

# CONTENTS

## *Energy and Environment*

### **1. ENERGY RESOURCES**

- 1.0 INTRODUCTION
- 1.1 DEFINITION
- 1.2 SOCIO-ECONOMIC STUDY
- 1.3 ENERGY RESOURCES
- 1.4 CLASSIFICATION & ESTIMATION OF PETROLEUM RES
- 1.5 EXPLORATION FOR PETROLEUM IN SEDIMENTARY BASINS OF INDIA AND RESULTS OBTAINED
- 1.6 NON-CONVENTIONAL HYDROCARBON RESOURCES: COAL - BED METHANE & GAS HYDRATES
- 1.7 EXPLORATION FOR COAL
- 1.8 TRANSFORMATION OF ENERGY
- 1.9 CLASSIFICATION OF ENERGY SOURCES
- 1.10 CHARACTERISTICS OF ENERGY QUESTIONS

### **2. THE EARTH'S ATMOSPHERE**

- 2.0 INTRODUCTION
- 2.1 THE BIRTH OF THE EARTH
- 2.2 THE ATMOSPHERE OF EARTH
- 2.3 COMPOSITION
- 2.4 STRUCTURE OF THE ATMOSPHERE
- 2.5 PHYSICAL PROPERTIES
- 2.6 OPTICAL PROPERTIES
- 2.7 AIR POLLUTION
- 2.8 ACID RAIN
- 2.9 GREENHOUSE GASES
- 2.10 GLOBAL WARMING
- 2.11 CLIMATE MODELS
- 2.12 ATTRIBUTED AND EXPECTED EFFECTS
- 2.13 RESPONSES TO GLOBAL WARMING EXERCISE:

### **3. POLLUTION FREE CLIMATE**

- 3.0 HISTORY
- 3.1 MODERN AWARENESS
- 3.2 FORMS OF POLLUTION
- 3.3 POLLUTANTS
- 3.4 REGULATION AND MONITORING
- 3.5 MAJOR FORMS OF POLLUTION AND MAJOR POLLUTED AREAS
- 3.6 EFFECTS
- 3.7 GREENHOUSE GASES AND GLOBAL WARMING
- 3.8 BUSINESS, WASTES AND POLLUTION
- 3.9 ECOLOGICAL SYSTEMS AND ENVIRONMENTAL ISSUES
- 3.10 ENVIRONMENTAL ISSUES IN ENERGY DEVELOPMENT

- 3.11 GOALS AND GOAL CONFLICTS
  - 3.12 POLLUTANTS
  - 3.13 ECONOMICS OF POLLUTION CONTROL
  - 3.14 INDUSTRIES AND NATURAL ENVIRONMENT
  - 3.15 GOVERNMENT COMMITMENT
- EXERCISE:

#### **4. PROJECT MANAGEMENT**

- 4.0 MANAGING PROJECT RESOURCES FLOW
  - 4.1 INVESTMENT FEASIBILITY STUDIES
  - 4.2 PROJECT EVALUATIONS AND CAPITAL BUDGETING
  - 4.3 PROJECT RISK ANALYSIS
  - 4.4 PROJECT SELECTION UNDER RISK
  - 4.5 SOCIAL COST BENEFIT ANALYSIS FOR PROJECT APPRAISAL
  - 4.6 ENVIRONMENT
  - 4.7 ENVIRONMENTAL IMPACT ASSESSMENT
  - 4.8 ENVIRONMENTAL IMPACT STATEMENT
  - 4.9 ENVIRONMENTAL MANAGEMENT PLAN (EMP)
- EXERCISE:

#### **5. ISO 14000 AND ENVIRONMENTAL MANAGEMENT SYSTEMS**

- 5.0 ENVIRONMENTAL MANAGEMENT SYSTEM
  - 5.1 WHAT ARE ISO, ISO 14000, AND ISO 14001?
  - 5.2 A BRIEF HISTORY OF ENVIRONMENTAL MANAGEMENT SYSTEM
  - 5.3 HISTORY OF DEVELOPMENT OF ISO 14000 SERIES
  - 5.4 ISO 14001
  - 5.5 ISO 14004 ENVIRONMENTAL MANAGEMENT SYSTEMS - GENERAL GUIDELINES
  - 5.6 ENVIRONMENTAL ECONOMICS
  - 5.7 GLOBAL GEOCHEMICAL CYCLES CRITICAL FOR LIFE
  - 5.8 VALUATION
  - 5.9 SOLUTIONS
  - 5.10 RELATIONSHIP TO OTHER FIELDS
  - 5.11 PROFESSIONAL BODIES
  - 5.12 ISO 14015: ENVIRONMENTAL MANAGEMENT — ENVIRONMENTAL ASSESSMENT OF SITES AND ORGANIZATIONS (EASO)
  - 5.13 EVALUATION
  - 5.14 REPORTING
  - 5.15 THE ISO 14020 SERIES
  - 5.16 ISO 14031: ENVIRONMENTAL PERFORMANCE EVALUATION
  - 5.17 ISO 14040 LIFE CYCLE ASSESSMENT
  - 5.18 DATA ANALYSIS
  - 5.19 VARIANTS
  - 5.20 CRITIQUES
  - 5.21 DYNAMIC LIFE CYCLE ASSESSMENT
- EXERCISE:

#### **6. GLOBAL ENVIRONMENT : CLIMATE CHANGE, UNFCCC, SUSTAINABLE DEVELOPMENT, KYOTO PROTOCOL**

- 6.0 CLIMATE CHANGE
- 6.1 UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE
- 6.2 ANNEX I, ANNEX II COUNTRIES & DEVELOPING COUNTRIES
- 6.3 INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)
- 6.4 THE CHALLENGE OF SUSTAINABLE DEVELOPMENT
- 6.5 DEFINITIONS AND INTERPRETATIONS OF SUSTAINABLE DEVELOPMENT
- 6.6 THE ENERGY DIMENSION OF SUSTAINABLE DEVELOPMENT
- 6.7 BENEFITS OF RENEWABLE ENERGY NOT CAPTURED IN STANDARD ECONOMIC ACCOUNTS
- 6.8 NEED FOR NEW POLICY INITIATIVES TO ENCOURAGE INNOVATION AND INVESTMENT IN RENEWABLE TECHNOLOGIES
- 6.9 ROLE OF ENERGY CONSERVATION STRATEGIES
- 6.10 SPECIAL CHARACTERISTICS OF STRATEGIES FOR DEVELOPING COUNTRIES
- 6.11 SOME ECOLOGICAL CONSIDERATIONS
- 6.12 CONCLUDING REMARKS
- 6.13 KYOTO PROTOCOL

#### **7. CLEAN DEVELOPMENT MECHANISM**

- 7.0 CARBON CREDIT
  - 7.1 CARBON SINK
  - 7.2 ENVIRONMENTAL HEALTH
  - 7.3 RENEWABLE REVOLUTION
  - 7.4 EMISSION ALLOWANCES
  - 7.5 KYOTO'S 'FLEXIBLE MECHANISMS'
  - 7.6 ECONOMICS OF GLOBAL WARMING
  - 7.7 HOW BUYING CARBON CREDITS CAN REDUCE EMISSIONS?
- EXERCISE

#### **8. SUSTAINABLE DEVELOPMENT NEED FOR NUCLEAR ENERGY**

- 8.0 SUSTAINABLE DEVELOPMENT
  - 8.1 SCOPE AND DEFINITIONS
  - 8.2 ENVIRONMENTAL SUSTAINABILITY
  - 8.3 THE NOTION OF CAPITAL IN SUSTAINABLE DEVELOPMENT
  - 8.4 MARKET FAILURE
  - 8.5 SUSTAINABLE DEVELOPMENT IN ECONOMICS
  - 8.6 NUCLEAR POWER IN THE FUTURE AND SUSTAINABLE DEVELOPMENT
  - 8.7 PREVENTING CATASTROPHIC CLIMATE CHANGE
  - 8.9 ECONOMY OF INDIA
  - 8.10 NUCLEAR POWER
  - 8.11 ACCIDENTS AND SAFETY
  - 8.12 ENVIRONMENTAL EFFECTS OF NUCLEAR POWER
  - 8.13 MILESTONES IN THE HISTORY OF NUCLEAR ENERGY
  - 8.14 ADVANTAGES OF NUCLEAR ENERGY
  - 8.15 DISADVANTAGES OF NUCLEAR ENERGY
  - 8.16 THE FUTURE OF NUCLEAR ENERGY
  - 8.17 CONCLUSION
  - 8.18 NUCLEAR POWER GROWTH IN INDIA
- EXERCISE

## **9. WATER SECURITY**

- 9.0 WATER
  - 9.1 CHEMICAL AND PHYSICAL PROPERTIES
  - 9.2 TASTE AND ODOR
  - 9.3 DISTRIBUTION OF WATER IN NATURE
  - 9.4 WATER AND HABITABLE ZONE
  - 9.5 WATER ON EARTH
  - 9.6 WATER CYCLE
  - 9.7 FRESH WATER STORAGE
  - 9.8 EFFECTS ON LIFE
  - 9.9 EFFECTS ON HUMAN CIVILIZATION
  - 9.10 HUMAN USES
  - 9.11 WATER LAW, WATER POLITICS AND WATER CRISIS
  - 9.12 WATER IN CULTURE
  - 9.13 WATER SECURITY
  - 9.14 RAIN WATER HARVESTING
  - 9.15 DEFINITIONS AND CLASSIFICATION
  - 9.16 BASIC CATEGORIES OF WATER HARVESTING SYSTEMS FOR PLANT PRODUCTION
  - 9.17 OVERVIEW OF MAIN WH SYSTEMS
  - 9.18 WATER AND SOIL REQUIREMENTS
  - 9.19 WATER REQUIREMENTS OF TREES, RANGELAND AND FODDER
  - 9.20 SOIL REQUIREMENTS FOR WATER HARVESTING
  - 9.21 RAINFALL-RUNOFF ANALYSIS
  - 9.22 DETERMINATION OF RUNOFF COEFFICIENTS
  - 9.23 ASSESSMENT OF ANNUAL OR SEASONAL RUNOFF
  - 9.24 WATER HARVESTING TECHNIQUES SITE AND TECHNIQUE SELECTION
  - 9.25 NEGARIM MICROCATCHMENTS
  - 9.26 CONTOUR BUNDS FOR TREES
  - 9.27 SEMI-CIRCULAR BUNDS
  - 9.28 CONTOUR RIDGES FOR CROPS
  - 9.29 TRAPEZOIDAL BUNDS
  - 9.30 CONTOUR STONE BUNDS
  - 9.31 PERMEABLE ROCK DAMS
  - 9.32 WATER SPREADING BUNDS
  - 9.33 SOCIO-ECONOMIC FACTORS AND PROJECT MANAGEMENT
  - 9.34 PROJECT MANAGEMENT
  - 9.35 WATER TREATMENT
  - 9.36 WATER PURIFICATION
- EXERCISE:

## **BIBLIOGRAPHY**

## **REFERENCES**

## **INDEX**