FACULTY OF ENGINEERING AND TECHNOLOGY

Syllabus

For

BACHELOR OF VOCATION (B.VOC.)
(REFRIGERATION AND AIR CONDITIONING)
(Semester: I – VI)

Session: 2019–20

GURU NANAK DEV UNIVERSITY
AMRITSAR

Note:  (i) Copy rights are reserved.
Nobody is allowed to print it in any form.
Defaulters will be prosecuted.

(ii) Subject to change in the syllabi at any time.
Please visit the University website time to time.
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester System

Scheme of Syllabus

Semester – I:

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Paper</th>
<th>Max Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper – I</td>
<td>Fundamentals of Computer – I</td>
<td>100 (75 Theory +25 Practical)</td>
</tr>
<tr>
<td>Paper – II</td>
<td>Thermodynamics in Refrigeration &amp; Air Conditioning</td>
<td>100 (60 Theory +40 Practical)</td>
</tr>
<tr>
<td>Paper – III</td>
<td>Basics of Refrigeration &amp; Air Conditioning –I</td>
<td>100 (60 Theory +40 Practical)</td>
</tr>
<tr>
<td>Paper – IV</td>
<td>Communicative Skills in English – I</td>
<td>50</td>
</tr>
<tr>
<td>Paper – V</td>
<td>Punjabi (Compulsory) / ** ਪੰਜਾਬੀ ਚਾਲੀਅਕਾਰੀ / ** Punjab History &amp; Culture (From Earliest Times to C 320)</td>
<td>50</td>
</tr>
<tr>
<td>Paper – VI</td>
<td>* Drug Abuse: Problem, Management and Prevention (Compulsory Paper)</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Total :</td>
<td>400</td>
</tr>
</tbody>
</table>

Semester – II:

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Paper</th>
<th>Max Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper – I</td>
<td>Fundamentals of Computer – II</td>
<td>100 (75 Theory +25 Practical)</td>
</tr>
<tr>
<td>Paper – II</td>
<td>Basics of Refrigeration &amp; Air Conditioning –II</td>
<td>100 (60 Theory +40 Practical)</td>
</tr>
<tr>
<td>Paper – III</td>
<td>Basic Sciences</td>
<td>100</td>
</tr>
<tr>
<td>Paper – IV</td>
<td>Communicative Skills in English – II</td>
<td>50 (35 Theory +15 Practical)</td>
</tr>
<tr>
<td>Paper – V</td>
<td>Punjabi (Compulsory) / ** ਪੰਜਾਬੀ ਚਾਲੀਅਕਾਰੀ / ** Punjab History &amp; Culture (C 320 TO 1000 B.C.)</td>
<td>50</td>
</tr>
<tr>
<td>Paper – VI</td>
<td>* Drug Abuse: Problem, Management and Prevention (Compulsory Paper)</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Total :</td>
<td>400</td>
</tr>
</tbody>
</table>

Note: * Marks of this Paper will not be included in the Total Marks.  
** (Special Paper in lieu of Punjabi Compulsory)  
(For those students who are not domicile of Punjab)
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester System

Semester – III:

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Paper</th>
<th>Max Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper – I</td>
<td>Fundamentals of Computer – III</td>
<td>100 (75 theory +25 Practical)</td>
</tr>
<tr>
<td>Paper – II</td>
<td>Refrigeration &amp; Air Conditioning – III</td>
<td>100 (60 theory +40 Practical)</td>
</tr>
<tr>
<td>Paper – III</td>
<td>Refrigeration &amp; Air Conditioning – IV</td>
<td>100 (60 theory +40 Practical)</td>
</tr>
<tr>
<td>Paper – IV</td>
<td>Workshop Practice</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Total :</td>
<td>400</td>
</tr>
</tbody>
</table>

Semester – IV:

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Paper</th>
<th>Max Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper – I</td>
<td>Fundamentals of Computer – IV</td>
<td>100 (75 theory +25 Practical)</td>
</tr>
<tr>
<td>Paper – II</td>
<td>Refrigeration &amp; Air Conditioning – V</td>
<td>100 (60 theory +40 Practical)</td>
</tr>
<tr>
<td>Paper – III</td>
<td>Refrigeration &amp; Air Conditioning – VI</td>
<td>100 (60 theory +40 Practical)</td>
</tr>
<tr>
<td>Paper – IV</td>
<td>Refrigeration and Air Conditioning Components Lab</td>
<td>100</td>
</tr>
<tr>
<td>Paper – V (EVL-221)</td>
<td>*Environmental Studies</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Total :</td>
<td>400</td>
</tr>
</tbody>
</table>

* Marks of Paper EVS will not be included in Grand Total.
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester System

Semester – V:

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Paper</th>
<th>M. Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper – I</td>
<td>Fundamentals of Computer–V</td>
<td>100 (75 theory+25 Practical)</td>
</tr>
<tr>
<td>Paper – II</td>
<td>Refrigeration and Air Conditioning–VII</td>
<td>100</td>
</tr>
<tr>
<td>Paper – III</td>
<td>Project Lab–I</td>
<td>(120 Project–work+80 Viva–Voce=200)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total :</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>

Semester – VI:

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Paper</th>
<th>M. Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper – I</td>
<td>Fundamentals of Computer–VI</td>
<td>100 (75 theory+25 Practical)</td>
</tr>
<tr>
<td>Paper – II</td>
<td>Refrigeration and Air Conditioning–VIII</td>
<td>100</td>
</tr>
<tr>
<td>Paper – III</td>
<td>Project Lab–II</td>
<td>(120 Project–work+80 Viva–Voce=200)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total :</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>
Bachelor of Vocation (B.Voc.)  
(Refrigeration and Air Conditioning)  
Semester – I

(Theory)

Max. Marks: 100  
Theory Marks: 75  
Practical Marks: 25  
Periods Per Week: Theory: 6

Time: 3 Hours

Instructions for the Paper Setters:-

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A

• What is Computer, Block Diagram (Components), Application of Computer, Booting of Computer System
• Elements of Computer System (Input devices (Keyboard, Scanner, Mouse), Output devices– (Printer, Monitor), Storage Devices– (Magnetic Disk, Optical Disks)

Section-B

• What is Operating System, Types of Operating System (Multitasking, Multiprogramming, Multiprocessing)

Section-C

• Introduction to Windows Vista
• Parts of Windows Screen (Desktop icons, Windows (Application Window, Document window)

Section-D

• Introduction to MS Office
  ▶ Introduction to MS Word (Word 2003)
  ▶ Parts of Word Window (Title Bar, Menu Bar)
  ▶ Opening, Closing and saving a word Document
  ▶ Font Dialog Box
  ▶ Page Setup
  ▶ Editing a word document (Cut, Copy, Paste, Bold, Italic, Underline)
  ▶ Print Dialog Box
  ▶ Creating a Table, Operations on Table in MS Word
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester – I

Practical

Max.Marks: 25

Practical based on Fundamentals of Computer

- MS Word and
- Window Vista

References:

1. Introduction to Computer by P.K. Sinha
2. Fundamental of Information technology by Lakhanpal Publishers
Paper–II: Thermodynamics in Refrigeration & Air Conditioning

Time: 3 Hours
Periods/week: 6
Max. Marks: 100
Theory Marks: 60
Practical Marks: 40

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note: Attempt of question paper may be made either in English or Punjabi.

SECTION-A

Definition of Thermodynamic Terms: System, surroundings, Types of systems, intensive and extensive properties, Thermodynamic processes: isothermal, isobaric, isochoric, adiabatic.

SECTION-B

Temperature: different scales of temperature, instruments used for measuring temperature, reversible and irreversible processes, first and second law of thermodynamics.

SECTION-C

Applications of Thermodynamics: Carnot cycle, refrigerator and heat pump, refrigeration.

SECTION-D

Equipments Used in Refrigeration: application of RAC, methods of refrigeration, terminology of refrigeration, definition of TON as applied to refrigeration, C.O.P., refrigeration effect.

List of Reference Books:
1. Ref & AC S. Domkundwar Dhanpat Rai
2. Ref & AC S.C. Arora —do—
Practical: Thermodynamics in Refrigeration & Air Conditioning–I

PRACTICAL: LAB–I

Time: 3 Hours
Period/week: 6
Marks: 40

List of Experiments:
1. To study the basic tools eg. spanners, cutting & Threading tools, bending tools etc.
2. Cutting, flating & joining of tubes.
3. Bending of tubes of diff. sizes.

List of Reference Books:
1. Ref & AC S. Domkundwar Dhanpat Rai
2. Ref & AC S.C. Arora —do—
Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note: Attempt of question paper may be made either in English or Punjabi.

SECTION-A


SECTION-B

Specific heat of gases & units of heat: melting and boiling point, absolute temperature, difference between heat and temperature, condensation, vaporisation.

SECTION-C

Refrigerants: Introduction to Refrigerant, Classification of Refrigerants,

SECTION-D

Desirable properties of Ideal Refrigerant.
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester – I

Practical: Basics of Refrigeration & Air Conditioning – I

PRACTICAL: LAB–II

Time: 3 Hours
Period/week: 6
Marks: 40

List of Experiments:
1. Soldering, brazing & pinching of tubes.
2. Cutting of G.I. & Copper tubes.

List of Reference Books:
1. Ref & AC S. Domkundwar Dhanpat Rai
2. Ref & AC S.C. Arora —do—
Time: 3 Hours  Max. Marks: 50

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

The syllabus is divided in four sections as mentioned below:

**Section–A**
**Reading Skills:** Reading Tactics and strategies; Reading purposes – kinds of purposes and associated comprehension; Reading for direct meanings.

**Section–B**
Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/expressions.

**Activities:**
- Comprehension questions in multiple choice format
- Short comprehension questions based on content and development of ideas

**Section–C**
**Writing Skills:** Guidelines for effective writing; writing styles for application, personal letter, official/ business letter.

**Activities:**
- Formatting personal and business letters.
- Organising the details in a sequential order

**Section–D**
Resume, memo, notices etc.; outline and revision.

**Activities:**
- Converting a biographical note into a sequenced resume or vice-versa
- Ordering and sub-dividing the contents while making notes.
- Writing notices for circulation/ boards

**Recommended Books:**
- *Oxford Guide to Effective Writing and Speaking* by John Seely.
- *English Grammar in Use* (Fourth Edition) by Raymond Murphy, CUP
PAPER-V: पैगम्बर (स्थलांकी)

भाग : 3 पृष्ठ

पाठ-लेख अंक एवं पाठ-प्रमाण

मैथिल-वी

माध्यम अनूठम (वरिंदर जाला)
(मृ. मुलिनद गीत गुरु विभाग संगोष्ठी संगठन)
तालथम उच्च प्रामाण्यता, अभ्युतमत।
(पृष्ठ 59 तथा वर्णमाला, मजह)

मैथिल-भी

हिंदिमाल पानी (हिंदिमाल संघ-मंचवादी)
मृ. म.म.महेश, देवानगरी माध्यम, पृष्ठ 1 त्रि 6)
(हिंदी साक्षर, हिंदी-मस्ती)

मैथिल-भी

(3) पैड़ु उच्चता

(अ) पैड़ु पृथ्वी वे पृथ्वी ने झुका।

मैथिल-भी

(3) पैगम्बर पृथ्वी हिंदी : हिंदी का भोज, हिंदी का भविष्य के विषयों, महत्व, हिंदी, मूल-पृष्ठ।

(अ) पृष्ठ टॉपलिंग: पृष्ठ का टॉपलिंग स्वाद, पृष्ठ अंक हिंदी-भाषा का भोज, भाषात्मक हिंदी भाषाओं के पहाड़-हिंदू।

अंत-बंध अंक आधीकृतता लड़ी उपाधियाँ

1. पृथ्वी पौड़ रात्रि चार रात्रि ठेठी। उद रात्रि धिंसें ले पृथ्वी पौड़े सा करो।
2. विभिन्नवेदी रात्रि बुझ पृथ्वी भविष्य वटले रात्रि। उद रात्रि धिंसें ले पृथ्वी पृथ्वी।
3. उदवर पृथ्वी रात्रि वर्षण भविष्य रात्रि।
4. धिंसें मैंट चार रात्रि लौर लौर चार रात्रि पृथ्वी हिंदी चार सा सा कर बुझ-पृथ्वी।
पेडू कैदी, अधिक लुभ, पेडू विची दरकर बटट अठे पेडू दिच पेडू 
बैठे लटट अठे भाजूं (फश्ली नाट-व्हाइट) 
झाप्झ (विची, टिथी, ऑपल) : पटड़ा पैडे दर्दें

मैवमल-बी

पैडी मसवत-घटवड़ : मश्ली नाट-व्हाइट 
(मसवत मसवत, मश्लुख मसवत, भिमल मसवत, भुल मसवत, अंगिड मई व्हिडिउट)

मैवमल-बी

हिंदू दर्दें सी पैडी मसवत-क्ससी : धाराय, धारु, जिम्बुआ-सुड़े, पेडू अठे वेट प्रीजन्य भान्ट लट मेवेपाड़।

मैवमल-बी

उड़ड़े दे मेंउ दिलट दे तां, पाबूं भीलिविंग दे तां, दूंदे दे तां, दिलट दे में उब विहड़ी मसवत दिलट

बीर-बंद्र अठे धम्बदम लडी उदगियाँ

1. भुल भुलवट दे चांट भुट रोटटो। उर चुट दिच हे भुल भुल हून्दे लटो।
2. विचिनालिवी दे बूंडं भुल भुल चढ़ते उर। उर चुट दिच हेट भुल भुलभी दे।
3. उलेव भुल दे घरावट अर उर।
4. पेडू पैडे बनत दरकर नेवट चर्च उर पूरुं दी डॉ भटी डॉ डॉ पैडे बनत दर दिच-भुलभी

बिलकुल नव दरकर मसवत दे।
PAPER–V: Punjab History & Culture (From Earliest Times to C 320)
(Special Paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours 
Max. Marks: 50

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section–A
1. Physical features of the Punjab and its impact on history.
2. Sources of the ancient history of Punjab

Section–B
3. Harappan Civilization: Town planning; social, economic and religious life of the Indus Valley People.

Section–C
5. Social, Religious and Economic life during Rig Vedic Age.

Section–D
7. Teachings and impact of Buddhism
8. Jainism in the Punjab

Suggested Readings:
Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

Meaning of Drug Abuse:

Section – B

Consequences of Drug Abuse for:
- Family: Violence.
- Society: Crime.
- Nation: Law and Order problem.

Section – C

Management of Drug Abuse:
Medical Management: Medication for treatment and to reduce withdrawal effects.

Section – D

Psychiatric Management: Counselling, Behavioural and Cognitive therapy.
Social Management: Family, Group therapy and Environmental Intervention.
References:

(Theory)

Max. Marks: 100
Theory Marks: 75
Practical Marks: 25

Time: 3 Hours
Periods per week: Theory: 6

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

UNIT – I
• Internet (Understanding its Basics, Evolution)
• World Wide Web (WWW)
• Email (Structure and Working)
• LAN, WAN, MAN
• Client Server System
• Types of software, Translators (compiler, interpreter, assembler)

UNIT – II
• Introduction to MS Power Point
  ❖ Elements of Power Point
  ❖ Staring, Saving, Printing of Slides
  ❖ Diff Views in Power Point
  ❖ Formatting of Slides
  ❖ Creation of graphs
  ❖ Printing Presentations
(PRACTICAL)

Practical based on fundamentals of Computer – II

- MS Power Point
- Internet

References:
2. Introduction to Computer by P.K. Sinha.
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester – II

Paper–II: Basics of Refrigeration & Air Conditioning–II

Time: 3 Hours
Periods/week: 6
Max. Marks: 100
Theory Marks: 60
Practical Marks: 40

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note: Attempt of question paper may be made either in English or Punjabi.

SECTION-A
Air Refrigeration System: Introduction, Carnot cycle, Bell Coleman Cycle.

SECTION-B
Advantages & disadvantages of Air Refrigeration System: Necessity of cooling the aeroplane

SECTION-C
Thermal insulation of Air–conditioning System: Introduction, Desired properties of an ideal insulating material,

SECTION-D
Factors affecting the thermal conductivity: types of insulating materials.
Practical: Basics of Refrigeration & Air Conditioning–II
PRACTICAL: LAB–III

Time: 3 Hours  Marks: 40
Period/week: 6

List of Experiments:
1. To make different types of joints with help of elbows. T’s socket etc.
2. To study different types of comp. eg open & sealed type.
3. To study different types of condensers eg. Air cooled & Water cooled.
4. To study the various types of expansion devices. Capillary tube Exp. Values.
   Thermostatic Exp. value.
5. To study pressure & Temperature measuring instruments.

List of Reference Books:
1. Ref & AC S. Domkundwar Dhanpat Rai
2. Ref & AC S.C. Arora —do—
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester – II

Paper–III: Basic Science

Time: 3 Hours
Periods per week: 6
Max. Marks: 100

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION A
Definition of force, types of forces, units of force, pressure and its units & everyday examples of force/pressure. Friction, factors affecting friction, static friction, sliding friction, rolling friction in daily life, advantage of friction, disadvantage of friction, Ways to increase or decrease friction.

SECTION B
Concept of motion, uniform & non-uniform motion, speed, velocity, acceleration, graphical representation of motion, distance-time graph, velocity-time graph. Laws of motion, formulation of second law of motion, momentum & its conservation. Definition of work done, scientific conception of work, work done by a constant force. Types of work done (+ve, -ve, zero). Definition of energy, forms of energy (Kinetic energy & potential energy), Power & its units.

SECTION C
Concept of metals & non-metals, physical and chemical properties of metals, physical and chemical properties of non-metals, uses of metals. Definition of acids & bases, indicators to check the acidity and basicity. Definition of combustion, necessary condition for combustion, types of combustion, fuel, characteristics of good fuel, harmful products formed by combustion of fuels.

SECTION D
Definition of temperature, different scales for measurement of temperature, transfer of heat (conduction, convection & radiation processes). Concept of electric charge, types of charges, conductors & insulators, electric current, Ohm's law, concept of resistance & its units, resistance in series and parallel.

References:
1. NCERT/CBSE Lakhmir Singh & Manjit Kaur.
2. NCERT/CBSE Lakhmir Singh & Manjit Kaur.
PAPER–IV: COMMUNICATION SKILLS IN ENGLISH – II

Time: 3 Hours

Max. Marks: 50
Theory Marks: 35
Practical Marks: 15

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Contents:

SECTION–A
Listening Skills: Barriers to listening; effective listening skills; feedback skills.
Activities: Listening exercises – Listening to conversation, News and TV reports

SECTION–B
Attending telephone calls; note taking and note making.
Activities: Taking notes on a speech/lecture

SECTION–C
Speaking and Conversational Skills: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics.
Activities: 1) Making conversation and taking turns
                     2) Oral description or explanation of a common object, situation or concept

SECTION–D
The study of sounds of English,
Stress and Intonation,
Situation based Conversation in English,
Essentials of Spoken English.
Activities: Giving Interviews

PRACTICAL / ORAL TESTING

Marks: 15

Course Contents:–
1. Oral Presentation with/without audio visual aids.
2. Group Discussion.
3. Listening to any recorded or live material and asking oral questions for listening comprehension.

Questions:–
1. Oral Presentation will be of 5 to 10 minutes duration (Topic can be given in advance or it can be student’s own choice). Use of audio visual aids is desirable.
2. Group discussion comprising 8 to 10 students on a familiar topic. Time for each group will be 15 to 20 minutes.

Note: Oral test will be conducted by external examiner with the help of internal examiner.
22
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester – II

PAPER-V: ਪੀਠਾਧੀ (ਲਸਗੜ੍ਹੀ)

ਸਮਾਨ : 3 ਪੇਟੇ
ਵਿਭਾਗ : 50

ਪ੍ਰਾਥਮਿਕ ਅਨੁਸਾਰ ਪਹਿਲਾ ਅਲਾਵਾ

ਮੰਨਵਾਚਕ

ਅਧਿਆਤਮ ਅਧਿਆਤਮ (ਕਾਰਟੀ ਕਾਲ),
(ਸਫ਼ਲ ਸੁਚਿਤਰ ਗੀਤ ਅਚਨੇ ਡਰਿਕਾਮ ਸਿਧ ਮੈਟੇ)
ਵਾਂ ਤਰੁਭਾਗ ਦੇਖ ਪ੍ਰੀਤੀਵਿਨਿਤੀ ਅਮਿਟਮਾਟ।
(ਸਮਾਨ-ਸਮਾਨ, ਪਹਿਲਾ ਚਿਹਨ)

ਮੰਨਵਾਚਕ-ਚੀ

ਦਿਕਿਆਂ ਨਾਵਾਂ (ਦਿਕਿਆਂ ਨਾਵਾ ਦੇਖ-ਦੇਖਣੀ)
ਸਬਦ ਸ.ਮ.ਅਸਿਸਟੈਂਟ,
ਪੇਸ਼ਕਸ਼ੀ ਸ਼ਹਿਰ ਪੁਰਬਗਾਂਤ, ਖ਼ਿਆਤਾ। (ਲੇਖ 7 ਤੋਂ 12)
(ਸ਼ਹਿਰ, ਸ਼ਹਿਰ ਭੈਲੀ)

ਮੰਨਵਾਚਕ-ਭਾਈ

(ਹ) ਮਹਾਂ-ਸਰਕੁਆਦੀ 
ਅਨੁਸਾਰ ਵਾਤਾਵਰਣ : ਪਰਿਵਾਰਾ, ਮੋਹਵੇ ਮੰਨਵਾਚਕ
(ਅ) ਪ੍ਰਾਥਮਿਕ ਵਾਤਾਵਰਣ

ਮੰਨਵਾਚਕ-ਭੈਨ

(ਹ) ਸੰਤਤ ਵਾਤਾਵਰਣ
(ਅ) ਭੁਕਾਂਤੇ 

ਅਧਿ.ਅਧਿ. ਅਧਿ-ਅਧਿਆਤਮ ਸਹੀ ਉਚਾਰਤਿਆਂ

1. ਪੁਸਤਕ ਕਣ ਦੇਖ ਮਹਤਵ ਮਹਤਵਾਦੀ। ਉਤਰ ਬਾਣਾ ਹਰੇਂ ਦੇ ਪੁਸਤਕ ਕਣ ਦੇਖਣਾਂ।
2. ਹਰੇਂ ਹਰ ਪੁਸਤਕ ਵਿਚ ਹੁਂਦੀ ਹੇੰਦੀ ਪੁਸਤਕ ਵਿਚ ਹੁਂਦੀ ਹੇੰਦੀ
3. ਉਤਦੇ ਪੁਸਤਕ ਦੇ ਮਹਤਵ ਵਿਚ ਹੁਂਦੀ ਹੇੰਦੀ
4. ਦੇਖਣ ਦੇ ਮੁੱਠ ਮਹਤਵ ਦੇ ਮੁੱਠ ਮਹਤਵ ਦੇ ਮੁੱਠ ਮਹਤਵ ਦੇ ਮੁੱਠ ਮਹਤਵ ਦੇ ਮੁੱਠ ਮਹਤਵਾਦੀ।
PAPER-V: पृष्ठवी धीमाही
(In lieu of Compulsory Punjabi)

मात्रा: 3 पढ़े
वाल आंक: 50

पाठ-शृंखला

मैथमात-चे

मात्रा मूलीयां: पढ़ाई अतः द्वरा
(उप, विद्याशृंखला, विद्यालय, विद्याशृंखला, विद्यालय, मात्रीय, मेरुता अतः द्विश्रृंखला)

मैथमात-शी

पृष्ठवी धारव घटात: पृष्ठवी नाटु-पान
(2) समाप्त धार, मैथमात धार अतः खासतृत धार (पढ़ाई अतः द्वरा)
(3) विभागीय धार, प्रमुखपात धार अतः पृष्ठवी धार (पढ़ाई अतः द्वरा)

मैथमात-शृंखला

पृष्ठवी धार
मेथिय मात्रा

मैथमात-शृंखला

पृष्ठवी पृष्ठवी (पृष्ठवी अतः द्वरा)
अतः अतः वर्णां

अंक-दंड अतः धीमाही धीमाही उपाधियां

1. पृष्ठवी पृष्ठवी रे चाँद नता रेततो। उत नता दिच्चे रे पृष्ठवी पृष्ठवी सहत्तो।
2. विद्यालयीय हे दुःख भें पृष्ठवी चांद रेततो। उत नता दिच्चे दिच पृष्ठवी लपाही हे।
3. के समु पृष्ठवी रे चाँद नता रेततो।
4. पृष्ठवी मंत्र चाँद रेत नेवत चाँद उं पृष्ठवी की दंड अतः दंड रे दंड चाँद चाँद धीम-धीम लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी लिच रे दंड रेत पृष्ठवी
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester – II

PAPER–V: Punjab History & Culture (C 320 to 1000 B.C.)
(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours
Max. Marks: 50

Instructions for the Paper Setters:-

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section–A

1. Alexander’s Invasion and its Impact
2. Punjab under Chandragupta Maurya and Ashoka.

Section–B

3. The Kushans and their Contribution to the Punjab.
4. The Panjab under the Gupta Empire.

Section–C

5. The Punjab under the Vardhana Emperors
6. Socio-cultural History of Punjab from 7th to 1000 A.D.

Section–D

7. Development of languages and Education with Special reference to Taxila
8. Development of Art & Architecture

Suggested Readings:

1. L. M Joshi (Ed), History and Culture of the Punjab, Art-I, Punjabi University, Patiala, 1989 (3rd Edition)
PAPER – VI: DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION
(COMPULSORY PAPER)

DRUG ABUSE: MANAGEMENT AND PREVENTION
Time: 3 Hours                                Max. Marks: 50

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four
Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are
required to attempt five questions, selecting at least one question from each Section. The fifth
question may be attempted from any Section.

Section – A
Prevention of Drug abuse:
Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active
Scrutiny.

Section – B
School: Counselling, Teacher as role-model. Parent-teacher-Health Professional Coordination,
Random testing on students.

Section – C
Controlling Drug Abuse:
Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity
and media, Campaigns against drug abuse, Educational and awareness program

Section – D
Legislation: NDPs act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of
Drugs, Strict enforcement of laws, Time bound trials.
References:

1. Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester – III


Time: 3 Hrs.  Max. Marks: 100 (Th: 50, Practical: 50)

Instructions for the Paper Setters:-
Eight questions of equal marks ( Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Interacting with the computer: Computer Components/ Input/ Output Devices: Input devices; keyboard, mouse, scanner, output devices; VDU and printer (impact and non-impact printers), plotter etc. Primary and secondary storage (auxiliary storage), secondary storage; magnetic disks – tracks and sectors, optical disk (CD, CD-RW and DVD memory). Computer Software concept: System software, application software, operating systems, and advantages of software and application packages. Introduction to operating systems such as msdos and windows, difference between dos and windows Operating system- MS-Windows Operating system- Definition & functions, basics of Windows, Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders, Control panel – display properties, adding and removing software and hardware, setting date and time, screensaver and appearance, Using windows accessories.

SECTION–B
Word Processor using Microsoft Office Introduction to Word, Introduction to Parts of Word Window (Title Bar, Menu Bar, Tool Bar, The Ruler, Status Area), Page Setup, Creating New Documents, Saving Documents, Opening an Existing documents, insert a second document into an open document, Editing and formatting in document, Headers and Footers, Spell Checking, Printing document, Creating a Table Using the Table Menu and table formatting, Borders and Shading, Templates and Wizards, Mail Merge, importing, exporting and inserting files, formatting pages, paragraphs and sections, indents and outdents, creating lists and numbering, Headings, styles, fonts and font size Editing, positioning and viewing texts, Finding and replacing text, inserting page breaks, page numbers , book marks, symbols and dates.

SECTION–C
Presentation Software using Microsoft Office
Introduction to MS Power point, Power point elements, Templates, Wizards, Views, Exploring Power Point Menu, Working with Dialog Boxes, Adding Text, Adding Title, Moving Text Area, Resizing Text Boxes, Adding Art, Starting a New Slide, Starting Slide Show, Saving presentation; Printing Slides, Views (View slide sorter view, notes view, outlines view) Formatting and enhancing text formatting, Creating Graphs (Displaying slide show and adding multi – media)
SECTION–D

Spreadsheet using Microsoft Office

Elements of Electronics Spread Sheet and Ms-Excel: Application/usage of Electronic Spread Sheet, Opening of Spread Sheet, and menu bar, Creation of cells and addressing of cells, Cell inputting.

Manipulation of cells: Enter texts numbers and dates, Creation of tables, Cell Height and Widths, Copying of cells.


Spread sheets for Small accountings: Maintaining invoices/budgets, Totaling of various transactions, maintaining daily and monthly sales reports.

Charts: drawing different types of charts.

Reference Books:
1. Andrew S. Tanenbaum, David J. Wetherall Computer Networks (5th Edition), PHI.
3. A. Goel, Computer Fundamentals, Pearson Education.
4. Will Train, Gini Corter, Annette Marquis “Microsoft Office” BPB
PRACTICAL

1. On the basis of Computer Fundamental & Office Automation:

Books Recommended:

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note: Attempt of question paper may be made either in English or Punjabi.

SECTION-A

SECTION-B
Compressor Lubrication: Methods of Lubrication & the properties of a Lubricating oil Identifications of sources of problem in operation Value failure, Shaft Seals 3- way Values cylinder to head gascats.

SECTION-C
Condensers: Definition, Basic Principle, Types of Condenser: Air cooled Condenser, Water Cooled Condenser.

SECTION-D
Evaporative Condenser and their Constructional features: Comparison between Waters & Air cooled condenser & their Advantages & disadvantages.
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester – III

Practical: Refrigeration & Air Conditioning-III

PRACTICAL: LAB–II

Time: 3 Hours
Marks: 50
Period/week: 6

List of Experiments:
1. To Study the various control devices e.g. Thermostat, Relays & dryers etc.
2. To Study the vapour compression System.
3. To assemble & operate a small vapour compression system.

List of Books Recommended:

<table>
<thead>
<tr>
<th>Name of Book</th>
<th>Author</th>
<th>Publisher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>S.C. Arora</td>
<td>Dhanpat Rai</td>
</tr>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>Dowkundwar Khurmi</td>
<td>Katson Publication</td>
</tr>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>Sarao, Gaabi Singh</td>
<td>Satya Prakashan.</td>
</tr>
</tbody>
</table>
Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note: Attempt of question paper may be made either in English or Punjabi.

SECTION-A

SECTION-B

SECTION-C
Refrigeration & Air Conditioning System Practice: Piping layout Selection of pip material & size for various Refrigerant,

SECTION-D
Methods of joining: flairing & brazing System, evacuation, depyartation, charging balancing, leak testing, Use of Solenoid values pressure equalizers.
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester – III

Practical: Refrigeration & Air Conditioning – IV

PRACTICAL: LAB–V

Time: 3 Hours
Period/week: 6

Marks: 50

List of Experiments:
1. To Study an Electrolux Refrigerator.
2. To Study the Window Type Air Conditioner, Split Type air Conditioner.
3. To Study Ammonia-Water Plant.

List of Books Recommended:

<table>
<thead>
<tr>
<th>Name of Book</th>
<th>Author</th>
<th>Publisher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>S.C. Arora</td>
<td>Dhanpat Rai</td>
</tr>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>Dowkundwar Khurmi</td>
<td>Katson Publication</td>
</tr>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>Sarao, Gaabi Singh</td>
<td>Satya Prakashan.</td>
</tr>
</tbody>
</table>
Introduction to workshop. Maintenance of workshop tools and machinery. Safety precautions.
Usage of various gauges to measure length, mass, volume, speed, temperature and pressure, like: diameter of wire by wire gauge, external and internal diameter by vernier caliper, micrometer, screw gauge, pressure by pressure gauge, etc.

1. Carpentry Shop Introduction to various types of woods and carpentry tools.
2. Sheet Metal Shop - Practice of measuring, marking, cutting, bending, folding, riveting, soldering, etc.
3. Electrical Shop Practice of wire joints, soldering and de-soldering, brazing, familiarization of voltmeter, ammeter, multi meter, etc.
5. Machine Shop
   Introduction and Practice on Lathe machine, Drilling machines.

Recommended Books:

Time: 3 Hrs. Max. Marks: 100 (Th: 50, Practical: 50)

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A

SECTION–B
Web Browsers: Internet Explorer, Chrome and Firefox Surfing the Internet: Giving the URL address, Search, Moving Around in a web-site, Printing or saving portion of web pages, down loading/uploading Chatting on Internet Email: Basic of electronic mail, Creating Email id, Mailbox: Inbox and outbox. Using Emails: Viewing an email, sending an Email, Saving mails, sending same mail to various users, Document handling: Sending soft copy as attachment, Enclosures to email, sending a Portion of document as email

SECTION–C
Introduction to HTML: HTMLand Wordwide web, HTML elements, Basic structure of elements, creating HTML pages, viewing pages, Nesting of HTML tags, Colours and fonts.

SECTION–D
Introduction to Tally: Accounting concept, Basics of T== Accounting, Accounts number, creation of voucher, types and class, accounts voucher, balance sheet etc.

Suggested Readings/ Books
1. Tanenbaum A. S., “Computer Networks”, PHI.
2. TALLY ERP 9 TRAINING GUIDE - 4TH REVISED & UPDATED EDITION – 2018
PRACTICAL

On the basis of Internet & Data Communication

Marks: 50

Books Recommended:
Bachelor of Vocation (B.Voc.)
(Refrigeration and Air Conditioning) Semester – IV

Paper-II: Refrigeration & Air Conditioning-V

Time: 3 Hours
Periods/week: 6

Max. Marks: 100
Theory Marks: 50
Practical Marks: 50

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note: Attempt of question paper may be made either in English or Punjabi.

SECTION-A
Domestic Refrigerators: Introduction, Construction & Operational features of domestic Refrigerators. Defrosting Automatic Pressure & Electric Defrosting etc.

SECTION-B

SECTION-C
Water coolers: Storage & Pressure type Water Coolers and their filtering, Constructional features.

SECTION-D
Insulation Bottle Coolers: Ice Creams.
Practical: Refrigeration & Air Conditioning-V

PRACTICAL: LAB–VI

Time: 3 Hours
Period/week: 6
Marks: 50

List of Experiments:
1. To Study a cooling Tower.
2. To Study a desert cooler & Pump used for this type.

List of Books Recommended:

<table>
<thead>
<tr>
<th>Name of Book</th>
<th>Author</th>
<th>Publisher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>S.C. Arora</td>
<td>Dhanpat Rai</td>
</tr>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>Dowkundwar Khurmi</td>
<td>Katson Publication</td>
</tr>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>Sarao, Gaabi Singh</td>
<td>Satya Prakashan.</td>
</tr>
</tbody>
</table>
Time: 3 Hours
Periods/week: 6
Max. Marks: 100
Theory Marks: 50
Practical Marks: 50

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.
Note: Attempt of question paper may be made either in English or Punjabi.

SECTION-A

SECTION-B
Duct Construction: Built systems. Loop perimeter, Radial Perimeter & Exunded Plenum Duct System. Water Pumps: Vertical Types & Horizontal Type.

SECTION-C
Evaporators: Introduction, Types of Evaporator Flooded Type Evaporator. Dry Expansion type Evaporator.

SECTION-D
Baudelot cooler Bare Tube, Plate Surface, Finned Evaporator, Their construction & Operational features.
Practical: Refrigeration & Air Conditioning-VI

PRACTICAL: LAB–VII

Time: 3 Hours
Period/week: 6
Marks: 50

List of Experiments:
1. To test check the capacitors, Relays, automatic Value, Solenoid value, high & low pressure cut off etc.
2. To find the C.O.P. of a water cooler.
3. To find the C.O.P. of an Ammonia Ice Plant.

List of Books Recommended:

<table>
<thead>
<tr>
<th>Name of Book</th>
<th>Author</th>
<th>Publisher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>S.C. Arora</td>
<td>Dhanpat Rai</td>
</tr>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>Dowkundwar Khurmi</td>
<td>Katson Publication</td>
</tr>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>Sarao, Gaabi Singh</td>
<td>Satya Prakashan.</td>
</tr>
</tbody>
</table>
PAPER–IV: Refrigeration and Air Conditioning Components Lab

Max.Marks: 100

Introduction to general and special type of tools for refrigeration and air conditioning. Identification of various Refrigeration equipments, components of vapour compression system like compressor, condenser, expansion valve and evaporator etc

**Refrigerant:**
Practical demonstration of refrigerant cylinders, testing of leakage, evacuation and charging refrigerants in refrigerators. Practice to identify unknown refrigerants and safe handling of cylinders and valves.

**Refrigerator Components:**
Demonstration, method of installation, fault finding and fault rectification/servicing of compressors, condensers, drier, expansion valve, evaporator and motors.

**Thermal Insulation:**
Practice of filling thermal insulation materials in refrigeration systems.

**Recommended Books:**
2. Refrigeration and Air Conditioning by. S.C. Arora and S. Domkundwar; Dhanpat Rai and Sons, Delhi.
4. Refrigeration & Air Conditioning by Sandeep Bajaj.
Teaching Methodologies
The Core Module Syllabus for Environmental Studies includes classroom teaching and field work. The syllabus is divided into 8 Units [Unit-1 to Unit-VII] covering 45 lectures + 5 hours for field work [Unit-VIII]. The first 7 Units will cover 45 lectures which are classroom based to enhance knowledge skills and attitude to environment. Unit-VIII comprises of 5 hours field work to be submitted by each candidate to the Teacher in-charge for evaluation latest by 15 December, 2019.

Exam Pattern:
End Semester Examination- 75 marks
Project Report/Field Study - 25 marks [based on submitted report]
Total Marks- 100

The structure of the question paper being:

Part-A, Short answer pattern with inbuilt choice – 25 marks
Attempt any five questions out of seven distributed equally from Unit-1 to Unit-VII. Each question carries 5 marks. Answer to each question should not exceed 2 pages.

Part-B, Essay type with inbuilt choice – 50 marks
Attempt any five questions out of eight distributed equally from Unit-1 to Unit-VII. Each question carries 10 marks. Answer to each question should not exceed 5 pages.

Project Report / Internal Assessment:

Part-C, Field work – 25 marks [Field work equal to 5 lecture hours]
The candidate will submit a handwritten field work report showing photographs, sketches, observations, perspective of any topic related to Environment or Ecosystem. The exhaustive list for project report/area of study are given just for reference:

1. Visit to a local area to document environmental assets: River / Forest/ Grassland / Hill / Mountain / Water body / Pond / Lake / Solid Waste Disposal / Water Treatment Plant / Wastewater Treatment Facility etc.
2. Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
3. Study of common plants, insects, birds
4. Study of tree in your areas with their botanical names and soil types
5. Study of birds and their nesting habits
6. Study of local pond in terms of wastewater inflow and water quality
7. Study of industrial units in your area. Name of industry, type of industry, Size (Large, Medium or small scale)
8. Study of common disease in the village and basic data from community health centre
9. Adopt any five young plants and photograph its growth
10. Analyze the Total dissolved solids of ground water samples in your area.
11. Study of Particulate Matter (PM$_{2.5}$ or PM$_{10}$) data from Sameer website. Download from Play store.
12. Perspective on any field on Environmental Studies with secondary data taken from Central Pollution Control Board, State Pollution Control Board, State Science & Technology Council etc.
The multidisciplinary nature of environmental studies
Definition, scope and importance, Need for public awareness

(2 lectures)

Natural Resources: Renewable and non-renewable resources:
Natural resources and associated problems.
(a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
(f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
   • Role of an individual in conservation of natural resources.
   • Equitable use of resources for sustainable lifestyles.
(8 Lectures)

Ecosystems
• Concept of an ecosystem
• Structure and function of an ecosystem
• Producers, consumers and decomposers
• Energy flow in the ecosystem
• Ecological succession
• Food chains, food webs and ecological pyramids
• Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)
(6 Lectures)

Biodiversity and its conservation
• Introduction – Definition: genetic, species and ecosystem diversity
• Biogeographical classification of India
• Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
• Biodiversity at global, national and local levels
• India as a mega-diversity nation
• Hot-spots of biodiversity
• Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
• Endangered and endemic species of India
• Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity
(8 Lectures)
Environmental Pollution:

Definition:

- Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides

(8 Lectures)

Social Issues and the Environment

- From unsustainable to sustainable development
- Urban problems and related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation
- Consumerism and waste products
- Environmental Protection Act, 1986
- Air (Prevention and Control of Pollution) Act, 1981
- Water (Prevention and control of Pollution) Act, 1974
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness

(7 Lectures)

Human Population and the Environment

- Population growth, variation among nations
- Population explosion – Family Welfare Programmes
- Environment and human health
- Human Rights
- Value Education
- HIV / AIDS
- Women and Child Welfare
- Role of Information Technology in Environment and Human Health
- Case Studies

(6 Lectures)
Field Work

- Visit to a local area to document environmental assets River / forest / grassland / hill / mountain
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds
- Study of simple ecosystems-pond, river, hill slopes, etc

(Field work equal to 5 lecture hours)

References:

2. Down to Earth, Centre for Science and Environment, New Delhi.
9. State of India’s Environment 2018 by Centre for Sciences and Environment, New Delhi
(Theory)

Time: 3 Hours

Max. Marks: 100
Theory Marks: 75
Practical Marks: 25

Instructions for the Paper Setters:
a) Ten compulsory very short answer questions of 2 marks each. 10x02=20
b) Eight short answer questions of 5 marks each, students are required attempt any five questions. 05x05=25
c) Four long answer questions of 15 marks each, students are required to attempt any two. 02x15=30

UNIT–I
Logic Development and Program Development Tools: Data Representation, Flowcharts, Problem Analysis, Decision Trees/Tables, Pseudo code and algorithms.

UNIT–II

UNIT–III
E–Commerce: Its definition, aims, processes, tools and results, EDI, VANs and Internet as Promoters. Types of E–Commerce, Commerce–net.
Steps to Start E–Commerce, H/W & S/W Requirements, Steps involved in opening your own online business.
1. On the basis of UNIX and E–Commerce

**Books Recommended:**

2. E–Commerce –The Cutting Edge of Business
   - Kamlesh K. Bajaj
   - Debjani Nag
Time: 3 Hours  Max. Marks: 100  
Periods per week Theory: 6

Instructions for the Paper Setters:

a) Ten compulsory very short answer questions of two marks each  10x02=20
b) Eight short answer questions of eight marks each, students are required attempt any five questions.  05x08=40
c) Six long answer questions of ten marks each, students are required to attempt any four.  04x10=40

Note: Attempt of question paper may be made either in English or Punjabi.

UNIT–I
Absorption Refrigeration System: Introduction, Simple absorption system, ammonia absorption system, selection of absorbent and refrigerant, properties for ideal absorbents, properties for ideal refrigerant–absorbent combination, Electrolux Refrigerators.

UNIT–II
Analysis of Absorption Refrigeration System: Aqua ammonia absorption Refrigeration system and its analysis, properties of binary mixture, temperature Concentration Diagram for binary mixture (T–C)

List of Books Recommended:

<table>
<thead>
<tr>
<th>Name of Book</th>
<th>Author</th>
<th>Publisher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>S.C. Arora</td>
<td>Dhanpat Rai</td>
</tr>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>Dowkundwar Khurmi</td>
<td>Katson Publication</td>
</tr>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>Sarao, Gaabi Singh</td>
<td>Satya Prakashan.</td>
</tr>
</tbody>
</table>
Students are required to submit their synopsis related to Refrigeration and Air Conditioning of any project module.
(Theory)

Time: 3 Hours

Max. Marks: 100
Theory Marks: 75
Practical Marks: 25

Instructions for the Paper Setters:
a) Ten compulsory very short answer questions of 2 marks each. 10x02=20
b) Eight short answer questions of 5 marks each, students are required attempt any five questions. 05x05=25
c) Four long answer questions of 15 marks each, students are required to attempt any two. 02x15=30

UNIT–I
Introduction to data, field, record, file, database, database management system. Structure of database system, Advantage and disadvantage, levels of database system, Relational model, hierarchical model, network model, comparison of these models, E–R diagram

UNIT–II
RDBMS: –Different keys used in a relational system, Data Integrity

DBA, responsibilities of DBA

UNIT–III
SQL *PLUS
Introduction to Oracle 10g
SQL– DDL, DML, DCL
PRACTICAL

1. On the basis of Basic SQL  

Reference Books:
1. Introduction to Database System by C.J. Date.
2. Database Management System by B.C. Desai.
3. Database Concept by Korth.
4. Simplified Approach to DBMS– Kalyani Publishers
Paper–II: Refrigeration and Air Conditioning–VIII

Time: 3 Hours
Max. Marks: 100
Periods per week Theory: 6

Instructions for the Paper Setters:
a) Ten compulsory very short answer questions of two marks each. 10x02=20
b) Eight short answer questions of eight marks each, students are required attempt any five
questions. 05x08=40
c) Six long answer questions of ten marks each, students are required to attempt any four.
04x10=40

Note: Attempt of question paper may be made either in English or Punjabi.

UNIT–I
Stream Jet Refrigeration: – Introduction, Components of the plants, advantages and
disadvantages of Steam Jet System, applications of steam jet system, Performance of Steam jet
Refrigeration system

UNIT–II
Production of low Temperature:– Introduction, Production of dry ice, Manufacture of Dry Ice,
Liquefaction of Hydrogen, Liquefaction of helium, Application of Low Temperature

List of Books Recommended:

<table>
<thead>
<tr>
<th>Name of Book</th>
<th>Author</th>
<th>Publisher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>S.C. Arora</td>
<td>Dhanpat Rai</td>
</tr>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>Dowkundwar Khurmi</td>
<td>Katson Publication</td>
</tr>
<tr>
<td>Refrigeration &amp; Air Conditioning</td>
<td>Sarao, Gaabi Singh</td>
<td>Satya Prakashan.</td>
</tr>
</tbody>
</table>
Students are required to submit their synopsis related to Refrigeration and Air Conditioning of any project module.