

PUNJABI UNIVERSITY, PATIALA 147002

(INDIA)

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Faculty of Life Sciences

Outline of Course and Syllabi

for

**B. Voc. RENEWABLE ENERGY TECHNOLOGY PART –II (Semester III)
Session: 2020-21, 2021-22 & 2022-23**

SYLLABUS
BACHELOR OF VOCATION
RENEWABLE ENERGY TECHNOLOGY
OUTLINE OF PAPERS AND TESTS
FOR
B. Voc. RENEWABLE ENERGY TECHNOLOGY PART –II (Semester III)
Session: 2020-21, 2021-22 & 2022-23

| CODE | SUBJECTS | L | T | P | TOTAL CREDITS* *one credit =15 hrs./1 lecture of 1 hr. | External Marks | Internal Marks | Practical Marks | TOTAL MARKS |
|------------|---|---|---|---|---|----------------|----------------|-----------------|--|
| B.VRET-311 | Communication Skills-I* (Qualifying) | 3 | 1 | 0 | 4 | 75 | 25 | | 100* (Satisfactory/Unsatisfactory) * |
| B.VRET-312 | Introduction to IT | 3 | 1 | 0 | 4 | 74 | 26 | | 100 |
| B.VRET-313 | Bio-Energy-I (biochemical conversion systems) | 3 | 0 | 0 | 3 | 74 | 26 | | 100 |
| B.VRET-314 | Fundamentals of measuring devices | 3 | 0 | 0 | 3 | 74 | 26 | | 100 |
| B.VRET-315 | Solar Photovoltaic Technologies-II | 3 | 0 | 0 | 3 | 74 | 26 | | 100 |
| B.VRET-316 | Practical Paper I pertaining to (B.VRET-312) | | | 3 | 3 | | | 45 | 45 |
| B.VRET-317 | Practical Paper I pertaining to (B.VRET-313) | | | 3 | 3 | | | 45 | 45 |
| B.VRET-318 | Practical Paper III pertaining to (B.VRET-314) | | | 3 | 3 | | | 45 | 45 |
| B.VRET-319 | Practical Paper IV pertaining to (B.VRET-315) | | | 3 | 3 | | | 45 | 45 |
| B.VRET-320 | Industrial visit | | | 1 | 1 | | | | 20 |
| B.VRET-321 | Environmental studies and road safety awareness* (Qualifying) | 2 | | | | 70 | 30 | | 100* |
| | Total General Education Component | | | | 12 | | | | 600 |
| QP- | Qualification pack of level 6 | | | | 18 | | | | Evaluation Shall be done by Sector skill Council |

Note: * marks are not included in total marks. (Qualifyingpaper)

B. Voc. RENEWABLE ENERGY TECHNOLOGY**PART –II (Semester IV)****SYLLABUS****BACHELOR OF VOCATION PART –II (Semester IV)****RENEWABLE ENERGY TECHNOLOGY****OUTLINE OF PAPERS AND TESTS****FOR****Session: 2020-21, 2021-22 & 2022-23**

| CODE | SUBJECTS | L | T | P | TOTAL CREDITS* *one credit =15 hrs./1 lecture of 1 hr. | External Marks | Internal Marks | Practical Marks | TOTAL MARKS |
|------------|--|---|---|---|---|----------------|----------------|--|-------------|
| B.VRET-411 | Communication Skills-II* (Qualifying)* | 1 | 1 | | 2 | 75 | 25 | | 100* |
| B.VRET-412 | Holistic Development II Physical training | 3 | 1 | | 4 | 74 | 26 | | 100 |
| B.VRET-413 | Bio-Energy-II(biochemical conversion systems) | 3 | 0 | | 3 | 74 | 26 | | 100 |
| B.VRET-414 | Hydro-Power-I | 3 | 0 | | 3 | 74 | 26 | | 100 |
| B.VRET-415 | Physico-chemical processes for water treatment | 3 | 0 | | 3 | 74 | 26 | | 100 |
| B.VRET-416 | Practical Paper V pertaining to B.VFP-412 | | | 3 | 3 | | | 45 | 45 |
| B.VRET-417 | Practical Paper V pertaining to B.VFP-413 | | | 3 | 3 | | | 45 | 45 |
| B.VRET-418 | Practical Paper V pertaining to B.VFP-414 | | | 3 | 3 | | | 45 | 45 |
| B.VRER-419 | Practical Paper VII: pertaining to B.VFP-415 | | | 3 | 3 | | | 45 | 45 |
| B.VRET-420 | Industrial Visit | | | 1 | 1 | | | | 20 |
| | Total General Education Component | | | | 12 | | | | 600 |
| QP | Qualification pack of level 6 | | | | 18 | | | Evaluation Shall be done by Sector skill council | |

* marks are not included in total marks. (Qualifying paper)

B.VRET-311

Communication Skills-I

Time Allowed 3hrs; MM: 75; Pass Percentage: 35 %

INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and carry 15 marks each. Section C will consist of 10 short answer type questions which will cover the entire syllabus uniformly and will carry 1.5 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B of the question paper and the entire section C.

LEARNING OUTCOMES

1. Students will able to learn communication skills.
2. Students will able learn to develop their personality.
3. Students able to write papers, proposals, reports etc.
4. Students will inculcate the habit of regular reading and writing.

Section – A

Communication: Meaning, Importance, and Process, Objectives of Communication, Effective Communication, Means/ Media and Types of Communication, Channels of Communication, Barriers to Communication, Voice Training, Importance of Feedback. Interview, Report Writing, Speeches and Presentations, Documentation, Business Correspondence: Definition, Importance Business letters: Essential features, Parts and Layout , Types: Purchase order letter, Enquiry Letter, Quotation Letter, Acceptance Letter, Refusal Letter, Follow Up Letter and Cancellation of order letter.

Section - B

Personality Development, Types of personality, Dynamics of Personality, Personality Traits, Influences on Personality, Personality Analysis through body language and Individual habits, Physical Aspects of personality, Emotional Stability, Memory Training, Mind and mental development, Mental Blocks, Manners and Art of Living.

References:

1. The Written Word by VandanR.Singh
2. Business Communication by M.K. Sehgal, VandanaKhetarpal
3. A Course in Communication Skills by Duttetal
4. Succeeding through Communication by SubhashJagota
5. Personality Development and Soft Skills by Prof. Achhru Singh &Dr.Dharminder Singh Ubha

B.VRET-312

Introduction to IT

Time Allowed 3hrs;

MM: 74;

Pass Percentage: 35 %

INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and carry 11 marks each. Section C will consist of 15 short answer type questions which will cover the entire syllabus uniformly and will carry 30 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B of the question paper and the entire section C.

LEARNING OUTCOMES

1. Students will be able to understand the basic fundamentals of computer.
2. Students will able to learn about Input and Output devices.
3. Students will able to learn about computer language
4. Students will able to understand memories and software.

SECTION-A

Computer Fundamentals: Block diagram of a computer, characteristics of computers and generations of computers. Input Devices: Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Speech Recognition Devices, Optical Recognition devices OMR, OBR, OCR Output Devices: Monitors, Impact Printers - Dot matrix, Character and Line printer, Non Impact Printers - DeskJet and Laser printers, Plotter. Memories: Main Memories - RAM, ROM and Secondary Storage Devices Hard Disk, Compact Disk, DVD. Computer Languages: Machine language, assembly language, high level language, 4GL, Language Translators: Compiler, Interpreter, Assembler Software: System Software, Application Software.

SECTION-B

Number System: Non-positional and positional number systems, Base conversion, Concept of Bit and Byte, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other. Applications of Information Technology and Trends: IT in Business and Industry, IT in Education & training, IT in Science and Technology, IT and Entertainment, Current Trends in IT Application AI, voice recognition, Multimedia Technology.

BVRET-316

PRACTICALS OF INFORMATION TECHNOLOGY:

Handling of peripheral devices, Installation of Operating System and softwares. Scanning Systems for Viruses, Working of Antivirus and Virus removal.

Windows concepts, working with windows-Desktop, Basic layout, Icons, Opening Windows, Window Characteristics, Window Controls, Resize Windows, Arrange Windows, task bar, Working with Screen Saver. Files and Folder-organization, Searching for files, working with folders through window explorer. Maintenance-Recycle Bin, Disk Cleanup, Add and Remove Programs, Control Panel

References: 1. P.K. Sinha and P. Sinha, Foundations of Computing, First Edition, 2002, BPB.

2 Chetan Srivastva, Fundamentals of Information Technology, Kalyani Publishers.

3 Turban Mclean and Wetbrete, Information Technology and Management, Second Edition, 2001, John Wiley & Sons.

4 Satish Jain, Information Technology, BPB, 1999.

5.Fundamental of Computers - By V. Rajaraman (Prentice Hall)

6.Fundamental of Computers - By P. K. Sinha (B.P.B publication)

7. Introduction to Information Systems, ALEXIS LEON 8. Computer Fundamentals & Its Business Applications, Dr. S. Chand.

B.VRET-313

Bio-Energy-I (Biochemical conversion systems)

Time Allowed: 3hrs; MM: 74;

Pass Percentage: 35 %

INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and carry 11 marks each. Section C will consist of 15 short answer type questions which will cover the entire syllabus uniformly and will carry 30 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B of the question paper and the entire section C.

Learning outcomes

1. The students will be able to understand the commissioning and management of biogas plant.
2. Students will be able to describe the nature and Principle of different biomass energy and know how to choose suitable Biomass fuel.
3. Students will be able to understand advantages of biomass energy.
4. Students will be able to understand Biomethanation.

Section-A

Basics in biomass study: Biomass- types and its advantages and drawbacks, Indian scenario, characteristics, conversion mechanisms and fuel assessment studies

Biomethanation: Microbial systems, phases in biogas production, parameters affecting gas production, biogas plants: types, design, constructional details and comparison and factors affecting the design

Methods for maintaining biogas production: Insulating the gas plant, composting, hot water circulation, use of chemicals and solar energy systems.

Section-B

Commissioning and management of biogas plant: commissioning and management of biogas plant, community plant, biogas appliances, effect of biogas on engine performance, socio-economic aspects of biogas , cost-benefit analysis of biogas plant.

Economics and environmental aspects, energy effectiveness and cost effectiveness, history of energy consumption and cost, economic and competitive issues for biogas energy, policy and market interventions (subsidies, credits, carbon markets etc.) and environmental aspects of bio-energy conversion.

References

1. Khandelwal, K.C., Mahdi, S.S., Biogas Technology – A Practical Handbook, Tata McGraw-Hill, 1986.
2. R. C. Mahaeswari, Bio Energy for Rural Energisation, Concepts Publication, 1997.
3. Tom, B. Reed, Biomass Gasification – Principles and Technology, Noyce Data Corporation, 1981
4. Best Practises Manual for Biomass Briquetting, I R E D A, 1997.

5. S. Eriksson and M. Prior, The briquetting of Agricultural wastes for fuel, FAO Energy and Environment paper, 1990.
6. David Boyles, Bio Energy Technology Thermodynamics and costs, Ellis Hoknood, Chichester, 1984.

BVRET-317

Practical based on Bio-Energy

1. To know how Bio-gas can be produced from Kitchen waste.
2. To know the Performance of Gasifire.
3. To study the construction and working of biogas plant.
4. To study Bio-gas production from medical waste.
5. To study Bio-gas production from industrial waste
6. To study Management of agricultural waste by using biogas plant.

References:

1. Waste Management (2013).
[Retrieved from <http://www.sciencedirect.com/science/article/pii/S0956053X14000269> "Editorial Board/Aims & Scopes"].
2. Davidson, G. (2011). "Waste Management Practices".
Retrieved from <http://www.dal.ca/content/dam/ /pdf/sustainability>
3. Barbalace, Roberta Crowell (2003-08-01). "The History of Waste".
EnvironmentalChemistry.com. Retrieved 2013-12-09.

BVRET-314

FUNDAMENTALS OF MEASURING DEVICES

Time Allowed: 3hrs; MM: 74;

Pass Percentage: 35 %

INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and carry 11 marks each. Section C will consist of 15 short answer type questions which will cover the entire syllabus uniformly and will carry 30 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B of the question paper and the entire section C.

LEARNING OUTCOMES:

1. Students will gain the knowledge of measurement symbols and their applications.
2. Student will get knowledge about how to read a main scale and additional scale for different devices.
3. Students will be able to identify circuits or circuit sections of different types.
4. Students will get knowledge about color codes of different electronic devices.

Section - A

Measuring instruments: Measurement of time, water clocks, sun dials, pendulum clocks, digital clocks, atomic clocks, Length measurements, rulers, standard meter, micro-Meters, screw gauges, travelling microscopes, laser range finder, sonar, GPS, Angle Measurements, Spectrometer verniers, scale and telescope, measurement of stellar Parallaxes, Electrical measurements, Working principle of galvanometer, voltmeter, ammeter and digital multimeters.

Section-B

Resistors: Fixed and Variable type (preliminary ideas) - Colour Code of Standard Resistors.

Capacitors: Fixed and Variable type, Colour Coding of capacitors.

Cables/Wires: Types: flexible, hook-up, coaxial and fiber optic. Multi-core Power and Control cables.

Switches: Different Types: Slide, Toggle, Push to ON, Push to OFF, Rocker-Their Applications

References

1. Fundamentals of Physics; David Halliday & Robert Resnick; 2010; John Wiley & Sons
2. Basic Electronics- Solid state; BL Thereja; 2005; S. Chand & Co.
3. Instrumentation devices and systems, C.S Rangan, G.R. Sharma, V.S.V. Mani, Tata McGrawHill
4. Optoelectronics, Wilson and Hawkes
5. Optoelectronics, Jasprit Singh

6. Elements of electronics- M.K. Bagde, S.P. Singh and K. Singh (S. Chand and Co.)

BVRET-318

PRACTICALS OFFUNDAMENTALS OF MEASURING DEVIECES

1. To Familiarize with multimeter.
2. To understand the Working of galvanometer.
3. To find the Working of voltmeter and ammeter.
4. To determine the Color Code of Standard Resistors.
5. To measure the diameter of given wire using screw gauges.

B.VRET 315

Solar Photovoltaic technology-II

Time Allowed: 3hrs;

MM: 74;

Pass Percentage: 35 %

INSTRUCTIONS FOR THE PAPER-SETTER & CANDIDATE:

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and carry 11 marks each. Section C will consist of 15 short answer type questions which will cover the entire syllabus uniformly and will carry 30 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B of the question paper and the entire section C.

Learning Outcomes:

1. The students will be able to understand how a solar cell converts sunlight into electrical power.
2. The students will be able to identify the difference between PV cells, modules, panels and arrays.
3. The students will get knowledge about the effects of varying incident solar irradiance and cell temperature on PV modules.
4. The students will be able to understand the significance of PV modules.
5. The students will be able to understand why PV modules make excellent battery chargers based on their I-V characteristics.

Section - A

Solar photovoltaic systems: The solar photovoltaic systems & Components, PV systems configurations, application of PV systems, benefits and limitations of PV systems, reading & interpreting data from PV systems components.

Salient features of solar thermal and PV systems, solar water heater and its types and functions, working of solar PV systems, types of solar PV cells and its uses, features of polycrystalline and mono crystalline and thin film PV systems.

Section – B

Description of solar module definition of key terms used with modules, tests on solar module, factors that affect performance of solar modules, need for power inverters stating two common types of power converters, advantages and disadvantages of the two types of power inverters, selecting Inverters connecting power inverters.

References:

1. Kreith F and Kreider J.F., 'Principles of Solar Engineering', Mc Graw Hill Book Co.
2. J. A. Duffie and W. A. Beckmann, Solar Engineering of Thermal Processes, John Wiley, London, 1991.
3. Non-Conventional Energy Sources, G.D. Ray, Khanna Publications.
4. Non-Conventional Energy Resources, B.H. Khan, The McGraw Hill Publications.

B.V.RET 319
Practical Based Solar Photovoltaic technology-II

1. To Inter-connection of solar cells in PV modules.
2. To explain different types of batteries for solar PV systems, Maintenance & precaution.
3. To Set up an off-grid Solar PV package for DC loads.
4. To Set up a 1.5 KW standalone Solar PV system.
5. To Set up a Solar Street Lighting System.
6. To understand the working of Solar Heaters.
7. To study Charge Controllers & Inverters.

References:

1. Concentrating Solar Power: Data and Directions for an Emerging Solar Technology Burt J. Alexander and Ted F. Richardson, Pub. Date: 2012-September, Binding: Hardcover
2. A practical guide to solar photo voltaic systems for technicians by Jean-Paul Louineau
3. Solar thermal and photo voltaic field engineers training course, by energy and resources institute, New Delhi, India

**BACHELOR OF VOCATION PART –II (Semester IV)
RENEWABLE ENERGY TECHNOLOGY**

B.VRET 411

COMMUNICATION SKILLS-II

Time Allowed 3hrs; MM: 75;

Pass Percentage: 35 %

COURSE CONTENT

The course content shall compromise the following books:

1. *Perspectives: Selections from Modern English Prose and Fiction*, edited by S.A. Vasudevan and M. SathyaBabu, Published by Orient Longman.
2. *Six One-Act Plays*, edited by Maurice Standford. Published by Orient Longman.

Learning outcomes:

1. Students able to write questions based upon pros and fiction.
2. Students will inculcate the habit of regular reading and writing.
3. Students will able to write report on any incident episode related to any theme.
4. Students will able to understand and write biographies of eminent personality.

TESTING

The paper shall have two sections. Section-A shall comprise testing from *Perspectives: Selections from Modern English Prose and Fiction* while Section-B from *Six One-Act Plays*.

SECTION-A: PERSPECTIVES

Q. 1 Based on the section entitled “Prose”, comprising chapters 1 to VI.

1. One essay-type question with internal alternative. The answer should not exceed 250 words. 10 Marks
2. Five short-answer questions to be attempted out of seven. Each answer should be written in 25 to 30 words. 5X2=10 Marks

Q. 2 Based on the section entitled “Fiction”, comprising chapters VII to IX.

- (a) One essay-type question with internal alternative on character/theme and incident/episode. The answer should not exceed 250 words. 10 Marks

- (b) There will be one short answer question from each of the three stories. The candidate shall be required to attempt any two. Each answer should be written in 25 to 30 words.
 $2 \times 2\frac{1}{2} = 5$ Marks

Q. 3 Based on the section entitled “Biographies”, comprising chapters X to XII.

- (a) One essay-type question with internal alternative. The answer should not exceed 250 words. 10 Marks
- (b) There will be one short answer question from each chapter. The candidate shall be required to attempt any two. Each answer should be written in 25 to 30 words.
 $2 \times 2\frac{1}{2} = 5$ Marks

Section–B

SIX ONE-ACT PLAYS

- Q. 4 (a) One essay-type question on character, incident/episode and theme, with internal alternative. The answer should not exceed 250 words. 15 Marks
- (b) Five short-answer question to be attempted out of seven. Each answer should be written in 25-30 words. 5X2=10 Marks

B.VRET-412

HOLISTIC DEVELOPMENT-II PHYSICAL TRAINING

Time Allowed 3h MM: 75; Pass Percentage: 35 % Total lectures: 45 hrs.

INSTRUCTIONS FOR PAPER SETTER & CANDIDATE:

Question paper shall be divided into 3 parts. Each question will carry equal marks from section A& B. Four questions shall be set from each section. Candidate will attempt two questions from each section of 15 marks. Section C of question paper shall carry ten questions of 1.5 marks each.

Learning outcomes:

1. Students will be able to learn sports relationship with economy and politics.
2. Students will be able to learn performance of sports in India.
3. Students will be able to learn various types of sports injuries and their treatment and prevention.
4. Students will be able to learn qualities of first aider.
5. Students will be able to learn sports psychology and effect of anxiety and aggression in sports.
6. Students will be able to learn rules, regulations and layout plan of indoor and outdoor games.

Section -A

1. **Sports relationship:** Role and importance of sports and economy, sports and politics.
2. **Sports performance:** Causes and remedial measures of India's poor performance in Sports.
3. **Sports injuries:** - Causes symptoms, first aid, treatment and prevention of (Sprain, Strain, contusion, dislocation & fracture).
4. **First Aid:-**Meaning, principles and qualities of first aider. First aid for dislocation, burns, electric shock, drowning and heat stroke.

Section -B

5. **Sports Psychology:** -Meaning and Importance in Physical education and sports and competition. Psychological factors affecting physical performance.
6. **Anxiety and Aggression-** Meaning and remedial measure of anxiety and aggression in sports.
7. **Badminton:** History, layout, General rules and regulation, officials, Major tournaments and Arjuna awardees.
8. **Discuss Throw:** Rules and regulations, Layout and Technique.
9. **High Jump;** Rules and regulations, Layout and Technique.

REFERENCES

- 1 Kang G.S. Deol N.S, 2008, An introduction to Health and Physical Education 21st century Patiala.
- 2 Blair,jones,and Simpson; 1962, Educational Phychology,The Macmillan Co.,New York,
- 3 Lindgren.H.E., 1962,Educational Phychology in the class Room,newdelhi,johnwiley& sons,
- 4 Whiting HTA; 1972, Reading in sports Phycholgy,HenryKimptonPublihser London.
- 5 Dhaliwal,A.S.VidyakManovidyan,Patiala.Punjabi University.
- 6 Puni,A.T. 1980, Sports Psychology:An abridged translation by G.S.Sandhu,NIS Patiala.
- 7 Suin,R.M, 1982., Psychology in Sports,Mehtods and applications,surjit publications ,new delhi.
1. Ajmer Singh and Jagtar Singh, ,2004, Gill;Essentail of Physical education and Olympic movement KalyaniPublishers,Ludhiana..
2. Swami Siranander: 1978, The Science of Paranayama, ,published by the Divine life society P.O. ShivanandaNagar.Distt. TehriGarhgwal,U.P.Himalayas Ind.
3. Yogendra,1975, Facts about, KuvalayaDhama,Lonavala Bombay.
4. Bucher Olsen and Willgoose; 1976, The Foundation of Health,prentice Hall inc.EnglewoodFliffs,New Jersey.
10. Turner Sellery and Smith, 1961, School Health and Health Education.The C.V. Mos by Company St.Loius.
11. Ajmer Singh and Jagtar Gill, 2004, Essential of Physical Education and Olympic Movement.KalyaniPublihsters,Ludhiana.
12. G.S.Kang:-Anatomy,physilgoy and Helath Education ,Published by Publication Bureau,PunjabiUniversity,Patiala.

B.VRET-413

Bio-Energy-II (Biochemical conversion systems)

Time Allowed: 3hrs;

MM: 74;

Pass Percentage: 35 %

INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and carry 11 marks each. Section C will consist of 15 short answer type questions which will cover the entire syllabus uniformly and will carry 30 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B of the question paper and the entire section C.

Learning outcomes

1. Students will be able to understand the different types of waste and properties of solid waste.
2. Students will get knowledge about the waste minimization and recycling processes.
3. Students will learn about the various hazardous wastes generated from different sources.
4. Students will be able to understand the waste disposal, its types and methods.

Section-A

Municipal & industrial waste to energy Conversion: Solid waste, definition of solid waste, sources, types & composition of solid waste, properties of solid waste

Municipal solid waste: Physical, chemical & biological properties, waste minimization and recycling of municipal waste, waste treatment & disposal size reduction, aerobic composting, incineration and environmental effects due to incineration

Industrial solid wastes: composition of industrial solid waste, biodegradable & non-biodegradable hazardous, methods of detoxification, legal aspects of municipal solid waste collection

Section-B

Hazardous waste management: Definition & Identification of hazardous waste, sources and nature of hazardous waste, hazardous waste control, impact on environment, assessment of hazardous waste sites and underground storage tanks construction, installation & closure.

Waste disposal: land fill method of solid waste disposal, land fill classification, types & methods of land fill, layout & preliminary design of land fill, composition, characteristics, generation, control of landfill leachate & gases, environmental monitoring system for land fill gases.

References

1. "Renewable Energy Resources" by John Twidell and Tony Weir, 2nd edition, Fison & Co.
2. Parker, Colin & Roberts, Energy from Waste – An Evaluation of Conversion Technologies, Elsevier Applied Science, London, 1985
3. Shah, Kanti L., Basics of Solid & Hazardous Waste Management Technology, Prentice Hall, 2000.

4. ManojDatta, Waste Disposal in engineered Landfills, Narosa Publishing House, 1997
5. Rich, Gerald et. al., Hazardous Waste Management Technology, Podvan Publishers, 1987
6. Bhide AD., Sundaresan BB., Solid Waste Management in Developing Countries, INSDOC New Delhi, 1983.
7. Mathur, A.N., and Rathore, N.S., “Renewable Energy and Environment” – Proceedings of the National Solar Energy, Himanshu Publications, Udaipur

BVRET-417

PRACTICAL-BIO-ENERGY-II

1. To study the different types of waste.
2. To study the various types of techniques for solid waste minimization.
3. To study the legal aspects of municipal solid waste system.
4. To study the aerobic composting.
5. Visit to assess hazardous waste site and working of solid waste plant
6. To know various methods of Waste disposal and their classification
7. To study Layout and preliminary design of land fill

B.VRET-414

Hydro Power-I

Time Allowed: 3hrs;

MM: 74; Pass Percentage: 35 %

INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and carry 11 marks each. Section C will consist of 15 short answer type questions which will cover the entire syllabus uniformly and will carry 30 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire section C.

LEARNING OUTCOMES

1. Students will able to gain the detailed knowledge of power plants, tunnel system.
2. Students will able understand the need of hydro power energy.
3. Students will able to gain learn about the state estimation optimization and maintenance of electrical equipment.
4. Students will able to understand the design and block diagram of electrical system in power plant.

Section-A

Introduction to Hydro Power Energy: Introduction to non-conventional energy, types of energy, hydropower energy, need for hydropower energy and its power estimation.

Types of Hydro Power Plants: High, medium and low head plants, base load and peak load plants, run-of-river plant with pondage, run-of-river plant without pondage, storage type plant and pump storage plants, mini and micro hydro plants, underground hydropower plants.

Electric current, voltage, AC rectifier, DC rectifier, transformers, losses in transformer.

Section-B

Description of main parts of Hydropower Station: Block diagram of small hydro power station, dam, details of desilting tank. storage & balancing reservoir. pen stock, pipe line & tunneling. surge tank, valve house, turbines. synchronous generator. protection & control equipment.

Synchronous Generator & its construction, types of synchronous generator -self excited, separately excited, self-excited with carbon brush.

References:

1. Bisht Tara Datt, Electrical Machine II, Asian Publishers Muzzaffarnagar.
2. Chakrabarti&Halder, Power System & Analysis - Operation & Research, PHI Pvt Ltd, New Delhi.
3. Gupta &Singhal, Electric Machines, New Age International (P) Ltd, Publishers New Delhi.
4. Kumar Murugesh K., Basic Electrical Science & Technology, Vikas Publishing House Pvt Ltd, New Delhi.
5. Nag, P. K., Power Plant Engineering, TMH Publication, New Delhi.
6. Ravindranath&Chander, Power System Protection & Switch Gear, New Age International (P) Ltd, Publishers New Delhi.

B.V.RET-418
Practical based on Hydro Power

1. To study the flow through venturimeter
2. To study the flow of visualization using Reynolds apparatus
3. To study the flow through bend meter
4. To study the working of multimeter
5. To determine the working and constructional details of hydro power plant
6. To calibrate a pressure gauge using a dead weight pressure gauge calibration
7. calibration of orifice meter
8. To calculation of the rate of flow using roto meter.
9. To study friction factor of given set of pipes.

References:

1. laboratory manual - hydraulics and hydraulic machines [kindle edition] by R.V. Raikar (author)
2. Textbook of hydraulic machines 9 edition author(s): R.K. Bansal
1. Experiments in hydraulics and hydraulic machine procedures by Prakash, M.N. Shesha

B.VRET-415

Physico-Chemical Processes for Water Treatment

Time Allowed: 3hrs;

MM: 74;

Pass Percentage: 35 %

INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and carry 11 marks each. Section C will consist of 15 short answer type questions which will cover the entire syllabus uniformly and will carry 30 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B of the question paper and the entire section C.

Learning outcomes:

1. Student will able to understand the physical, chemical and biological parameters of water.
2. Students will able to learn about Primary, Secondary and tertiary treatment units and operational unit processes of water.
3. Students will get knowledge about the disinfection, factor effecting and its various methods by which disinfection will be done.
4. Students will learn about different types of filters and its modes of operations.
5. Students will able to know about processes like reverse osmosis, ion exchange etc.

Section-A

Physical, chemical and biological parameters of water- Water Quality requirement –Potable water standards -Wastewater Effluent standards -Water quality indices.

Physical processes-chemical processes and biological processes-Primary, Secondary and Tertiary treatment-Unit operations-unit processes.

Theory of Disinfection - Factors affecting disinfection, Disinfection - chlorine dioxide;chloramines; ozonation; UV radiation.

Section-B

Theory of granular media filtration; Classification of filters; slow sand filter and rapid sand filter; mechanism of filtration; modes of operation and operational problems; negative head and air binding; dual and multimedia filtration, pressure filters, principle of working and design.

Reverse Osmosis, Microfiltration, Nano-filtration, Ultrafiltration and Electrodialysis.

Ion Exchange-processes, Application of Membrane Processes,

Reference

1. Physicochemical processes for water quality control, Weber, W.J., John Wiley and sons, New York, 1983
2. Wastewater Engineering, Treatment and Reuse , Metcalf and Eddy, Tata McGraw- Hill Publication, New Delhi, 2003 .
3. Water and Wastewater Treatment: A Guide for the Non-engineering Professional, Joanne E. Drinan, Frank Spellman. CRC Press , Taylor and Francis.
4. Water & Waste Water Engineering by Fair and Gayer.
5. C.A.Sastry, Water Treatment Plants, Narosa Publishing House, Bombay, 1996 .
6. Handbook of Water and Wastewater Treatment Technologies. Nicholas P. Cheremisin

B.VRET-419

Practical-Physico-Chemical Processes for Water Treatment

1. Identified different types of hardness of water and methods of removing hardness of water
2. How to check TDS in given water sample.
3. To examine the pH of different water samples on your locality.
4. Determine the percentage of Calcium in the given water sample.
5. Determine the percentage of Magnesium in the given water sample .
6. To study the different methods of disinfection of water by
 - Chemical reagents
 - UV light
 - Chlorine