SAFETY IN CHEMICAL AND PETROCHEMICAL INDUSTRY

7.1 UN CLASSIFICATION OF HAZARDOUS MATERIALS

7.1.1 UN Classification of Hazardous materials

7.1.2 Safety in chemical industry

7.1.3 Criteria for sitting and layout of chemical and petrochemical plants

7.1.4 Plant area classification

7.1.5 Instrumentation for safe plant operations

7.2 HAZARD IN UNIT PROCESSES AND UNIT OPERATIONS

7.2.1 Hazard in Unit processes and Unit operations

7.2.2 Control, precautions and prevention, specific safety measures for certain chemical industry like fertilizer, insecticide, pesticides-choler-alkali, explosives, and polymer plants

7.2.3 Sampling technique for toxic and flammables, Pharmaceuticals, Petro-chemical etc.

7.3 SAFETY PRECAUTIONS

7.3.1 Precautions in the process and operations involving explosives, flammables, toxic substances, dusts, gases, vapor cloud formations and combating

7.4 STORING AND HANDLING OF CHEMICALS

7.4.1 Receiving, storing and handling of chemicals

7.4.2 Chemical compatibility considerations

7.5 TRANSPORTATION OF HAZARDOUS MATERIAL

7.5.1 Transportation of Hazardous material

7.5.2 Safety precautions for transporting hazardous / toxic / flammable / explosive / radioactive substances by all modes

7.6 TRANSFER OF CHEMICALS THROUGH PIPE LINES

7.6.1Transfer of chemicals by pipelines within and outside installations, above and underground and submarines

7.7 COLOR CODING

7.7.1 Color coding identification of contents

7.7.2 Safety precautions for working on pipelines, safe entry procedures to

7.7.3 Confined spaces including reaction vessels

7.7.4 Safe procedure of start up and shut down procedures

7.7.5 Safety in preventive and emergency maintenance operations

7.8 MSDS

7.8.1 Use of Material safety data sheets

7.9 WORK PERMIT SYSTEM

7.9.1 Work permit system, confined space, hot work, working at height

7.10 FIRE AND EXPLOSION

7.10.1 Fire and Explosion

7.10.2 Chemistry of fire, factors contributing towards fire, classification of fires. Common causes of industrial fire

7.10.3 Determination of fire load. Design of building plant, exits etc for fire safety and fire resistanceof building materials

7.10.4 Prevention of fire.Portable extinguishers. hydrant system, Sprinkler system, introduction to Carbon-di-oxide systems, Foam extinguisher system, Dry chemical extinguishing system , Halon replacement of fire fighting product

7.10.5 Fire detection and alarm system

7.10.6 Special safety precautionary measures for control of fire and explosion in handling / processing flammable liquids, gases, vapors, mists and dusts etc. 27 BLEVE (Boiling liquids expanding vapor explosion, vapor cloud explosion) including pesticides

7.10.7 Fire emergency action plan. Deflagration and Detonation

7.11 FIRE EXPLOSION AND TOXICITY INDEX

7.11.1 Salient features of fire explosion and toxicity index, Dow, dispersion, Probability analysis, modeling.

7.11.2 Pressure vessels fired and unfired, codes of practices governing their safety

7.12 ASSESSMENT OF RELIABILITY OF VESSELS, TEST CHECKS

7.12.1 Assessment of reliability of vessels, test checks

7.13

7.13.1 Inspection techniques for plants, reaction vessels, check list for routine inspection, checklist for specific maintenance and breakdown

7.14 INSPECTION TECHNIQUES

7.14.1 Corrosion and erosion, location, causes inspection and prevention.

8. SAFETY IN CONSTRUCTION INDUSTRY.

8.1 Meaning and scope of safety in construction

8.1.1 Understand the basic philosophy, peculiarities and parameters governing the safety in construction such as site planning and layout

8.1.2 Know the safe access

8.1.3 Know about the Good Housekeeping, safety in the use of construction machinery

8.1.4 Know about the signs & indication

8.1.5 Know about the accidents and hazards – their causes and effects

8.2 Safety in Construction Operations

8.2.1 Underground works Safety in using and operating machine and equipment relating to the below works

8.2.1.1 Know about excavation

8.2.1.2 Know about drilling and blasting

8.2.1.3 Know about trenching

8.2.1.4 Know about shoring

8.2.1.5 Know about strutting

8.2.1.6 Know about tunneling

8.2.1.7 Know about piling

8.2.2 Above ground works Safety in use and operations of related machinery and equipment relating to the below works

8.2.2.1 Know about scaffolding

8.2.2.2 Know about centering

8.2.2.3 Know about formwork ladders

8.2.2.4 Know about wall and floor openings

8.2.2.5 Know about staircases and railings

8.2.2.6 Know about structural steel work including welding, cutting, erection, etc.

8.2.3 Underwater operations Safety in use and preparation of related machinery and equipment

8.2.3.1 Know about river training

8.2.3.2 Know about well sinking

8.2.3.3 Know about caissons

8.2.3.4 Know about underwater concreting cofferdams and special operations concerted with irrigation work

8.2.4 Movement of materials and personnel

8.2.4.1 Know how to handle heavy/long items

8.2.4.2 Know about railway wagons, motor trucks, vehicles etc.

8.2.4.3 Know about Hazardous materials

8.2.5 Special works

8.2.5.1 Know about high rise buildings, bridges, roads, railways asphalting pneumatic caissons, electrical installations and lifts.

8.2.6 Fire prevention and protection at work site

8.3 Safety in Demolition operations

8.3.1 Understanding the planning and permit

8.4 Safety with regard to storage, stocking and handling of materials of construction

8.4.1 Know about hazards, health ill effects while handling construction materials and chemicals

8.4.2 Know safety measures with respect material such as cement, limes, aggregates, fly ash,timber, steel, glass, paints, varnishes, petroleum products related products etc.

8.5 Accident prevention

8.5.1 Know about Occupational hazards,

8.5.2 Know about Occupational diseases relating to construction work

8.5.3 Know about safety in the use of Personal Protective equipment specific to constructionindustry

8.5.4 Know about health and welfare measures

8.5.5 Know about emergency medical measure for construction site, treatment of injuries and rehabilitation

8.6 Statutory obligations

8.6.1 Know about construction safety law and obligations

8.6.2 Know about IS and NB Codes

8.6.3 Know about local building and development by laws

8.6.4 Know about Accident investigation and reporting, monitoring safety performance

8.7. Special precautions

8.7.1 Understanding the special precautions for works of engineering construction like distilling/fractionating columns, towers, chimney silos, silos and gas installations, transmission/communication lines

8.7.2 Know about cable car installations, air fields

NOTE: The syllabus/topics mentioned are indicative in nature. Candidates are expected to possess significant knowledge/proficiency pertaining to the relevant subjects and their qualifying degree.