

CURRICULUM REVISION PROJECT

2012

TEACHER GUIDE FOR ENVIRONMENTAL STUDIES

(17401)

FOURTH SEMESTER-All Branches of Diploma in
Engineering & Technology

DECEMBER 2013



**MAHARASHTRA STATE
BOARD OF TECHNICAL EDUCATION, Mumbai**
(Autonomous) (ISO 9001:2008) (ISO/IEC 27001:2005)

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1. APPROACH TO CURRICULUM DESIGN

1.1 Background:

MSBTE is introducing the revised curriculum under 'G' scheme from the academic year 2012-13.

There are many institutions in the state running different diploma courses. In order to ensure uniform and effective implementation of the curriculum it is necessary that every teacher is aware of approach for curriculum design, educational principles to be adopted, learning resources to be used and evaluation methods. The teacher guide prepared for each subject will provide the inputs related to above mentioned aspects to achieve uniform and effective implementation of curriculum of various subjects.

1.2 CURRICULUM PHILOSOPHY

MSBTE has adopted systems approach while designing the scientific based curriculum since 1995. The same approach has been adopted while revising the curriculum in semester pattern.

Fig. No. 1 shows the systems diagram. This diagram provides the holistic view for curriculum designing, development, implementation and evaluation

The input to polytechnic education system is the students having 10+ qualifications. The teaching learning process occurs in the institution for six/eight semesters. The output of the system i. e. Diploma pass out is normally the input to industries. (Some students do go for higher education). While designing the curriculum the expectations of the industries play a major role. Due to globalization and competition the industries expect that pass outs have generic and technological skills along with right attitude.

To fulfill the needs derived from systems approach following conceptual framework is considered:

1.3 Curriculum:

“Curriculum is an educational program designed and implemented to achieve specified educational objectives”

This definition takes into account the fact that

- Education is purposeful
- There is an organized plan of action contemplated
- Such a plan is translated into action through appropriate strategies of implementation.

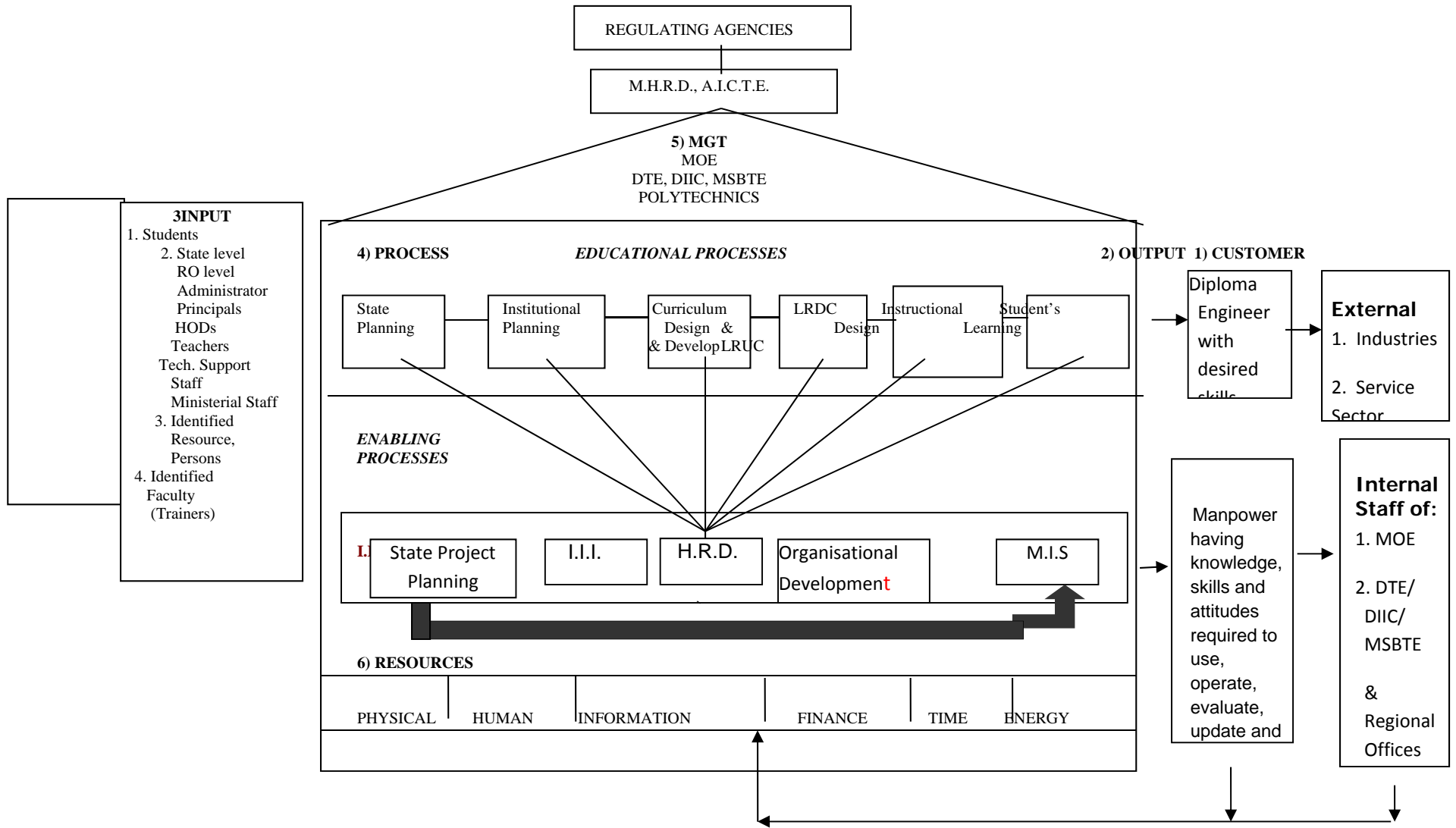


Fig 1 Systems Approach

1.4 Curriculum goals

1. To develop confidence in students by providing more exposure to industry experience and world of work at global level
2. To provide conceptual knowledge and develop analytical ability
3. To develop communication skill with good English by providing sufficient practice
4. To enhance latest technical knowledge industry interaction and media
5. To develop learning to learn skills and life skills to cope up with industrial culture
6. To impart managerial skills by providing appropriate theoretical inputs
7. To develop problem solving ability through technical projects.

1.5 DESIRED SKILLS

Industries expect from the diploma engineer the abilities and skills of general nature and specific to the job performance. The curriculum aims at developing life skills and technological skills so that the diploma pass outs would be suitable for industry. The skills are listed below:

Life Skills:

- Search information from various sources
- Develop communication ability
- Develop Presentation skill
- Work as a member of a team/group and as leader
- Collect field data
- Develop Learning to learn
- Write report for given task/work/project
- Develop computer proficiency
- Develop observation skills

Technological Skills:

Diploma engineers should possess following intellectual and motor skills in order to satisfactorily perform duties assigned to them:

A) Intellectual skills.

- 1) Read and interpret Civil Engineering drawings.
- 2) Prepare estimates and bill of quantities.

- 3) Carryout Civil engineering survey.
- 4) Design simple civil engineering structures.
- 5) Prepare tender documents.
- 6) Plan, execution of various construction activities.
- 7) Test engineering materials, prepare reports and interpret them.
- 8) Use various civil engineering software.
- 9) Follow various standards and codes.
- 10) Maintain records in various formats.
- 11) Carry out building maintenance.
- 12) Prepare various building plans as per requirements by using appropriate byelaws.
- 13) Supervise construction work.
- 14) Select appropriate technique for quality control.

B) Motor Skills.

- 1) Prepare manual and Computer generated Civil engineering drawings.
- 2) Use survey instruments, plot survey data and prepare drawings.
- 3) Handle testing of equipments.
- 4) Lay out of Civil engineering structures.
- 5) Draw free hand sketches of Civil engineering structures.

1.6 Salient Changes in the curriculum:

- ❖ For First Semester Basic Science is divided into two parts- Basic Physics and Basic Chemistry. Theory examination of both parts as well as practical examination of both parts will be conducted on separate days. Sum of theory marks of both parts shall be considered for passing theory examination of Basic Science. Similarly it is applicable to practical examination. It is mandatory to appear for theory and practical examination of both parts. Candidate remaining absent in any examination of any section will not be declared successful for that exam head.
- ❖ For second semester Applied Science is divided into two sections- Applied Physics and Applied Chemistry where the theory examination of 50 marks each and practical examination of 25 Marks each will be conducted separately and the minimum passing marks for Applied Science will be the combination of both the sections. . It is mandatory

to appear for theory and practical examination of both parts. Candidate remaining absent in any examination of any section will not be declared successful for that exam head.

- ❖ The components of Development of Life Skills were taught in two semesters. In Development of Life Skills –I the topics related to personal development, such as Learning to Learn Skills, personality development, presentation skills etc. were included. In Development of Life Skills – II the topics related to Team Building, Leadership, group behavior etc. were covered. In the revised curriculum the scope of development of life skills has been broadened to include behavioral science component. Therefore the subject Development of Life Skills – II has been renamed and it is now included at Vth Semester in the revised curriculum under the title Behavioral Science.
- ❖ The subject of Professional Practices was introduced to integrate the skills acquired in Development of Life Skills, through technical subjects from second to sixth semester. The experience in implementing the contents of the subject shows that there are limited activities possible in second semester as the technical knowledge given to the students is very limited. Also at sixth semester the student are doing projects in which they are performing many activities included in the Professional Practices and therefore it is proposed that the subject of Professional Practices be prescribed only for three semesters viz. Third, fourth and fifth semesters.
- ❖ Introduction of Environment Studies at fourth Semester for all courses
- ❖ From the experience of implementation of Elective Subjects at V and VI semesters in last five years, it is proposed to have only one elective at the sixth semester for all courses. However the specialized courses like Medical Electronics, Electronics and Video Engineering will not have provision for electives. For elective, student will have to choose one from the given two/three subjects.
- ❖ While revising the curriculum redundant /obsolete topics/sub topics are being replaced by new/advance technology topics/sub topics.
- ❖ In Civil Engineering Group CAD and Building Materials have been added as an independent subject. Topics on Airport Engineering and Docks and Harbours have been added in the subject Transportation Engineering.

2. OBJECTIVES

2.1 Introduction

Objectives are the statements which describe the expected learning outcome. Such statements enable teachers to plan instructional process with appropriate resources. These objectives also provide a direction to frame proper questions to assess the learning outcome. During last decade there has been research on cognitive approach in psychology. This approach is based on biological structure of brain and meta-cognitive knowledge dimension. Important elements of this approach which form basics of learning are explained below.

2.2 Domains of Learning:

Learning is a process by which students develop relatively permanent change in mental associations through experience. This is how learning is defined by cognitive psychologists. Behavioral; psychologists define learning as a relatively permanent change in behavior.

There are following domains of learning:

A: Cognitive Domain relates to intellectual skills or abilities

B: Affective Domain relates to emotions, feelings, likes, dislikes etc.

C: Psychomotor Domain relates to manipulative skills of hands, legs. Eye-hand coordination in Engineering & Technology courses, endeavor is made to design curriculum with a focus on development of cognitive skills through classroom teaching. Where as manipulative (psychomotor) skills are developed in workshops, laboratories & seminars where students work individually or in a group. Development of affective skills attitudes and value is supposed to be acquired through projects and co curricular activities. These are also developed from the work culture or institutions.

How far a student has developed these abilities/skills especially from cognitive and psychomotor domains is assessed on the basis of suitable examinations. When classroom and laboratory teaching is viewed in this light, evaluation becomes an integral part of teaching – learning process.

2.3 LEVELS OF LEARNING:

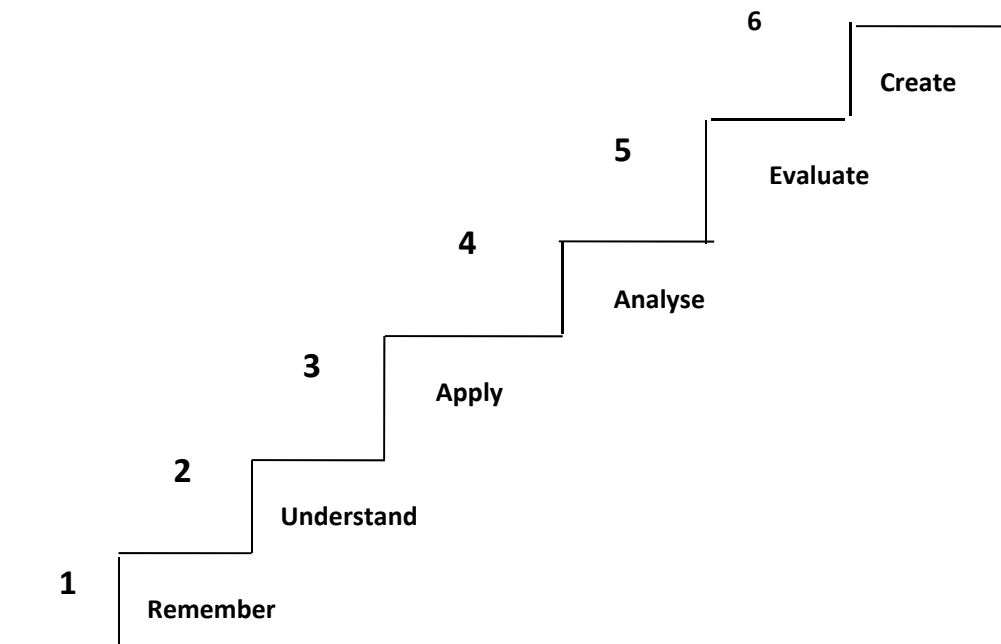
Question paper is a tool/ instrument designed to test the extent of learning of the student. Various questions set in a question paper should assess the abilities of students to respond to level of learning. Dr. Bloom a German educationist classified levels of learning in cognitive domain for the purpose of writing objectives and assessment. Dr. Bloom's revised taxonomy is based on

cognitive psychology and is two dimensional. First dimension is cognitive process dimension and other is knowledge dimension. Details of these two dimensions are given below.

2.4.1 Cognitive Domain:

Dr. Benjamin Bloom (1956) analysed questions asked in various examinations in American situation and proposed a hierarchical arrangement of instructional objectives (Intellectual abilities) tested by these questions.

The lowest level of cognitive learning achieved by a student is demonstrated by the recall of information that the student retrieves from his long term memory. So, the storage and retrieval of specific facts, concepts, principles, laws, definitions, properties, procedures etc. directly from memory was classified as a knowledge level objective. Thus questions testing memory of students were treated as at the lowest level of the hierarchy of intellectual abilities. The other levels of hierarchy proposed by Dr. Bloom in 1956 relate to the degree of information processing required in the brain needed to provide answer to a question. The various levels in the cognitive hierarchy proposed by Dr. Bloom in 1956 and further revised in 2001 are given below in the diagrammatic form.



Following are the details of each level which indicate the general and specific objectives. Further appropriate verbs are given which are useful in setting good questions. In this table only four levels are considered for diploma students.

Description of the Major Levels in the cognitive Domain (Bloom's Taxonomy)	Illustrative General Instructional Objectives	Illustrative verbs for stating specific learning outcomes
Remember – Knowledge is defined as the remembering of previously learned material. This may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required to mind of the appropriate information. This represents the lowest level of learning outcomes in the cognitive domain	Knows common terms, specific facts, basic concepts, principles, methods & procedures	Define, describe, identify label, list, match, name, outline, reproduce, select, state
Understand – This is defined as the ability to grasp the meaning of material. This may be shown by translating material from one form to another (words or numbers) by interpreting material (explaining or summarizing), and by estimating future trends (predicting consequences or effects). Draw sketches these learning outcomes go one step beyond the simple remembering of material and represent the lowest level of understanding.	Understands fact, principles Interprets verbal material, Interprets charts, tables, graphs. Translates verbal material to mathematical formula. Estimates consequences implied in data. Justifies methods & procedures.	Convert, distinguish estimate, explain, extend, generalize, give examples; infer, paraphrase, predict, rewrite, summarize, draw labeled sketches.
Apply – Application refers to the ability to use learned material in new and concrete situations. This may include the application of such things as concepts, principles, rules, methods, laws and theories. Learning outcomes in this area require a higher level of understanding than those under the level described earlier.	Applies principles to new situations. Applies theories to practical situations. Solves mathematical problem. Construct charts, graphs Demonstrates correct usage of a procedure	Change, compile, demonstrate, discover manipulate, modify operate, predict, prepare, produce, show, solve, use.
Analyze – Analysis refers to the ability to break down material into its component parts so that its organizational structure may be understood. This may include the identification of the parts, analysis of the relationship between parts, and recognition of the organizational principles involved.	Recognizes unstated assumptions and logical fallacies in reasoning. Distinguishes between facts and inferences. Evaluates relevance/	Breakdown, diagram, differentiate, discriminate, distinguish, identify illustrate, infer, outline,

Learning outcomes here represent a higher intellectual level than “understand” and apply because they require an understanding of both the content and the structural form of the material.	adequacy of data.	point out, relate, select, separate, subdivide.
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2.4.2 Categories of Knowledge Dimension

After considering the various designations of knowledge types, especially developments in cognitive psychology that have taken place since the original framework of Bloom’s taxonomy, knowledge is categorised in 4 types – Factual , Conceptual, Procedural and Meta-cognitive.

Factual Knowledge (A) is knowledge of discrete, isolated content elements. It includes knowledge of terminology and knowledge of specific details and elements. In contrast,

Conceptual Knowledge (B) is knowledge of “more complex, organised knowledge form”. It includes knowledge of classifications and categories, principles and generalizations and theories, models and structures.

Procedural Knowledge (C) is “knowledge of how to do something”. It includes knowledge of skills and algorithms, techniques and methods, as well as knowledge of criteria used to determine and/or justify “when to do what” within specific fields and disciplines.

Meta-cognitive knowledge (D) is “knowledge about cognition in general as well as awareness of and knowledge about one’s own cognition. It encompasses strategic knowledge, knowledge about cognitive tasks, including contextual and conditional knowledge; and self-knowledge”.

Assessment is required to be done on the basis of categories of knowledge and levels of learning. Table below indicates the two dimensional grid based on Blooms Taxonomy for setting questions.

Knowledge Dimension	COGNITIVE PROCESS DIMENSION			
	1 Remember	2 Understand	3 Apply	4 Analyze
A. Factual Knowledge				
B. Conceptual Knowledge				
C. Procedural Knowledge				
D. Meta-cognitive Knowledge				

2.5 Components of Curriculum:

2.5.1 Rationale: It indicates the logical basis for the inclusion of the subject in the curriculum. It also indicates the importance of the subject related to the entire curriculum.

Rationale tells the students the connection of subjects related to the study of higher level subjects and also the use in their job/profession.

2.5.2 Objectives: Objectives indicate what the student will be able to do/perform after he/she completes the study of the subject. It also in other words indicates the scope of the subject.

Objectives indicate what is achievable and hence gives direction to the student about how to study the subject, what important things are to be observed and performed during practicals.

Just as rationale indicates the use of the knowledge gained while studying the subject, objectives indicate how efficiently and effectively one can work if the objectives are fulfilled while studying the subject.

2.5.3 Learning Structure: It graphically/pictorially indicates the content of the curriculum of the subject and what is to be learnt in the subject. As you know that Cognitive Domain knowledge is divided in four components as mentioned in the Two dimensional grid. Of this Factual, Conceptual and Procedural knowledge components are identified in the curriculum of the subject along with the applications.

Facts, Concepts, Principles are used in developing procedures and applications. So these are given sequentially below procedure as Principles, Concepts and Facts in their order. Learning structure also provide an idea about how to develop the subject logically to achieve the objectives.

2.5.4 Contents: List of topics and subtopics to be included in the curriculum of the subject is given in the contents. This helps in achieving the rationale and objectives identified. Contents indicate the importance of the topics, sub topics in development of the subject and accordingly weightages in terms of Hours required to teach the subject components, so that the desired learning takes place. Marks to be allotted while testing the knowledge gained by the student are also indicated.

2.5.5 Practicals: While designing the curriculum the objectives are identified. To achieve these objectives students have to develop certain intellectual and motor skills. These skills are developed through well designed Practicals. So in the curriculum the list of the skills to be developed through Practicals is given. The list of Practicals is so developed that after performing the Practicals identified skills will be developed. Here it is necessary that the teacher gives enough opportunity to all the students to perform the practical properly to develop the skills in each one of them.

The skills will be developed if the students actually perform certain activities or tasks. Therefore it is necessary that any practical included in the curriculum necessarily involve some activities to be done by the students. So one has to think and innovate to modify the study experiments so that students will be asked to perform some activity. It could be in terms of identifying components, listing of materials used for manufacturing the components, stating importance of use of certain materials etc.

So any curriculum of a subject is so designed that it achieves the objectives of that subject as well as fulfill the objectives of the entire curriculum

3. CONTENT ANALYSIS

3.1 ComponentsofContentAnalysis:

As we have discussed earlier, any curriculum or syllabus of a SUBJECT given to the teacher is organised in terms of UNITS which include TOPICS or SUB-TOPICS as the case may be indicating the TIME in which it is expected to be taught to the students. Components of a topic or part thereof are analysed here at a micro level.

Before we begin actual teaching of any topic (lesson), we must carefully and critically analyse it so that we can plan for teaching - select appropriate media, methods and techniques of teaching and arrange the suitable resources to be required. This analysis of the content of a Topic results in identification of the following components of the content:

1. Facts
2. Concepts
3. Principles (rules, laws, theories)
4. Applications
5. Procedures
6. Skills (Psychomotor Skills), and
7. Attitudes (underlying affective behaviors as quite often these are not specifically mentioned in the curriculum, still they are to be developed lesson after lesson gradually).

When we undertake the exercise of content analysis, we ourselves understand the subject fully well and at the same time we become clear as to what we are going to teach. It also gives us an idea as to which methods of teaching and media of instruction we should prepare and use and also what resources including time we will require. This analysis will also enable us to design assignments as well as how we are going to assess students learning.

Since the nature of the components of content (1 to 7) differs from one another. These are learned by the students differently as different mental processes are involved in learning these components. The immediate implication of this varying nature of components is that these need

to be taught differently and assessed differently. For example, if you look at components 1 to 5 all of which belong to Cognitive Domain of Learning; Component 6 belongs to Psychomotor Domain and Component 7 belongs to Affective Domain (cannot be taught as these attitudes are caught), you will find that these differ from one another. The classification of human behaviors (activities) into the above three domains of learning entails the use of entirely different methods and media of instruction. Different locations of learning (classroom, laboratories, workshops, field visits) need to be selected.

Now we will discuss these components in some detail and see how each one of these should be taught and assessed differently.

3.1.1 FACTS:

These are universally accepted and commonly understood items about which there cannot be much argument and discussion. These are required only to be informed. For example: The sun rises in east and sets in the west; names of scientists and the year in which their theories were propounded; the rules and regulations of admission and examination prescribed by the University are some of the examples of facts. Sometimes, they need not be emphasised in the class as the students already know them. But information can be passed on by word of mouth, if deemed necessary.

3.1.2 CONCEPTS:

A concept is an abstraction or an idea that permits the learner to classify a variety of related phenomena into a convenient and meaningful category. Concept of something is like a picture formation of that thing which helps in conceptualizing it. Gagne says that concept learning produces a certain fundamental change in human performance that is independent of subject or content. Concepts can be divided into the following two categories:

1. Concrete Concepts: those which can be seen, touched and manipulated e.g. house, book, table, chair, cat, dog, any machine or apparatus, overhead projector, chalkboard and duster.

2. Abstract Concepts: those which cannot be seen and touched and handled but can only be imagined e.g. force, work, fractions, decimal, bending moment, moment of inertia,

friction, heat, and induction. Teaching of concrete concepts is not that difficult because the teacher can show the object physically or its picture. On the contrary, teaching of an abstract concept offers difficulty to the teacher as well as for students to understand. These concepts can be learned by heart without understanding as children mug up Nursery Rhymes without understanding even a single word. But at the stage of higher learning, this type of rote learning is not desirable. Adolescents (teenagers) and adults do not accept things without understanding.

3.1.3 Concept Attributes:

We identify a concept and understand it, once we are told about its qualities characteristics, and features. They are technically called concept attributes. While teaching a concept to our students we must spell out as many attributes as possible for better understanding of the concept.

Example: The Concept of Friction

Attributes:

1. Friction is a resistive force.
2. Frictional force acts in the direction opposite to the direction of the applied force.
3. Frictional force is more when the surfaces in contact are rough.
4. Smooth surfaces (perfect) have zero friction.
5. Frictional force is self-adjusting to a limit.

Towards the end of this Theme Paper a number of examples of concept attributes are given for your guidance.

The following questions pertaining to a concept (object or process) will be helpful in writing concept attributes:

1. What it is.
2. What are its constituent parts.
3. How it works.
4. How it is similar to and different from other known concepts.
5. What are its uses?

3.1.4 PRINCIPLES:

A principle is a statement of relationship between two or more concepts. Principles are sometimes called rules, laws or generalizations. In other words, relationship between two or more concepts which is scientific and universally true is called a Principle.

ForExample: (related concepts are underlined>)

1. Actions and reactions are equal and opposite.
2. Ohm's law $I = V/R$ is a principle, where I (Current), V (Voltage), and R (Resistance) are the concepts. While teaching a principle we must recall the concepts which it involves. These concepts might have been taught in the previous lesson. As you already know, concept learning is a prerequisite to Principle learning. Thus we recall the concepts of current, voltage and resistance by asking questions to the students. Only after that we must tell the relationship among these i.e. Ohm's Law.

3.1.5 APPLICATIONS:

Whatever principles, laws and theories have been learned are only academic exercises unless these are applied to solve a practical problem. In other words, we call this application transfer of learning to a new situation. If you recall, the process of learning dealt with in Theme Paper 2, you will appreciate that the litmus test of learning having occurred is its application in a new situation or solving a new problem.

Forexample:

1. Ohm's law can be applied to find out the unknown quantity (voltage, current, and resistance).
2. Design of a structure can be made based on related principles and theories.
3. Principles of learning and events of instruction can be applied in 'Designing a lesson Plan' and 'Presenting the lesson in the classroom'.
4. The above principles can also be applied while preparing textbooks, workbooks, learning packages and laboratory manuals to be used by the students.

3.1.6 PROCEDURES:

While analysing the content of a topic you might come across certain standard procedures which are prescribed to perform an operation or a given task. These procedures should be

clearly identified and taught accordingly not to be left to chance. We should not pre-suppose that the students understand them. We cannot afford to take these things for granted.

ForExample:

1. Procedure of setting up of an apparatus.
2. Procedure to start an engine.
3. Procedure to operate a machine (a lathe).

3.1.7SKILLS(PSYCHOMOTOR):

A skill is an ability to perform a task expertly and well. The skilled performance; must meet a pre-specified standard of acceptable performance. A skill has the following three characteristics:

1. It represents a chain of motor responses;
2. It involves the co-ordination of hand and eye movements, and
3. It requires the organization of chains into complex response patterns.

Skills could be intellectual (thinking, understanding); interactive (communication skills) and social (socialising, mixing up with others) also. But normally when we use the word skills, it refers to psychomotor skills.

ForExample:

1. Welding a butt joint,
2. Setting a theodolite at a station,
3. Making proper circuit connections, and
4. Turning a job on a lathe machine.

Laboratories and workshops of Polytechnics are the locations where these skills are developed among the students under the guidance of expert instructors *of* operators. Drill and practice are the main methods of teaching and learning these skills through model demonstrations and careful observations thereof.

Alongside developing these skills, desirable attitudes like cooperation, team work, leadership, safety, cost consciousness are also developed.

3.2 TEACHINGOFCONCEPTS;

In order to teach concepts effectively the following steps have been suggested by De Cecco & Crawford (1974).

Steps Suggested:

1. Describe the performance expected of the student after he has learned the concept.
2. Reduce the number of attributes to be learned in complex concepts and make important attributes dominant.
3. Provide the student with verbal indicators (explanation).
4. Provide positive and negative examples (non-examples) of the concept.
5. Present the examples in close succession or simultaneously.
6. Provide occasions for student responses and the reinforcement of these responses, and
7. Assess the learning of the concept.

3.3 TEACHING OF PRINCIPLES:

De Cecco & Crawford (1974) has suggested the following steps for teaching principles effectively.

Steps:

1. Describe the performance expected of the student after he has learned the principle.
2. Decide and indicate which concepts or principles the students must recall in learning the new principle.
3. Assist the student in the recall of component concepts.
4. Help the student in the recall of component concepts.
5. Help the student to combine the concepts and put them in a proper order.
6. Provide for practice of the principle and for reinforcement of student responses.
7. Assess the learning of the principle.

3.4 CONCLUSION:

To sum up, it can be said that it is essential for the teachers to develop the skills of 'Content Analysis' of their subjects. It brings content clarity among teachers themselves. More importantly, Content Analysis will be a pre-requisite for writing Instructional Objectives of the topic to be taught. You will study Instructional Objectives in a separate Theme Paper in detail. Teaching and learning process is bound to be effective once these crucial academic activities are undertaken.

4. CURRICULUM:

Course Name : All Branches of Diploma in Engineering & Technology

Course Code : AE/CE/CM/CO/CR/CS/CW/DE/EE/EP/IF/EJ/EN/ET/EV/EX/IC/IE/IS/

ME/MU/PG/PT/PS/CD/CV/ED/EI/FE/IU/MH/MI/DC/TC/TX/FG/AU

Semester : Fourth

Subject Title : Environmental Studies

Subject Code : 17401

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	--	02	01	50#*	--	--	25 @	75

#* Online Theory Examination

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

Rationale:

Environment essentially comprises of our living ambience, which gives us the zest and verve in all our activities. The turn of the twentieth century saw the gradual onset of its degradation by our callous deeds without any concern for the well being of our surrounding we are today facing a grave environmental crisis. The unceasing industrial growth and economic development of the last 300 years or so have resulted in huge ecological problems such as overexploitation of natural resources, degraded land, disappearing forests, endangered species, dangerous toxins, global warming etc.

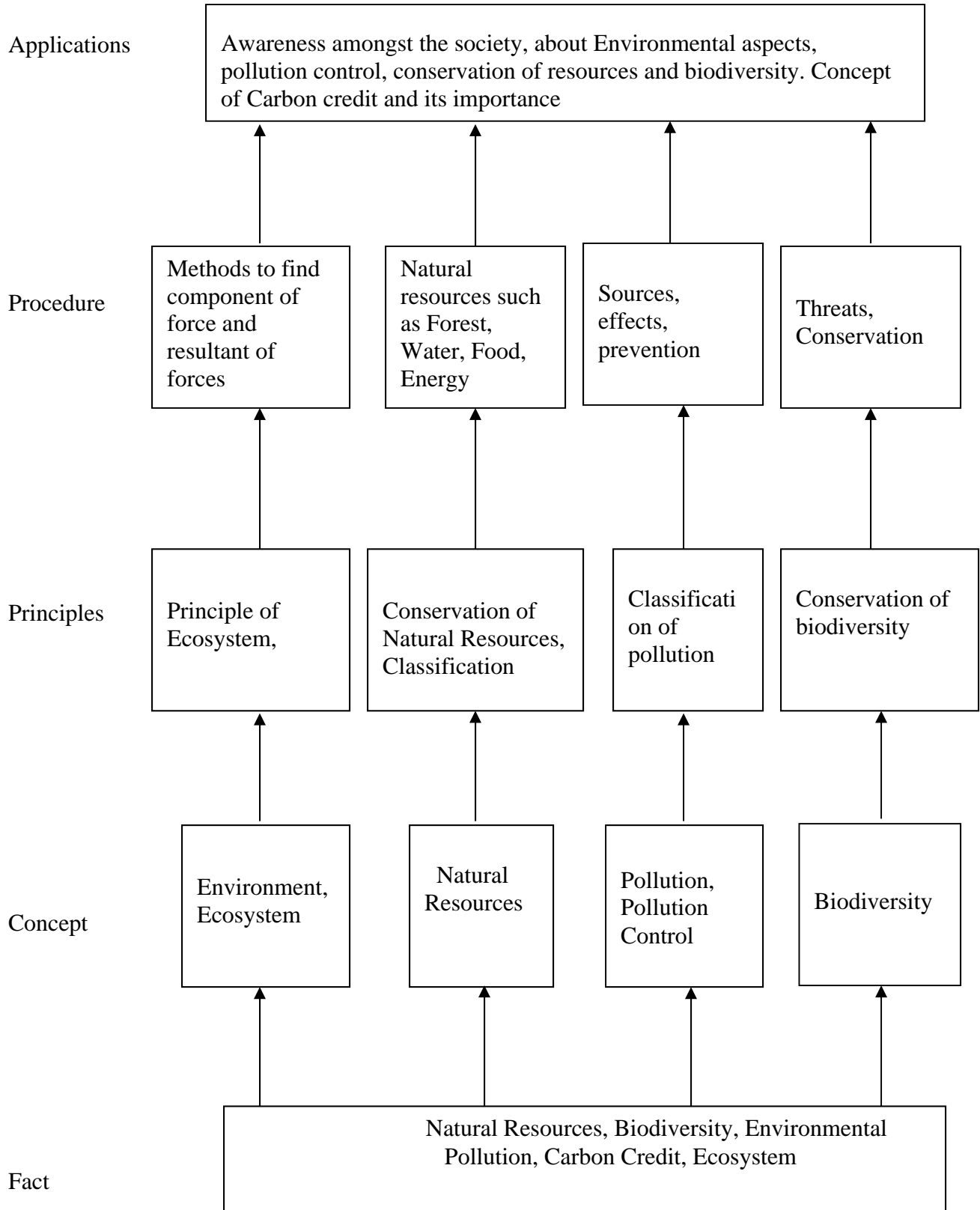
It is therefore necessary to study environmental issues to realize how human activities affect the environment and what could be possible remedies or precautions which need to be taken to protect the environment.

The curriculum covers the aspects about environment such as Environment and Ecology, Environmental impacts on human activities, Water resources and water quality, Mineral resources and mining, Forests, etc.

General Objectives: The student will be able to,

1. Understand importance of environment
2. Know key issues about environment
3. Understands the reasons for environment degradation
4. Know aspects about improvement methods
5. Know initiatives taken by the world bodies to restrict and reduce degradation

Learning Structure:



Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Nature of Environmental Studies</p> <p>Specific Objectives:</p> <ul style="list-style-type: none">➤ Define the terms related to Environmental Studies➤ State importance of awareness about environment in general public <p>Contents:</p> <ul style="list-style-type: none">• Definition, Scope and Importance of the environmental studies• Importance of the studies irrespective of course• Need for creating public awareness about environmental issues	01	04
<p>Topic 2: Natural Resources and Associated Problems</p> <p>Specific Objectives:</p> <ul style="list-style-type: none">➤ Define natural resources and identify problems associated with them➤ Identify uses and their overexploitation➤ Identify alternate resources and their importance for environment <p>Contents:</p> <p>2.1 Renewable and Non renewable resources</p> <ul style="list-style-type: none">• Definition• Associated problems <p>2.2 Forest Resources</p> <ul style="list-style-type: none">• General description of forest resources• Functions and benefits of forest resources• Effects on environment due to deforestation, Timber extraction, Building of dams, waterways etc. <p>2.3 Water Resources</p> <ul style="list-style-type: none">• Hydrosphere: Different sources of water• Use and overexploitation of surface and ground water• Effect of floods, draught, dams etc. on water resources and community <p>2.4 Mineral Resources:</p> <ul style="list-style-type: none">• Categories of mineral resources• Basics of mining activities• Mine safety	04	10

<ul style="list-style-type: none"> • Effect of mining on environment <p>2.5 Food Resources:</p> <ul style="list-style-type: none"> • Food for all • Effects of modern agriculture • World food problem 		
<p>Topic 3. Ecosystems</p> <ul style="list-style-type: none"> • Concept of Ecosystem • Structure and functions of ecosystem • Energy flow in ecosystem • Major ecosystems in the world 	01	04
<p>Topic 4. Biodiversity and Its Conservation</p> <ul style="list-style-type: none"> • Definition of Biodiversity • Levels of biodiversity • Value of biodiversity • Threats to biodiversity • Conservation of biodiversity 	02	06
<p>Topic 5. Environmental Pollution</p> <ul style="list-style-type: none"> • Definition • Air pollution: Definition, Classification, sources, effects, prevention • Water Pollution: Definition, Classification, sources, effects, prevention • Soil Pollution: Definition, sources, effects, prevention • Noise Pollution: Definition, sources, effects, prevention 	03	08
<p>Topic 6. Social Issues and Environment</p> <ul style="list-style-type: none"> • Concept of development, sustainable development • Water conservation, Watershed management, Rain water harvesting: Definition, Methods and Benefits • Climate Change, Global warming, Acid rain, Ozone Layer Depletion, Nuclear Accidents and Holocaust: Basic concepts and their effect on climate • Concept of Carbon Credits and its advantages 	03	10
<p>Topic 7. Environmental Protection</p> <p>Brief description of the following acts and their provisions:</p> <ul style="list-style-type: none"> • Environmental Protection Act • Air (Prevention and Control of Pollution) Act • Water (Prevention and Control of Pollution) Act • Wildlife Protection Act 	02	08

<ul style="list-style-type: none"> • Forest Conservation Act Population Growth: Aspects, importance and effect on environment • Human Health and Human Rights 		
Total	16	50

Practical:

Skills to be developed:

Intellectual Skills:

1. Collection of information, data
2. Analysis of data
3. Report writing

Motor Skills:

1. Presentation Skills
2. Use of multi media

List of Projects:

Note: Any one project of the following:

1. Visit to a local area to document environmental assets such as river / forest / grassland / hill / mountain
2. Visit to a local polluted site: Urban/Rural/Industrial/Agricultural
3. Study of common plants, insects, birds
4. Study of simple ecosystems of ponds, river, hill slopes etc

Prepare a project report on the findings of the visit illustrating environment related facts, analysis and conclusion. Also suggest remedies to improve environment.

Learning Resources:

Books:

Sr. No.	Author	Title	Publisher
01	Anindita Basak	Environmental Studies	Pearson Education
02	R. Rajgopalan	Environmental Studies from Crises to Cure	Oxford University Press
03	Dr. R. J. Ranjit Daniels, Dr. Jagdish Krishnaswamy	Environmental Studies	Wiley India

5. IMPLEMENTATION STRATEGY:

5.1 Planning of Lectures for a Semester with Content Detailing:

Topic 1	<p>Name: Nature of Environmental Studies</p> <p>Teacher shall implement the methodology/ techniques mentioned in the following table while teaching the topics. Along with this teacher may use additional/alternative methods to make students learning meaningful.</p> <p>e.g.</p> <table border="1"><thead><tr><th>Knowledge Category</th><th>Example/s of category</th><th>Teaching methodology</th></tr></thead><tbody><tr><td>FACT</td><td>Interdisciplinary field (Multidisciplinary Nature of Environmental Studies), living, non-living, surrounding</td><td>Explain the interdisciplinary nature of this subject, show relation with surroundings</td></tr><tr><td>CONCEPT</td><td>Environment, flora, fauna, ecosystem, CFC, consumers, producers, habitat, Kyoto protocol</td><td>Explain all the terms related to EST</td></tr><tr><td>PRINCIPLE</td><td>Scope and Importance of the environmental studies</td><td>Demonstrate through appropriate ppt or a video clip</td></tr><tr><td>PROCEDURE</td><td>Need for creating public awareness about</td><td>Demonstrate through models/PPT or a video</td></tr></tbody></table>	Knowledge Category	Example/s of category	Teaching methodology	FACT	Interdisciplinary field (Multidisciplinary Nature of Environmental Studies), living, non-living, surrounding	Explain the interdisciplinary nature of this subject, show relation with surroundings	CONCEPT	Environment, flora, fauna, ecosystem, CFC, consumers, producers, habitat, Kyoto protocol	Explain all the terms related to EST	PRINCIPLE	Scope and Importance of the environmental studies	Demonstrate through appropriate ppt or a video clip	PROCEDURE	Need for creating public awareness about	Demonstrate through models/PPT or a video
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		environmental issues	clip
	APPLICATION	Learn about environment and its degradation	<p>Exercises as self learning about the environment:</p> <p>Students are expected to assess the level of damage to the environment due to their actions that have happened during any one day, any one week and the last year. Then estimate the damage they have caused during lifetime if they continue in their present ways.</p> <p>Use the following examples for the above exercise:</p> <p>Example – Plastic: Plastic bags, plastic ball pens Recall about all the articles you use daily that are made from plastic. Prepare a list of the plastic articles you usually use. How can you decrease the amount of plastic you use? What effects does plastic have on our environment? Where did the plastic come from/ how is it manufactured? What happens to it when you discard it away/ where does it go?</p> <p>Example – Fossil fuels:</p>

			<p>How much do you use daily, weekly annually? Can you decrease your consumption? What effect does it have on the air we inhale? When we leave a motorbike or car running during a traffic stop, we do not usually remember that the fuel we are wasting is a part of a non-renewable resource that the earth cannot reform. Once all the fossil fuels are burnt off, it will mean the end of oil as a source of energy. Only if each of us contributes our part in conserving fossil based energy can we make it last longer on earth.</p> <p>Example – Water:</p> <p>How much do you really require for your uses, as against how much you waste when you: (a) Brush your teeth? (b) Have a bath? (c) Wash clothes? (d) Wash the scooter or car? Where did the water come from? What is its actual source? How has it reached you? Where will the waste water go? Do you feel you should change the way you use water? How can you change your habits so</p>
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that it is more sustainable?

Learning Resources::

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04	ErachBharucha	Textbook Of Environmental Studies	Orient Blackswan

Teaching Aids: LCD Projector and a PC

PPT with Sample: PPT on importance of Environmental Studies

Websites:

1. World Wide Fund for Nature (WWF-I), New Delhi: <http://www.wwfindia.org>
2. Center for Science and Environment (CSE), New Delhi:<http://www.cseindia.org/>
3. Centre for Environment Education (CEE), Ahmedabad:<http://ceeindia.org/cee/index.html>
4. UttarkhandSevaNidhi (UKSN), Almora:<http://usnpss.org/>
5. BharatiVidyapeeth Institute of Environment Education and Research (BVIEER), Pune: ieer.bharatividyaapeeth.edu/default.aspx
6. Salim Ali Center for Ornithology and Natural History (SACON), Coimbatore:<http://www.sacon.in/>

	<p>7. Wildlife Institute of India (WII), Dehradun: http://www.wii.gov.in/</p> <p>8. Botanical Survey of India (BSI): http://164.100.52.111/</p> <p>9. Zoological Survey of India (ZSI): http://zsi.gov.in/</p> <p>10. Central Pollution Control Board: http://www.cpcb.nic.in/</p> <p>11. National Environmental Engineering Research Institute : http://neeri.res.in/</p> <p>12. Ministry of Environment and Forest: http://envfor.nic.in/</p>
Lecture No.	Topic/ Subtopic to be covered
1	<ul style="list-style-type: none"> • Definition, Scope and Importance of the environmental studies • Importance of the studies irrespective of course • Need for creating public awareness about environmental issues

Topic 2	<p>Name: Natural Resources and Associated Problems</p> <p>Teacher shall implement the methodology/ techniques mentioned in the following table while teaching the topics. Along with this teacher may use additional/alternative methods to make students learning meaningful.</p> <p>e.g.</p> <table border="1"> <thead> <tr> <th>Knowledge Category</th> <th>Example/s of category</th> <th>Teaching methodology</th> </tr> </thead> <tbody> <tr> <td>FACT</td> <td>Forest, water, minerals and food resources</td> <td>State the facts about these resources</td> </tr> <tr> <td>CONCEPT</td> <td>Renewable and Non renewable resource</td> <td>Explain all the terms related to these resources</td> </tr> <tr> <td>PRINCIPLE</td> <td>Functions and benefits of forest resources, use and overexploitation of surface and ground water, basics of mining activities, mine safety, food for all, modern agriculture effects</td> <td>Demonstrate through appropriate ppt or a video clip</td> </tr> <tr> <td>PROCEDURE</td> <td>Identification of renewable and Non renewable resource</td> <td>Give the following activities (assignments) to the students: Take an object/finished product and identified resources that might</td> </tr> </tbody> </table>			Knowledge Category	Example/s of category	Teaching methodology	FACT	Forest, water, minerals and food resources	State the facts about these resources	CONCEPT	Renewable and Non renewable resource	Explain all the terms related to these resources	PRINCIPLE	Functions and benefits of forest resources, use and overexploitation of surface and ground water, basics of mining activities, mine safety, food for all, modern agriculture effects	Demonstrate through appropriate ppt or a video clip	PROCEDURE	Identification of renewable and Non renewable resource	Give the following activities (assignments) to the students: Take an object/finished product and identified resources that might
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PROCEDURE	Identification of renewable and Non renewable resource	Give the following activities (assignments) to the students: Take an object/finished product and identified resources that might																

			<p>have consumed in producing that object. Classify the resources</p> <p>Think of all the things that you do in a day. List these activities and identify the main resources used during these activities.</p> <p>What can you do to reduce waste, reuse articles that you normally throw away, what recycled materials can you use?</p> <p>Think of the various energy sources you utilize everyday. How could you decrease their use?</p>
APPLICATION		<p>Effects on environment due to deforestation, Timber extraction, Building of dams, waterways etc</p> <p>Effect of floods, draught, dams etc. on water resources and community</p> <p>Effect of mining on environment</p> <p>World food problem</p>	<p>Show the video clips/ppt about these in class</p>
<p>Learning Resources::</p> <p>Books:</p>			

Sr. No.	Author	Title	Publisher
01	AninditaBasak	Environmental Studies	Pearson Education
02	R. Rajgopalan	Environmental Studies from Crises to Cure	Oxford University Press
03	Dr. R. J. Ranjit Daniels, Dr.JagdishKrishnaswamy	Environmental Studies	Wiley India
04	ErachBharucha	Textbook Of Environmental Studies	Orient Blackswan

Teaching Aids: LCD Projector and a PC

PPT with Sample: PPT on Functions and benefits of forest resources, use and overexploitation of surface and ground water, basics of mining activities, mine safety, food for all, modern agriculture effects

Websites:

1. World Wide Fund for Nature (WWF-I), New Delhi: <http://www.wwfindia.org>
2. Center for Science and Environment (CSE), New Delhi:<http://www.cseindia.org/>
3. Centre for Environment Education (CEE), Ahmedabad:<http://ceeindia.org/cee/index.html>
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6. Salim Ali Center for Ornithology and Natural History (SACON), Coimbatore:<http://www.sacon.in/>
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8. Botanical Survey of India (BSI): <http://164.100.52.111/>

	<p>9. Zoological Survey of India (ZSI): http://zsi.gov.in/</p> <p>10. Central Pollution Control Board: http://www.cpcb.nic.in/</p> <p>11. National Environmental Engineering Research Institute :http://neeri.res.in/</p> <p>12. Ministry of Environment and Forest: http://envfor.nic.in/</p>
Lecture No.	Topic/ Subtopic to be covered
1	<p>2.1 Renewable and Non renewable resources</p> <ul style="list-style-type: none"> • Definition • Associated problems <p>2.2 Forest Resources</p> <ul style="list-style-type: none"> • General description of forest resources • Functions and benefits of forest resources • Effects on environment due to deforestation, Timber extraction, Building of dams, waterways etc.
2	<p>2.3 Water Resources</p> <ul style="list-style-type: none"> • Hydrosphere: Different sources of water • Use and overexploitation of surface and ground water • Effect of floods, draught, dams etc. on water resources and community
3	<p>2.4 Mineral Resources:</p> <ul style="list-style-type: none"> • Categories of mineral resources • Basics of mining activities • Mine safety • Effect of mining on environment
4	<p>2.5 Food Resources:</p> <ul style="list-style-type: none"> • Food for all • Effects of modern agriculture <p>World food problem</p>

Topic 3	<p>Name: Ecosystems</p> <p>Teacher shall implement the methodology/ techniques mentioned in the following table while teaching the topics. Along with this teacher may use additional/alternative methods to make students learning meaningful.</p> <p>e.g.</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 33%;">Knowledge Category</td> <td style="width: 33%;">Example/s of category</td> <td style="width: 33%;">Teaching methodology</td> </tr> </table>			Knowledge Category	Example/s of category	Teaching methodology
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FACT	Water, Carbon, Nitrogen, Oxygen and energy cycles. Producers, consumer and decomposers	State the facts about these.
CONCEPT	Food chains, webs and ecological pyramids	Explain all the terms related to these
PRINCIPLE	Structure and functions of ecosystem Energy flow in ecosystem	Demonstrate through appropriate ppt or a video clip or lecture
PROCEDURE	Major ecosystems in the world	Give the following activities (assignments) to the students: Write an essay on the major ecosystems in the world
APPLICATION	Ecological Pyramid	Assignment: Take any ecosystem (for example a pond) and identify the primary producer, and primary, secondary, tertiary consumers and depict these in a pyramid.

Learning Resources::

Books:

Sr. No.	Author	Title	Publisher
01	AninditaBasak	Environmental Studies	Pearson Education
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03	Dr. R. J. Ranjit Daniels, Dr.JagdishKrishnaswamy	Environmental Studies	Wiley India
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Lecture No.	Topic/ Subtopic to be covered
1	<ul style="list-style-type: none"> ● Concept of Ecosystem ● Structure and functions of ecosystem ● Energy flow in ecosystem ● Major ecosystems in the world

Topic 4

Name: **Biodiversity and Its Conservation**

Teacher shall implement the methodology/ techniques mentioned in the following table while teaching the topics. Along with this teacher may use additional/alternative methods to make students learning meaningful.

e.g.

Knowledge Category	Example/s of category	Teaching methodology
FACT	Biodiversity, Genetic diversity, Species diversity,	State the facts about these.
CONCEPT	Value of biodiversity	Explain all the terms related to the value of biodiversity
PRINCIPLE	Threats to biodiversity	Demonstrate through appropriate ppt or a video clip or lecture
PROCEDURE	In situ Conservation Strategies, Ex-situ Conservation Strategies	Give the following activities (assignments) to the students: Ask students to write about any one conservation strategy that is being adopted in India (for example wild life sanctuaries, national parks etc.)
APPLICATION	Hybridization, genetic pollution/erosion and food security, Climate change, Human overpopulation	Assignment: Write an essay on the threats to Biodiversity

Learning Resources::

Books:

Sr. No.	Author	Title	Publisher
01	AninditaBasak	Environmental Studies	Pearson Education
02	R. Rajgopalan	Environmental Studies from Crises to Cure	Oxford University Press
03	Dr. R. J. Ranjit Daniels, Dr.JagdishKrishnaswamy	Environmental Studies	Wiley India

	04	ErachBharucha	Textbook Of Environmental Studies	Orient Blackswan
<p>Teaching Aids: LCD Projector and a PC</p> <p>PPT with Sample: PPT on Threats to biodiversity</p> <p>Websites:</p> <ol style="list-style-type: none"> 1. World Wide Fund for Nature (WWF-I), New Delhi: http://www.wwfindia.org 2. Center for Science and Environment (CSE), New Delhi:http://www.cseindia.org/ 3. Centre for Environment Education (CEE), Ahmedabad:http://ceeindia.org/cee/index.html 4. UttarkhandSevaNidhi (UKSN), Almora:http://usnpss.org/ 5. BharatiVidyapeeth Institute of Environment Education and Research (BVIEER), Pune: ieer.bharatividyapeeth.edu/default.aspx 6. Salim Ali Center for Ornithology and Natural History (SACON), Coimbatore:http://www.sacon.in/ 7. Wildlife Institute of India (WII), Dehradun:http://www.wii.gov.in/ 8. Botanical Survey of India (BSI): http://164.100.52.111/ 9. Zoological Survey of India (ZSI): http://zsi.gov.in/ 10. Central Pollution Control Board: http://www.cpcb.nic.in/ 11. National Environmental Engineering Research Institute :http://neeri.res.in/ 12. Ministry of Environment and Forest: http://envfor.nic.in/ 				
Lecture No.	Topic/ Subtopic to be covered			
1	<ul style="list-style-type: none"> • Definition of Biodiversity • Levels of biodiversity • Value of biodiversity 			
2	<ul style="list-style-type: none"> • Threats to biodiversity 			

	<ul style="list-style-type: none"> • Conservation of biodiversity
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Topic 5	<p>Name: Environmental Pollution</p> <p>Teacher shall implement the methodology/ techniques mentioned in the following table while teaching the topics. Along with this teacher may use additional/alternative methods to make students learning meaningful.</p> <p>e.g.</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 33%;">Knowledge Category</th> <th style="width: 33%;">Example/s of category</th> <th style="width: 33%;">Teaching methodology</th> </tr> </thead> <tbody> <tr> <td>FACT</td> <td>Definitions of air, water, land and noise pollution</td> <td>State the facts about these.</td> </tr> <tr> <td>CONCEPT</td> <td>Pollution, sources, control and prevention</td> <td>Explain all the terms related to the value of biodiversity</td> </tr> <tr> <td>PRINCIPLE</td> <td>Classification and sources of pollution</td> <td>Demonstrate through appropriate ppt or a video clip or lecture</td> </tr> <tr> <td>PROCEDURE</td> <td>Control of pollution</td> <td>Give the following activities (assignments) to the students: Ask students to write about the procedures and methods of controlling all four types of pollution</td> </tr> <tr> <td>APPLICATION</td> <td>Effects of pollution</td> <td>Assignment: Write an essay on how to minimize the effects of pollution</td> </tr> </tbody> </table> <p>Learning Resources::</p> <p>Books:</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 10%;">Sr. No.</th> <th style="width: 30%;">Author</th> <th style="width: 30%;">Title</th> <th style="width: 30%;">Publisher</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>AninditaBasak</td> <td>Environmental Studies</td> <td>Pearson Education</td> </tr> <tr> <td>02</td> <td>R. Rajgopalan</td> <td>Environmental Studies from Crises to Cure</td> <td>Oxford University Press</td> </tr> <tr> <td>03</td> <td>Dr. R. J. Ranjit Daniels, Dr.JagdishKrishnaswam</td> <td>Environmental Studies</td> <td>Wiley India</td> </tr> </tbody> </table>			Knowledge Category	Example/s of category	Teaching methodology	FACT	Definitions of air, water, land and noise pollution	State the facts about these.	CONCEPT	Pollution, sources, control and prevention	Explain all the terms related to the value of biodiversity	PRINCIPLE	Classification and sources of pollution	Demonstrate through appropriate ppt or a video clip or lecture	PROCEDURE	Control of pollution	Give the following activities (assignments) to the students: Ask students to write about the procedures and methods of controlling all four types of pollution	APPLICATION	Effects of pollution	Assignment: Write an essay on how to minimize the effects of pollution	Sr. No.	Author	Title	Publisher	01	AninditaBasak	Environmental Studies	Pearson Education	02	R. Rajgopalan	Environmental Studies from Crises to Cure	Oxford University Press	03	Dr. R. J. Ranjit Daniels, Dr.JagdishKrishnaswam	Environmental Studies	Wiley India
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<p>Teaching Aids: LCD Projector and a PC</p> <p>PPT with Sample: PPT on Classification and sources of pollution</p> <p>Websites:</p> <ol style="list-style-type: none"> 1. World Wide Fund for Nature (WWF-I), New Delhi: http://www.wwfindia.org 2. Center for Science and Environment (CSE), New Delhi:http://www.cseindia.org/ 3. Centre for Environment Education (CEE), Ahmedabad:http://ceeindia.org/cee/index.html 4. UttarkhandSevaNidhi (UKSN), Almora:http://usnpss.org/ 5. BharatiVidyapeeth Institute of Environment Education and Research (BVIEER), Pune: ieer.bharatividyapeeth.edu/default.aspx 6. Salim Ali Center for Ornithology and Natural History (SACON), Coimbatore:http://www.sacon.in/ 7. Wildlife Institute of India (WII), Dehradun:http://www.wii.gov.in/ 8. Botanical Survey of India (BSI): http://164.100.52.111/ 9. Zoological Survey of India (ZSI): http://zsi.gov.in/ 10. Central Pollution Control Board: http://www.cpcb.nic.in/ 11. National Environmental Engineering Research Institute :http://neeri.res.in/ 12. Ministry of Environment and Forest: http://envfor.nic.in/ 			
Lecture No.	Topic/ Subtopic to be covered		
1	<ul style="list-style-type: none"> • Definition 		

	<ul style="list-style-type: none"> • Air pollution: Definition, Classification, sources, effects, prevention
2	<ul style="list-style-type: none"> • Water Pollution: Definition, Classification, sources, effects, prevention
3	<ul style="list-style-type: none"> • Soil Pollution: Definition, sources, effects, prevention • Noise Pollution: Definition, sources, effects, prevention

Topic 6	Name: Social Issues and Environment	
	<p>Teacher shall implement the methodology/ techniques mentioned in the following table while teaching the topics. Along with this teacher may use additional/alternative methods to make students learning meaningful.</p> <p>e.g.</p>	
	Knowledge Category	Example/s of category
	FACT	Definitions of Global warming, Acid rain, Ozone Layer Depletion, Nuclear Accidents and Holocaust
	CONCEPT	Development, Sustainable development, Water conservation, Watershed management, Rain water harvesting, Carbon Credits
	PRINCIPLE	Principles of Watershed management, Rain water harvesting, Carbon Credits and Sustainable development
PROCEDURE	Carbon credit trading	
APPLICATION	Effects of carbon credit trading on air pollution	
		<p>State the facts about these.</p> <p>Explain all these concepts</p> <p>Demonstrate through appropriate ppt or a video clip or lecture</p> <p>Give the following activities (assignments) to the students:</p> <p>Ask students to write about the procedures of trading in carbon credits</p> <p>Assignment:</p>

	control	Write an essay on how carbon credit concept is helping in minimizing the pollution																				
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<p>Teaching Aids: LCD Projector and a PC</p> <p>PPT with Sample: PPT on Principles of Watershed management, Rain water harvesting, Carbon Credits and Sustainable development</p> <p>Websites:</p> <ol style="list-style-type: none"> 1. World Wide Fund for Nature (WWF-I), New Delhi: http://www.wwfindia.org 2. Center for Science and Environment (CSE), New Delhi: http://www.cseindia.org/ 3. Centre for Environment Education (CEE), Ahmedabad:http://ceeindia.org/cee/index.html 4. UttarkhandSevaNidhi (UKSN), Almora:http://usnpss.org/ 5. BharatiVidyapeeth Institute of Environment Education and Research 																						

	<p>(BVIIEER), Pune: ieer.bharativedyapeeth.edu/default.aspx</p> <p>6. Salim Ali Center for Ornithology and Natural History (SACON), Coimbatore: http://www.sacon.in/</p> <p>7. Wildlife Institute of India (WII), Dehradun: http://www.wii.gov.in/</p> <p>8. Botanical Survey of India (BSI): http://164.100.52.111/</p> <p>9. Zoological Survey of India (ZSI): http://zsi.gov.in/</p> <p>10. Central Pollution Control Board: http://www.cpcb.nic.in/</p> <p>11. National Environmental Engineering Research Institute : http://neeri.res.in/</p> <p>12. Ministry of Environment and Forest: http://envfor.nic.in/</p>
Lecture No.	Topic/ Subtopic to be covered
1	<ul style="list-style-type: none"> • Concept of development, sustainable development • Water conservation, Watershed management, Rain water harvesting: Definition, Methods and Benefits
2	<ul style="list-style-type: none"> • Climate Change, Global warming, Acid rain, Ozone Layer Depletion, Nuclear Accidents and Holocaust: Basic concepts and their effect on climate
3	<ul style="list-style-type: none"> • Concept of Carbon Credits and its advantages

Topic 7	<p>Name: Environmental Protection</p> <p>Teacher shall implement the methodology/ techniques mentioned in the following table while teaching the topics. Along with this teacher may use additional/alternative methods to make students learning meaningful.</p> <p>e.g.</p> <table border="1"> <thead> <tr> <th>Knowledge Category</th> <th>Example/s of category</th> <th>Teaching methodology</th> </tr> </thead> <tbody> <tr> <td>FACT</td> <td>Definitions of Act, Law, Statute, Ordinance</td> <td>Differentiate among these.</td> </tr> <tr> <td>CONCEPT</td> <td>Enactment</td> <td>Explain about it</td> </tr> <tr> <td>PRINCIPLE</td> <td>Principles of Environmental Protection Act</td> <td>Demonstrate through appropriate ppt or a video clip or lecture</td> </tr> </tbody> </table>			Knowledge Category	Example/s of category	Teaching methodology	FACT	Definitions of Act, Law, Statute, Ordinance	Differentiate among these.	CONCEPT	Enactment	Explain about it	PRINCIPLE	Principles of Environmental Protection Act	Demonstrate through appropriate ppt or a video clip or lecture
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	<p>Air (Prevention and Control of Pollution) Act</p> <p>Water (Prevention and Control of Pollution) Act</p> <p>Wildlife Protection Act</p> <p>Forest Conservation Act</p> <p>Population Growth</p> <p>Human Health and Human Rights</p>	
PROCEDURE	Environmental Clearance	<p>Give the following activities (assignments) to the students:</p> <p>Ask students to write about the procedure of getting the Environmental Clearance from Ministry of Environment and Forest</p>
APPLICATION	All laws as mentioned above	<p>Assignment:</p> <p>Write an essay on “In what situations a particular act comes into effect”.</p>

Learning Resources::

Books:

Sr. No.	Author	Title	Publisher
01	AninditaBasak	Environmental Studies	Pearson Education
02	R. Rajgopalan	Environmental Studies from Crises to Cure	Oxford University Press
03	Dr. R. J. Ranjit Daniels, Dr.JagdishKrishnaswam	Environmental Studies	Wiley India

	y		
04	ErachBharucha	Textbook Of Environmental Studies	Orient Blackswan
<p>Teaching Aids: LCD Projector and a PC</p> <p>PPT with Sample: PPT on summary of all acts.</p> <p>Websites:</p> <ol style="list-style-type: none"> 1. World Wide Fund for Nature (WWF-I), New Delhi: http://www.wwfindia.org 2. Center for Science and Environment (CSE), New Delhi:http://www.cseindia.org/ 3. Centre for Environment Education (CEE), Ahmedabad:http://ceeindia.org/cee/index.html 4. UttarkhandSevaNidhi (UKSN), Almora:http://usnpss.org/ 5. BharatiVidyapeeth Institute of Environment Education and Research (BVIEER), Pune: ieer.bharatividyapeeth.edu/default.aspx 6. Salim Ali Center for Ornithology and Natural History (SACON), Coimbatore:http://www.sacon.in/ 7. Wildlife Institute of India (WII), Dehradun:http://www.wii.gov.in/ 8. Botanical Survey of India (BSI): http://164.100.52.111/ 9. Zoological Survey of India (ZSI): http://zsi.gov.in/ 10. Central Pollution Control Board: http://www.cpcb.nic.in/ 11. National Environmental Engineering Research Institute :http://neeri.res.in/ 12. Ministry of Environment and Forest: http://envfor.nic.in/ 			
Lecture No.	Topic/ Subtopic to be covered		
1	<p>Brief description of the following acts and their provisions:</p> <ul style="list-style-type: none"> • Environmental Protection Act • Air (Prevention and Control of Pollution) Act 		

	<ul style="list-style-type: none"> • Water (Prevention and Control of Pollution) Act
2	<ul style="list-style-type: none"> • Wildlife Protection Act • Forest Conservation Act • Population Growth: Aspects, importance and effect on Environment • Human Health and Human Rights

5.2 Planning and Conduct of Test:

- The time table and sample test paper for the test should be displayed minimum 10 days before the test.
- Each test will be of 25 marks.
- First test should cover about 40% of curriculum and second test should cover remaining curriculum.
- Format for question paper should be as per the sample question paper supplied by MSBTE.
- Guidelines for Setting Class Test Question Paper:

- The questions shall be MCQs carrying one mark each

5.3 Details about conduct of assignments:

- Assignments shall be given to the students in each topic and shall be submitted by the students in the next class for assessment/grading.
- If any student fails to submit the assignment on the specified date, a make-up date shall be announced for the late submission

5.4 Strategies for Conduct of Practical:

5.4.1 Suggestions for effective conduct of practical and assessment:

- Assessment of assignments and MCQs on topics and make-up topic tests and assignments, if any, shall be during practical hours.
- There shall be seven topic tests as MCQs and number of questions shall be decided by the teacher.
- All assignments as mentioned in the teacher's guide (implementation strategy) are compulsory and shall carry marks.

5.4.2 Preparation for conduct of practical

- Three projects as mentioned in syllabus shall be carried out at an appropriate interval of time and shall be guided by the subject teacher.
- Teacher must accompany the students during their visits for the projects.

6. Mode of assessment:

6.1. Class Test:

- There will be two tests each of 25 marks.
- The tests will be conducted as per the MSBTE schedule.
- Teacher should prepare model answer of class test question papers.
- After completion of test, subject teacher should display model answer on Department Notice Board.
- Teacher should show the answer paper of class test to the student and discuss about the mistakes.
- Teacher should maintain the record of class test as per MSBTE norms (CIAAN)

6.1.1 Sample Test Papers:

Sample Test Paper -1

Roll No.				
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17401

Course Name :All branches

Course Code : All Branches

Semester : Fourth

Subject Title :Environmental Studies

Marks: 25

Time: 1 hour

Instructions:

1. All questions are compulsory and multiple choice questions
2. Only one response is correct in each question
3. All question carry equal mark i.e. One mark per question
4. There is no negative marking

1. Political decision are made with respect to political jurisdictions; environmental problems

- i) often transcend these jurisdictions
- ii) respect political boundaries
- iii) often have little to do with regional economic decisions
- iv) none of the above.

2. Which of the following follow the concept of sustainable development?

- (1) Fishing the mature fish instead of the young fish.
- (2) Using wind power instead of burning coal to generate electricity.
- (3) The prohibition of trading endangered species.

- i) (1) and (2) only
- ii) (1) and (3) only
- iii) (2) and (3) only
- iv) (1), (2) and (3)

3. World Environment Day is celebrated on:

- i) 5th June
- ii) 1st July
- iii) 1st December
- iv) 15th September

4. He is known for his “Chipko Movement”

- i) AtalBehari
- ii) Kuldeepsingh
- iii) SunderlalBahuguna
- iv) M. C. Mehta

5. The death of the last individual of a species is called_____.

- i) extinction
- ii) endanger
- iii) neither i) nor ii)
- iv) diversity

6. Among the given options, which one is not correct for the use of large amount of fertilisers and pesticides ?

- i) They are eco-friendly
- ii) They turn the fields barren after some time
- iii) They adversely affect the useful component from the soil
- iv) They destroy the soil fertility

7. Which is not true?

- i) Lithosphere includes the crust and the uppermost mantle
- ii) Lithosphere is underlain by the asthenosphere
- iii) Lithosphere provides timber
- iv) lithosphere is broken into tectonic plates

8. Demand for a resource does not change with the change in_____

- i) idea
- ii) need
- iii) technology
- iv) economy

9. Which of the following is a renewable resource?

- i) salmon population that is farm raised
- ii) sulfur
- iii) light sweet crude oil shipped from Saudi Arabia
- iv) iron ore that is commercially mined

10. Fertile soil is always a renewable resource.

- i) True

ii) False

11. Oxygen is returned to the atmosphere mainly by_____

- i) respiration
- ii) photosynthesis
- iii) fungi
- iv) burning of fuels

12. A renewable resource is a resource which is replaced_____

- i) naturally
- ii) by human
- iii) by animals
- iv) all of the above

13. Progress that meets the needs of the present without compromising the ability of future generations to meet their own needs is

- i)the tragedy of commons.
- ii)sustainable development.
- iii)net primary productivity (NPP).
- iv)the impossibility theorem.

14. Percentage of total water found as fresh water is_____

- i) 87.5%
- ii) 2.5%
- iii) 97.5%
- iv) 75%

15. All of the following statements concerning characteristics of predator-prey relationships are correct EXCEPT:

- i) A rise in the population of prey is often followed by a rise in the population of predators.
- ii A rise in the population of predators is followed by a decrease in the population of prey.
- iii) The population of predators most often eliminates the population of prey.
- iv) Camouflage is an adaptation that protects prey.
- v) The production of large numbers of offspring within very short periods of time ensures the survival of some prey populations.

16. Which of the following is true about secondary consumers in an ecosystem?

- i) They are fewer in number than are primary consumers.
- ii) They eat only plants.
- iii) They are eaten by primary consumers.
- iv They are smaller and weaker than are primary consumers.

v) They contain the greatest total biomass in the system.

17. In an ecosystem, which one shows one way passage?

- i) Nitrogen
- ii) Carbon
- iii) Potassium
- iv) Free Energy

18. Upper part of sea/aquatic ecosystem contains

- i) Plankton
- ii) Nekton
- iii) Benthos
- iv) Plankton and Nekton

19. Lime is added to the soil which is too

- i) Sandy
- ii) Salty
- iii) Alkaline
- iv) Acidic

20. Which one of the following is not used for ex situ plant conservation?

- i) Field gene banks
- ii) Seed banks
- iii) Shifting cultivation
- iv) Botanical Garden

21. The least porous soil among the following is a

- i) Loamy soil
- ii) Silty soil
- iii) Clayey soil
- iv) Peaty soil

22. Which one of the following is an example of ex-situ conservation?

- i) National park
- ii) Wildlife sanctuary
- iii) Seed bank
- iv) Sacred groves

23. Sacred groves are specially useful in

- i) Generating environmental awareness
- ii) Preventing soil erosion
- iii) Year-round flow of water in rivers
- iv) Conserving rare and threatened species

24. The term Alpha diversity refers to

- i) Genetic diversity
- ii) Community and ecosystem diversity
- iii) Species diversity
- iv) Diversity among the plants

25. Which of the following are likely to be present in photochemical smog?

- i) Sulphur dioxide
- ii) Sulphur
- iii) Chlorofluorocarbon
- iv) Ozone

6.1.2 Sample Test Paper -2

Course Name : All branches

Course Code : All Branches

Semester : Fourth

Subject Title : Environmental Studies

Marks : 25

17401

Time: 1 hour

Instructions:

1. All questions are compulsory and multiple choice questions
2. Only one response is correct in each question
3. All question carry equal mark i.e. One mark per question
4. There is no negative marking

01. Which of the following devices is suitable for the removal of gaseous pollutants?

- i) Cyclone separator
- ii) Electrostatic precipitator
- iii) Fabric filter
- iv) Wet scrubber

02. Which of the following air pollution control devices is suitable for the removing the finest dust from the air?

- i) Cyclone separator
- ii) Electrostatic precipitator
- iii) Fabric filter
- iv) Wet scrubber

03. Air pollution from automobiles can be controlled by fitting:

- i) Cyclone separator
- ii) Electrostatic precipitator
- iii) Catalytic converter
- iv) Wet scrubber

04. Septic tank is:

- i) An aerobic attached growth treatment system
- ii) An aerobic suspended growth biological treatment system
- iii) An anaerobic attached growth biological treatment system

iv) An anaerobic suspended growth treatment system

05. Noise is:

- i) Loud sound
- ii) Sound of high frequency
- iii) Unwanted sound
- iv) Constant sound

06. Acidic deposition _____.

- i) causes ozone depletion
- ii) is a major component of indoor air pollution
- iii) causes eutrophication in streams and rivers
- iv) often crosses national boundaries, creating international disputes
- v) is primarily a local problem near point sources

07. You have been hired by a rapidly growing small city to improve the air quality, which has deteriorated in the past 10 years. Your first suggestion is to _____.

- i) try to negotiate with the large city downwind whose factories produce large amounts of pollution
- ii) decrease the amount of CFCs used locally
- iii) move or close the cattle feed lots near the river
- iv) improve transportation options, including carpool lanes, buses, and light rail
- v) remove the hydroelectric dam on the river

08. Closing down (decommissioning) a nuclear power plant can cost more than building the plant in the first place.

- i) True
- ii) False

09. Carbon credit is meant for

- i) Deforestation
- ii) Protection of environment
- iii) Rural infrastructure
- iv) Diamond trading

10. Which one of the following is not true about the term "CARBON CREDITS"?

- i) A Carbon credit gives the owner the right to emit one tonne of carbon dioxide.
- ii) Carbon credits are a tradable permit scheme and can be exchanged between businesses having short of quotas or below the quotas.
- iii) These can be bought and sold in international/national market at the Govt. controlled prices.

- iv) The need arises because International treaties such as Kyoto Protocol set quotas on the amount of greenhouse gases that those countries can produce.
- v) All the above are true.

11. The current practice for disposal of high level wastes from nuclear power plants is to

- i) sell the wastes to developing countries for use in their own nuclear power plants.
- ii) bury the wastes deep underground.
- iii) allow the military to reprocess the wastes for nuclear weapons.
- iv) drop the wastes into the deepest parts of the ocean.
- v) use the space shuttle to carry the wastes to outer space.

12. Ozone is a pollutant at ground level, but it is a desirable chemical in the stratosphere because it blocks dangerous ultraviolet radiation.

- i) True
- ii) False

13. Which state has made it compulsory to harvest rain water for all buildings?

- i) Rajasthan
- ii) West Bengal
- iii) Tamilnadu
- iv) Maharashtra

14. In Mumbai, what is the minimum plot area for which rain water harvesting is mandatory?

- i) 2000 sq m
- ii) 500 sq m
- iii) 1000 sq m
- iv) 1500 sq m

15. Which one is not greenhouse gas?

- i) CO₂
- ii) Ozone
- iii) CH₄
- iv) CFC

16. Which of these countries has the highest per capita carbon dioxide emissions?

- i) United States
- ii) Australia
- iii) Saudi Arabia
- iv) China

17. The Environment (Protection) Act, 1986 has relaxed the rule of “Locus Standi” and because of such relaxation even a common citizen can approach the Court provided he has given a notice of---

- i) 40 days
- ii) 60 days
- iii) 30 days
- iv) 120 days

18. In the commission of the offence under this Act by Government Department, the Act holds the Head of the Department as guilty of the offence unless

- i) the head of the Department proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence.
- ii) the head of the Department proves that the offence was committed with the knowledge to his superiors
- iii) the head of the Department was on tour
- iv) the head of the Department was on leaves

19. The Environment (Protection) Act, 1986 ----- to the officers of the Government for any act done under the provisions of this Act or under the powers vested in them or functions assigned to them under this Act.

- i) does not grant immunity
- ii) grants immunity
- iii) grants awards
- iv) grants scholarships

20. The Act debars the Civil Courts from having any jurisdiction to entertain any suit or proceeding in respect of—

- i) an action,
- ii) direction,
- iii) order issued by Central Government
- iv) other statutory authority under this Act.
- v) all of the above

21. The Water (Prevention and Control of Pollution) Act was enacted in year

- i) 1981
- ii) 1986
- iii) 1974
- iv) 1972

22. As compared to all other laws on environment protection which law is a more effective and bold measure to fight the problem of pollution

- i) The Air (Prevention and Control of Pollution) Act
- ii) The Water (Prevention and Control of Pollution) Act
- iii) The Environment (Protection) Act
- iv) National Environment Appellate Authority Act

23. The Air (Prevention and Control of Pollution) Act was enacted in year

- i) 1981
- ii) 1986
- iii) 1974
- iv) 1972

24. The Environment (Protection) Act was enacted in year

- i) 1981
- ii) 1986
- iii) 1974
- iv) 1972

25. What would the Kyoto Protocol do?

- i) It would not allow developing countries like China to modify their coal-burning equipment to prevent further increases in carbon dioxide levels.
- ii) It would curb all CO₂ emissions from all countries to bring them about 15 to 20% down from the levels reached in 1990.
- iii) It would completely ban production of CFCs.
- iv) By 2012, it would curb CO₂ emissions from all developed countries to bring them about 6 to 8%

Sample Question Paper

Course Name : All branches

Course Code : All Branches

Semester : Fourth

Subject Title : Environmental Studies

Marks : 50

17401

Time: 01 hour

Instructions:

1. All questions are compulsory and multiple choice questions
2. Only one response is correct in each question
3. All question carry equal mark i.e. One mark per question
4. There is no negative marking

1. Environmental Studies:

- i) is an interdisciplinary academic field
- ii) methodically studies human interaction with the environment
- iii) includes the natural environment, built environment, and the sets of relationships between them
- iv) all of the above

2. Environmental Studies does not involve:

- i) psychology
- ii) demography
- iii) ethics
- iv) literature

3. Van Mahotsav is an annual tree-planting festival in India, celebrated on:

- i) 2nd June
- ii) 1st July
- iii) 1st December
- iv) 15th September

4. Which of the following global trends is of great concern for the future of our environment?

- i) degradation of fertile soils
- ii) changes in the global atmosphere

- iii) species extinction leading to the loss of biodiversity
- iv) population growth and increasing per capita consumption of resources
- v) all of the above

5. Which is false about biosphere?

- i) It is the global sum of all ecosystems
- ii) It can also be called the zone of life on Earth
- iii) It does not contain microbes
- iv) It has evolved at least some 3.5 billion years ago

6. Which option below is not an example of pollution?

- i) smog in Delhi
- ii) nuclear waste
- iii) overpopulation
- iv) untreated sewage

7. Which one is not a disadvantage of a big dam?

- i) extremely expensive
- ii) flooding of prime arable land
- iii) electric energy generated from hydropower
- iv) blocking upstream migration of salmon
- v) water loss with evaporation

8. This area has no permanent roads or settlements and is maintained primarily for its primitive character and non-motorized recreation. It is a _____.

- i) wilderness area
- ii) primitive recreation area
- iii) national park
- iv) national forest

9. Which is true?

- i) Oxygen content may not get reduced if forest cover is not sufficient on the earth
- ii) Forests can be said to behave like non-renewable resources if not overused.
- iii) Fishes are capable of reproducing at the rate at which they are being caught.
- iv) None of the above
- v) All of the above

10. Non-renewable resources, once used__

- i) remain on earth in a different form

- ii) become waste material
- iii) are recycled
- iv) all of the above
- v) none of the above

11. Which one of the following is an example of non-renewable resources?

- i) Wind
- ii) Vegetation
- iii) Coal and minerals
- iv) Water

12. Which one of the following is not a fossil fuel?

- i) Petroleum
- ii) Coal
- iii) Natural gas
- iv) Uranium

13. _____ is the major raw material for biogas.

- i) Tree leaves
- ii) Grass
- iii) Cow dung
- iv) Waste from kitchen

14. Total earth's surface covered by water is _____

- i) 75%
- ii) 80%
- iii) 60%
- iv) 65%

15. What is true of Ecosystem?

- i) Primary consumers are least dependent upon producers
- ii) Primary consumers outnumber producers
- iii) Producers are more than primary consumers
- iv) Secondary consumers are largest and powerful

16. Pick up the correct food chain

- i) grass-chameleon-insect-bird
- ii) grass-fox-rabbit-bird
- iii) fallen leaves-bacteria-insect larvae
- iv) phytoplankton-zooplankton-fish

17. Association of animals when both partners are benefited

- i) Mutualism
- ii) Colony
- iii) Commensalism
- iv) Ammensalism

18. The dominant second trophic level in a lake ecosystem is

- i) Plankton
- ii) Phytoplankton
- iii) Benthos
- iv) Zooplankton

19. The percentage of forest cover recommended by the National Forest policy (1988) is

- i) 33% for plains and 67% for hills
- ii) 37% for plains and 63% for hills
- iii) 20% for plains and 70% for hills
- iv) 23% for plains and 77% for hills

20. Select the correct statement about biodiversity

- i) The desert areas of Rajasthan and Gujarat have a very high level of desert animal species as well as numerous rare animals
- ii) Large scale planting of BT cotton has no adverse effect on biodiversity
- iii) Western Ghats have a very high degree of species richness and endemism
- iv) Conservation of biodiversity is just a fad pursued by the developed countries

21. The Red Data Book maintains a record of the

- i) Plants and animals present in the whole world
- ii) Relationship between man and biosphere
- iii) Plants and animals which are known to be endangered
- iv) Forest wealth in the whole world

22. In a national park protection is given to

- i) The entire flora
- ii) The entire fauna
- iii) The plants and animals
- iv) The entire ecosystem

23. The phenomenon of the entry of toxic chemicals into the food chains and more concentrated at higher trophic levels is called

- i) Biological control
- ii) biomagnification
- iii) Algal bloom
- iv) Red tide

24. Bharatpur bird sanctuary is situated in

- i) Kerala
- ii) Karnataka
- iii) Gujarat
- iv) Rajasthan

25. Which of the following is an air pollutant?

- i) Nitrogen
- ii) Carbon
- iii) Carbon monoxide
- iv) Oxygen

26. Which of the following is a secondary air pollutant?

- i) Ozone
- ii) Carbon dioxide
- iii) Carbon monoxide
- iv) Sulphur dioxide

27. During Inversion:

- i) Temperature increases with altitude
- ii) Temperature decreases with altitude
- iii) Temperature remains constant
- iv) None of the above

28. Which of the following on inhalation dissolved in the blood hemoglobin more rapidly than oxygen?

- i) Sulphur dioxide
- ii) Carbon mono-oxide
- iii) Ozone
- iv) Nitrous oxide

29. TajMahal is said to be suffering from "Marble Cancer " . What is Marble Cancer?

- i) Acidic Rain which corrodes marble.
- ii) Large number of Fungus in Taj Mahal marbles

- iii) Yellowing of the marble on account of Soot particles
- iv) Smokes filling the Taj Mahal from adjoining industries

30. DDT is

- i) Green house gas
- ii) Non-degradable pollutant
- iii) Degradable pollutant
- iv) None of these

31. Greenhouse effect is caused by

- i) Green plants
- ii) Infrared rays
- iii) UV rays
- iv) X-rays

32. How the biological oxygen demand gets affected with the increased presence of organic matter in water?

- i) the oxygen demand increases
- ii) the oxygen demand decreases
- iii) the oxygen demand remains unchanged
- iv) None of the above

33. Large cities in developed countries are impossible without automobile ownership by a high percentage of the cities' residents.

- i) True
- ii) False

34. City dwellers must rely on rural areas for production of all of their foodstuffs.

- i) True
- ii) False

35. A single person can not help in efforts to work towards a sustainable society.

- i) True
- ii) False

36. Shifting back to a more localized production of food and other resources would lead to all of the following, except

- i) reduced local environmental sustainability
- ii) more stable source of jobs and income

- iii) more profits circulating within each community
- iv) reduced transportation fuel use
- v) reduced greenhouse gas emissions

37. Which of the following would not traditionally support an environmental-friendly economy?

- i) Shift taxes from wages and profits to pollution and waste.
- ii) Improve energy efficiency.
- iii) Shift from a carbon-based economy to a renewable fuel-based economy.
- iv) Repair ecological damage.
- v) Decrease subsidies for alternative fuel vehicles.

38. Which of the following is not true of watershed management?

- i) Watershed management is continuous and needs a multidisciplinary approach
- ii) A watershed management framework supports partnering, using sound science, taking well planned actions and achieving results
- iii) Watersheds are natural systems that we can work with
- iv) Watersheds are a type of building for storing bottled water

39. What is a watershed?

- i) area of land that water flows across as it moves toward a larger water body
- ii) area of land from which water drains to a particular water body
- iii) moisture released from clouds in the form of rain, snow, hail, etc.
- iv) both i) and ii)

40. Which is not a treatment measures for watershed development

- i) Contour bunding
- ii) Gravity dam
- iii) Contour trenching
- iv) Contour stone walls
- v) Bench terraces

41. A sustainable society

- i) returns to a more primitive style of living.
- ii) meets the needs and aspirations of the present without compromising those of the future.
- iii) curtails all further development.
- iv) continues as always and assumes that things will work out for the best.
- v) is inconsistent with the goals of environmentalism.

42. Rain water harvesting is not_____

- i) catching and holding rain where it falls and using it

- ii) storing it in tanks
- iii) recharging groundwater
- iv) harvesting the crops with rain water

43. The Environment Protection Act, 1986 does not provide

- i) a framework for the co-ordination of central and state authorities established under the Water (Prevention and Control) Act, 1974 and Air (Prevention and Control) Act, 1981.
- ii) power to state govt. for protection and improvement of environment
- iii) power to the central government to take measures necessary to protect and improve the quality of the environment
- iv) none of the above
- v) all of the above

44. Under EPA 1986, the central government is empowered to take measures necessary to protect and improve the quality of the environment by

- i) setting standards for emissions and discharges
- ii) regulating the location of industries
- iii) management of hazardous wastes
- iv) none of the above
- v) all of the above

45. As per EPA 1986, Environment does NOT include

- i) air
- ii) space
- iii) land
- iv) water

46. Match correctly the following and choose the correct option

- | | |
|--|---------|
| a. Environment Protection Act | A. 1974 |
| b. Air Prevention & Control of Pollution Act | B. 1987 |
| c. Water Act | C. 1986 |
| d. Amendment of Air Act to include noise | D. 1981 |

The correct matches is;

- i) A b, B a, C d, D c
- ii) A c, B b, C d, D a
- iii) A c, B d, C a, D b
- iv) A c, B b, C d, D a

47. Chapter 3 of Environment (Protection) Act, 1986 deals with

- i) General Powers of the Central Government

- ii) Prevention, Control, and Abatement of Environmental Pollution
- iii) Miscellaneous
- iv) Preliminary

48. The minimum penalty for contravention or violation of any provision of the Environment (Protection) Act, 1986 is

- i) an imprisonment for a term which may extend to seven years or fine up to one lakh rupees, or both
- ii) an imprisonment for a term which may extend to five years or fine up to one lakh rupees, or both
- iii) an imprisonment for a term which may extend to six years or fine up to two lakh rupees, or both
- iv) an imprisonment for a term which may extend to five years or fine up to two lakh rupees, or both

49. The Act also provides for the further penalty if the failure or contravention continues after the date of conviction. It is

- i) Rs 5000 per week
- ii) Rs 10000 per week
- iii) Rs 10000 per day
- iv) Rs 5000 per day

50. The Central Government or any other person duly authorised is empowered to collect the samples of -----as evidence of the offences under the Environment (Protection) Act, 1986.

- i) air
- ii) water
- iii) soil
- iv) any substance