

DEPARTMENT OF CIVIL ENGINEERING
ANNA UNIVERSITY CHENNAI, CHENNAI – 600025

UG / PG Programmes

GUIDELINES FOR PREPARATION OF PROJECT PHASE I REPORT / THESIS

The thesis shall report, in an organized and scholarly fashion, an account of the research work of the candidate leading to the discovery of new facts or techniques or correlation of facts already known (analytical, experimental, hardware oriented etc) and demonstrating a quality as to make a definite contribution to the advancement of knowledge. The following guidelines shall be followed in the preparation of the Report/Thesis.

The interim report submitted at the end of Project Phase I will be called “**PHASE I REPORT**” and that submitted on completion of the work at the end of Project Phase II will be called “**THESIS**”. The Candidates shall submit a typed copy of the manuscript to the Supervisor for the purpose of approval. The manuscript shall also be prepared in accordance with these guidelines.

Sl. No.	Item	Guideline
1	Number of copies to be submitted	Three hard copies + One soft copy on CD in <i>pdf</i> format (Not required for Phase I Report)
2	Size of thesis (typed matter reckoned from the first page of Chapter 1 to the last page including the list of References)	Phase I Report – Thirty pages (+/- 10%) Final Thesis – Sixty Pages (+/- 10%)
3	Cover Page and Title page	As per the Format in Appendix I (A to C)
4	Thesis size	(290 mm x 205 mm) after Trimming.
5	Page margins (Tables and Figures should also conform to the margin specifications)	Top edge : 30 to 35 mm Bottom edge : 25 to 30 mm Left side : 35 to 40 mm Right side : 20 to 25 mm
6	The content shall be in the following order:	
	BONAFIDE CERTIFICATE: Font Style <Times New Roman> Font Size 13 with double line spacing as per the Format in Appendix II (A to C)	
	ABSTRACT: an informative summary of the entire report including a concise description of the methods, results and significance of the research findings. An essay type of narration not exceeding two pages when typed in double line spacing, Font Style <Times New Roman> and Font Size 13. A sample abstract is presented in Appendix III . A Tamil Translation of the Abstract shall be placed after the Abstract in English.	
	ACKNOWLEDGEMENT - not exceeding one page when typed in double spacing.	
	TABLE OF CONTENTS: list all materials following it as well as any material which precedes it, excluding the Title page, Bonafide Certificate and Acknowledgment. A sample is presented in Appendix IV .	
	LIST OF TABLES: should use exactly the same captions as they appear above the Tables in the text. A sample is presented in Appendix V .	
	LIST OF FIGURES: should use exactly the same captions as they appear below the Figures in the text. A sample is presented in Appendix VI .	
	LIST OF SYMBOLS AND ABBREVIATIONS: in alphabetical order A sample is presented in Appendix VII .	

Sl. No.	Item	Guideline
6	<p>CHAPTER 1 - INTRODUCTION: Brief background, Need for the study, Objectives and scope of work (About 3 pages)</p> <p>CHAPTER 2 - LITERATURE REVIEW: What has already been done on the various aspects of the topic or related topics and what work still needs to be done to answer the questions or address the issues of the topic. This has to be presented under appropriate sub headings and well-organized sequence with proper references.</p> <p>CHAPTER 3 - METHODOLOGY: Description of “how the project was carried out?” including the experimental setup, the methods of sampling and measurement, modeling, field work, materials, analytical techniques. Include a detailed work plan indicating weekly activities on a Bar Chart in the Phase I Report.</p> <p>CHAPTER 4 - RESULTS AND DISCUSSION (Not required for Phase I report): Present the results in Tables and, where appropriate, in Figures. Give an indication of the variability. Interpret the results with the support of literature.</p> <p>CHAPTER 5 – SUMMARY AND CONCLUSIONS (Not required for Phase I report): Present a summary along with Specific conclusions / recommendations for the utilization of the results and scope for further studies</p> <p>REFERENCES: As per the instructions in Appendix VIII</p>	
7		<p>Typing and Paper quality: to be typed in black on good quality white paper preferably not lower than 80 gsm.</p>
8		<p>Chapter Formatting: chapter headings to be centered 50 mm below the top of the page and the text should commence 4 spaces below the heading. Font Style <Times New Roman> and Font Size 13 should be used for the general text with 1.5 Line spacing. Single spacing should be used for Tables, Quotations, Foot notes, Captions and References. Abbreviations should be written in full and abbreviated within brackets, while citing for the first time in the text.</p> <p>Headings: use bold fonts, do not underline; Use Arab numbers logically; allow one clear line below primary and higher level headings; Use of fourth level headings may be avoided.</p> <p>Tables and Figures: shall be introduced in the appropriate places in the text in the immediate vicinity of its first reference. Should be separated from the text both above and below by Line spacing of 3. To be numbered properly (e.g. Fourth Figure/Table in Chapter 3, will be assigned 3.4) and meaningful short caption given on top. The top line of the table continued into the next page should be placed centrally, for example read Table 2.1 (continued). Always refer to Figures and Tables in the text, preferably before they appear. Identify figures and tables using Arabic numerals: e.g Figure 1.1, Table 1.1; follow with a caption to describe;</p> <p>Photographs and graphics: shall also be treated as Figures and must be embedded in the document at the appropriate locations; use images that are clear and crisp.</p> <p>Equations: Equations appearing in each Chapter should be numbered serially, commencing a fresh for each Chapter.</p> <p>Citation of References: All references to be cited in the text at appropriate locations as per the instructions in Appendix VIII.</p> <p>References to be listed in the order: All cited references to be listed at the end.</p> <p>A typical Chapter is presented in Appendix IX.</p> <p>Sample section from a list of Reference in Appendix X.</p>
9		<p>Page Numbers: To be given serially for all pages, including those with Figures and Tables, alone typed without punctuation on the upper right corner 20 mm from top with the last digit in line with the right margin. Preliminary pages (such as Title page, Acknowledgement, Table of Contents etc.) should be numbered in lower case Roman numerals.</p>
10		<p>Binding : cover page white with back calico edge</p>

APPENDIX I A: (A typical Specimen of Cover Page & Title Page – Phase I Report)

TITLE OF THESIS

 <1.5 line spacing>

PHASE I REPORT

Submitted by

 <Italic>

NAME OF THE CANDIDATE

in partial fulfilment for the award of the degree of

 <1.5 line spacing>

**MASTER OF ENGINEERING IN
NAME OF THE PROGRAMME**



**NAME OF THE DIVISION OR CENTRE
DEPARTMENT OF CIVIL ENGINEERING
ANNA UNIVERSITY CHENNAI : CHENNAI 600 025**

<1.5 line spacing>

MONTH YEAR

APPENDIX I B: (A typical Specimen of Cover Page & Title Page –Thesis)

TITLE OF THESIS

 <1.5 line spacing>

A THESIS

Submitted by

 <Italic>

NAME OF THE CANDIDATE

in partial fulfilment for the award of the degree of

 <1.5 line spacing>

**MASTER OF ENGINEERING IN
NAME OF THE PROGRAMME**



**NAME OF THE DIVISION OR CENTRE
DEPARTMENT OF CIVIL ENGINEERING
ANNA UNIVERSITY CHENNAI: CHENNAI 600 025**

<1.5 line spacing>

MONTH YEAR

APPENDIX I C: (A sample Cover Page & Title Page –Thesis)

**STUDIES ON SOLID STATE ANAEROBIC DIGESTION
OF MUNICIPAL SOLID WASTE**

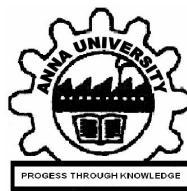
A THESIS

Submitted by

GIRIJA DEVI G

in partial fulfilment for the award of the degree of

**MASTER OF ENGINEERING IN
ENVIRONMENTAL ENGINEERING**



**CENTRE FOR ENVIRONMENTAL STUDIES
DEPARTMENT OF CIVIL ENGINEERING
ANNA UNIVERSITY CHENNAI : CHENNAI 600 025**

APRIL 2008

APPENDIX – II A: (A typical Specimen of Bonafide Certificate for Phase I Report)

Font Style <Times New Roman >

ANNA UNIVERSITY CHENNAI : CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this Report titled “**TITLE OF THE PROJECT**” is the bonafide work of **NAME OF THE CANDIDATE (Roll No.....)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

<<signature of the HOD with date>> <<signature of the Supervisor with date>>

<<Name of the HOD >>

<<Name of the Supervisor >>

Professor and Head

<<Academic Designation of Supervisor>>

Department of Civil Engineering

<<Name of Division/Centre>>

Anna University Chennai

Anna University Chennai

Chennai – 600 025

Chennai – 600 025

APPENDIX – II B: (A typical Specimen of Bonafide Certificate for Thesis)

ANNA UNIVERSITY CHENNAI : CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this Thesis titled “**TITLE OF THE PROJECT**” is the bonafide work of **NAME OF THE CANDIDATE (Roll No.....)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

<<signature of the HOD with date>> <<signature of the Supervisor with date>>

<<Name of HOD >>

<<Name of the Supervisor >>

Professor and Head

<<Academic Designation of Supervisor>>

Department of Civil Engineering

<<Name of Division/Centre>>

Anna University Chennai

Anna University Chennai

Chennai – 600 025

Chennai – 600 025

APPENDIX – II C: (A sample of Bonafide Certificate for Thesis)

ANNA UNIVERSITY CHENNAI : CHENNAI - 600 025

BONAFIDE CERTIFICATE

Certified that this Thesis titled “**STUDIES ON SOLID STATE ANAEROBIC DIGESTION OF MUNICIPAL SOLIDWASTE**” is the bonafide work of **Ms. GIRIJA DEVI G. (Roll No.200712101)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

Dr.V.Shanmugasundaram
Professor and Head
Department of Civil Engineering
Anna University Chennai
Chennai – 600 025

Dr.Kurian Joseph
Assistant Professor
Centre for Environmental Studies
Anna University Chennai
Chennai – 600 025

APPENDIX – III: (A typical Specimen of Abstract)

ABSTRACT

Asian countries are facing municipal solid waste management problems due to the rapid growth in solid waste generation rate and open dumping practices. There is a need for dumpsite reclamation processes to solve the environmental problems associated with dumpsites. Chennai is the fourth largest metro city in India with the current population of 6 millions, generating 3700 t/d of municipal solid waste. The wastes are disposed by open dumping at Perungudi and Kodungaiyur dumping grounds.

Assessment of reclamation and hazard potential of these dumpsites was carried out. Detailed investigations on solid waste characteristics, leachate quality and methane emission potential of the dumpsites were used to assess the reclamation potential. Hazard potential was assessed based on heavy metal speciation pattern in the solid waste samples and their mobile fraction having adverse environmental effects due to their leaching potential. An integrated risk based approach was also developed for the rapid assessment of the hazard potential of the dumpsites, which will be useful for prioritization of rehabilitation activities of the existing dumpsites.

The soil fraction of the mined waste collected from Perungudi and Kodungaiyur dumping grounds are 30-40% and 56-68%, respectively. The physico-chemical properties of the soil fractions are similar for samples collected from Perungudi and Kodungaiyur dumping ground. Chromium, Cu, Hg, Ni and Pb contents

of the soil fraction of the solid wastes are exceeding the Indian compost quality standards but less than the compost quality standards specified by the United States Environmental Protection Agency. Heavy metal speciation studies of the soil fraction of the solid waste samples into exchangeable, acid extractable, reducible, oxidizable and residual fraction for the metals Cu, Cr, Cd, Fe, Pb, Ni, Mn and Zn showed that less than 60% of the total metal contents are bioavailable (mobile fraction). Bioavailability is restricted to a maximum of 40% in the case of Cr, Pb, Cu and Fe. The soil fraction (40-60%) of the waste can be reclaimed as compost or cover material.

Leachate quality data showed that chemical oxygen demand and total dissolved solids are exceeding the Indian standards for disposal of treated leachates into inland surface water while biochemical oxygen demand, pH and heavy metals are less than the specified standard limits. Leachate treatment systems and protection liners will be useful to prevent the leachate contamination to surface and ground water. Methane content of both the borehole and the ambient air samples from the dumpsites varied between 0 and 220 ppm.

Validation of the developed decision making tool to assess the hazard potential of the dumpsite to Perungudi and Kodungaiyur dumping grounds resulted with scores of 569 and 579 out of 1000, respectively. This indicates that both sites have moderate hazard potential and need to be rehabilitated. Based on the present study suggestions and remedial measures for environmentally sound solid waste disposal are proposed.

APPENDIX – IV: (A typical Specimen of Table of Contents)

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	ABSTRACT (ENGLISH)	iii
	ABSTRACT (TAMIL)	iv
	LIST OF TABLES	x
	LIST OF FIGURES	xiii
	LIST OF SYMBOLS AND ABBREVIATIONS	xv
1	INTRODUCTION	1
	1.1 GENERAL	1
	1.2 NEED FOR THE STUDY	2
	1.3 OBJECTIVES OF THE STUDY	3
2	REVIEW OF LITERATURE	4
	2.1 INTRODUCTION	4
	2.2 FRAMEWORK OF LCA	4
	2.2.1 Product Life Cycle	6
	2.2.2 Product System and System Boundary	6
	2.2.3 Functional Unit and Reference Flow	7
	2.2.4 Environmental Burdens	8
	2.2.5 Environmental Impacts	8

CHAPTER	TITLE	PAGE
2.3	APPLICATIONS OF LCA	9
2.3.1	Product Design and Improvement	10
2.3.2	Strategic Planning	10
2.3.3	Public Sector Use	11
2.3.4	Marketing	11
2.3.5	Private sector applications	
2.4	LIFE CYCLE ASSESSMENT STUDIES	11
2.4.1	LCA of Leather	11
2.4.2	LCA Studies of Other Products / Processes	12
2.5	ENERGY USE AND ENVIRONMENTAL IMPACTS	15
2.5.1	Environmental Impacts Along Fuel Cycle	15
2.5.2	Energy Consumption Pattern in Leather Sector	19
2.6	HEALTH HAZARDS OF TANNING AND FINISHING CHEMICALS	19
3	MATERIALS AND METHODS	21
3.1	GENERAL	21
3.2	SYSTEM BOUNDARIES	21
3.2.1	Slaughtering	23
3.2.2	Preservation	24

CHAPTER	TITLE	PAGE
	3.2.3 Tanning and Finishing	24
	3.2.4 Waste Management	27
	3.2.5 Transportation	27
	3.2.6 Electricity Production	27
3.3	ASSUMPTIONS AND ALLOCATIONS	27
3.4	INVENTORISATION OF DATA	28
3.5	ANALYTICAL PROCEDURES	32
	3.5.1 Allocation Rule	32
	3.5.2 Global Warming Potential	33
	3.5.3 Acidification Potential	34
4	RESULTS AND DISCUSSION	35
4.1	INTRODUCTION	35
4.2	INVENTORISATION OF SLAUGHTERING	35
4.3	INVENTORISATION OF PRESERVATION	36
4.4	INVENTORISATION OF TANNING AND FINISHING OF LEATHER	37
	4.4.1 Analysis of wastewater	39
4.5	INVENTORISATION OF ELECTRICITY PRODUCTION	39
4.6	INVENTORISATION OF TRANSPORTATION	52
4.7	ANALYSIS OF DATA	54

CHAPTER	TITLE	PAGE
	4.7.1 Global warming	54
	4.7.2 Acidification	56
5	SUMMARY AND CONCLUSIONS	59
	5.1 SUMMARY	59
	5.2 CONCLUSIONS	60
	5.3 SCOPE FOR FURTHER STUDIES	61
	REFERENCES	62

APPENDIX – V: (A typical Sample of List of Tables)

LIST OF TABLES

TABLE	TITLE	PAGE
2.1	Extracted Energy, Water and Chemical Consumption of Cotton Towel	15
2.2	Air Emissions in the LCA of Cotton T-shirt and Polyester Jacket	16
2.3	Life Cycle Inventory Profile of Coal Generating system	18
3.1	Assumptions and Allocations	24
3.2	Inventory Items of Inputs and Outputs	26
3.3	Primary Data Collection Area	27
3.4	Emission Factor for Trucks	28
4.2	Inventory of Cotton Farming	31
4.3	Inventory of Ginning	32
4.4	Inventory of Spinning	33
4.5	Inventory of Knitting	33
4.6	Inventory of Pretreatment Stage in Dyeing of Fabric	34
4.7	Inventory of Dyeing of Fabric	35

APPENDIX – VI: (A typical Sample of List of Figures)

LIST OF FIGURES

FIGURE	TITLE	PAGE
1.1	Life Cycle Assessment of a Product	2
2.2	Framework of LCA and Application	6
2.3	System boundaries in LCA	9
3.1	System Boundary for the Life Cycle Assessment of Cotton T-shirt	23
4.1	Water consumption in the Dyeing of T-shirt	42
4.2	Chemical Consumption in the Life Cycle stages of cotton T-shirt	43
4.3	Energy Consumption in the Life Cycle Stages of Cotton T-shirt	43
4.4	Water consumption in the Life Cycle Stages of Cotton T-shirt	44
4.5	Solid Waste Generation during the Production of Cotton T-shirt	49

APPENDIX – VII: (A typical Sample of List of Symbols and Abbreviations)

LIST OF SYMBOLS AND ABBREVIATIONS

APHA	American Public Health Association
AWWA	American Water Works Association
A	Amps
BOD	Biochemical Oxygen Demand
C	Celsius
cm	Centimetre
CPCB	Central Pollution Control Board
CPHEEO	Central Public Health and Environmental Engineering Organization
CES	Centre for Environmental Studies
COD	Chemical Oxygen Demand
CETP	Common Effluent Treatment Plant
CRE	Conventional Reactive Effluent
cc	Cubic Centimetre
m ³	Cubicmetre
DEPA	Danish Environmental Protection Agency
d	Day
DIN	Deutsches Institut fur Normung
DC	Direct Current
ETP	Effluent Treatment Plant
EPA	Environmental Protection Agency
GAC	Granular Activated Carbon
g	Gram
h	Hour
IGEP	Indo – German Export Promotion
IPD	Institute for Product Development
kg	kilogram
kWh	kilo Watt hour
S	Kubelka – Munk Absorption Coefficient

K	Kubelka – Munk Scattering Coefficient
L	Litre
LS	Low Salt
LSRE	Low Salt Reactive Effluent
m	Metre
µm	Micrometre
µS	Micro Siemens
mL	Millilitre
mLd	Million litres per day
mm	Millimetre
min.	Minute
nm	Nanometre
N	Normal
D	Path Length of the cell
PAC	Powdered Activated Carbon
RO	Reverse Osmosis
A (λ)	Spectral Absorbance at wavelength λ nm
DFZ	Spectral Absorption Coefficient
R	Spectral Reflectance
m ²	Squaremetre
SD	Standard Deviation
SS	Suspended Solids
t	Time
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
UV	Ultra Violet
UNEP	United Nations Environmental Programme
USEPA	United States Environmental Protection Agency
V	Volts
WEF	Water Environment Federation
vol.	Volume

APPENDIX – VIII: CITING AND LISTING OF REFERENCES

CITING means formally recognizing, and including in the text, the resources from where information was obtained in the preparation of the Report. **REFERENCE** is the detailed description of the resources from which the information was obtained. Any work of other researchers, if used either directly or indirectly, the origin of the material thus referred to should be cited at appropriate places in the thesis. The details of the source should be provided in the list of REFERENCES at the end of the Thesis. Since providing relevant references gives increased credibility to the arguments presented in the thesis, it is useful to reference frequently, especially in Literature Review and Discussion.

Citing and Referencing is necessary to acknowledge the work of other researchers and to demonstrate the body of knowledge on which the present work is based. It will enable other researchers to trace the sources so as to get further information. **Lack of referencing could be interpreted as plagiarism, which is a very serious offence** in the academic world and carries severe penalties.

References can be made through direct quotations from the work of others published in Books, Journals, Reports, Conference Proceedings etc.; indirectly through paraphrasing from similar sources; use of images or Figures or Tables prepared by others; information obtained through electronic media such as web pages, for instance. A standard system of citing these references ensures an easy tracing of academic and other knowledge more efficiently. There are a number of systems for referencing but the Harvard System of Referencing is recommended commonly. Some examples are provided in Tables 1 and 2. More examples and explanations are available through the Learning Connection (University of South Australia, June 2007) website. available at:

<http://www.unisanet.unisa.edu.au/learningconnection/student/studying/referencing.asp>

The basic format for books is: Author's family name, Initials (year in brackets), *Title of book*, Publisher, Place of publication. Please refer Table 1 for examples.

The basic format for Journals is: Author's family name, Initials (year in bracket), 'Title of article,' *Title of journal*, vol. , Issue No., Page range. Please refer Table 2 for examples.

The basic format for World Wide Web References is: Author. Title of item. [Online] Available <http:// address/filename>, date of document or download. For Example:

Schwartz, Robert. The Cold War Revisited: A Splintered USSR. [Online] Available <http://usa.coldwar.server.gov/index/cold.war/countries/former.soviet.block/>, Accessed on November 1, 2008

The abbreviation *et al.* (Latin) is used to mean "and others" while citing articles written by more than two authors. However, the details of all the authors have to be provided while listing the same under REFERENCES

While Referencing the work of an author who has written more than one work in the same year, use a lower case letter of the alphabet next to the year date and keep these letters in your reference list as well. The order in which you attach the letters is determined by the alphabetical order of the title of the works by the author. For example:

In a recent publication Pedder (2001b) argued that this process was only applicable in a few circumstances and that for small business alternative processes were more suitable (Pedder 2001a).

Referencing of Tables or diagrams that are copied the source (Author, Year) is to be provided at the bottom of the Table or after the Title of the Figure.

Table 1 Examples for Citing and Referencing of Books

Category of Reference	Example citation in-text	The entry in the reference list
Books: Basic format	Author's family name (year in brackets)	Author's family name, Initials (year in brackets), <i>Title of book</i> , Publisher, Place of publication.
Book with single author	Arceivala (1986) argues that...	Arceivala, S.J (1986) <i>Wastewater treatment for pollution control</i> , Tata Mc Graw Hill Publishing company, New Delhi.
Book with two authors	According to Barret and Stanley (1999)	Barrett, P., and Stanley, C., 1999. <i>Better Construction Briefing</i> . Blackwell Science Ltd., Oxford.
Book with more than two authors	As suggested by Bansal <i>et al.</i> (1995), -	Bansal, R.C., Donnet, J.B. and Fritz Stoeckli (1995) <i>Active Carbon</i> , Marcel Dekker Inc., New York.
Electronic book	This has been emphasised by Thomas (2000) that...	Thomas, W.M. (2000), <i>The research methods knowledge base</i> , 2nd edn, accessed on 14 November 2000, < http://www.socialresearchmethods.net/kb/index.htm >.
2nd or later edition of a book	Derham (2001) questions whether	Derham, F (2001), <i>Art for the child under seven</i> , 7th edn, Australian Early Childhood Association, San Fransisco
One volume of a multi-volume set of books	It has been implied (Einax 1995) that ...	Einax, J. (1995), <i>Chemometrics in environmental chemistry: Applications</i> , vol. 2, Handbook of Environmental Chemistry, Springer, Berlin.
Chapter in an edited book	In conclusion, Cicourel (1999) emphasises the importance of...	Cicourel, A.V. (1999), 'The interaction of cognitive and cultural models in health care delivery', in <i>Talk, work and institutional order: discourse in medical, mediation and management settings</i> , eds S. Sarangi and C. Roberts, Mouton de Gruyter, Berlin, pp. 183 224.

Table 2 Examples for Citing and Referencing of Journals/Websites

Category of Reference	Example citation in-text	The entry in the reference list
Journal article with single author	and this has been established by Buckley (1998).	Buckley C.A. (1992) 'Membrane Technology for the treatment of dyehouse effluents', <i>Wat.Sci.Tech.</i> , Vol. 25, No.10. pp. 203 – 209.
Journal article with two authorsphotocatalytic oxidation process is well established (Balcioglu and Arslan, 1997)	Balcioglu I.A. and I. Arslan (1997) 'Treatment of textile wastewater by heterogenous photocatalytic oxidation process', <i>Environmental Technology</i> , Vol.18, pp. 1053 – 1059.
Journal article with more than two authors	The fact that alpha-isotoxins are not derived from edited mRNAs (Digiano <i>et al.</i> ,1992) suggests that ...	Digiano F.A., Clarkin C., Charles M.J., Maerker M.J, Francisco D.E. and Larocca (1992) 'Testing of the EPA toxicity identification evaluation protocol in the textile dye manufacturing industry', <i>Wat.Sci.Tech.</i> , Vol.25, No.3, pp. 55 – 63.
Electronic Journal article	As established by Garcia (2004) -----	Garcia, P 2004, 'Pragmatic comprehension of high and low level language learners', <i>TESL-EJ</i> , vol 8, no. 2, accessed on 2 December, 2008, < http://berkeley.edu/TESL-EJ/ej30/a!.html >.
A World Wide Web site	The Department of Immigration and Multicultural and Indigenous Affairs' website (2004) has details of ...	<i>The Department of Immigration and Multicultural and Indigenous Affairs</i> , Canberra, accessed on 7 March 2004, < http://www.immi.gov.au/ >.
Document on World Wide Web with no author	An overview of lung cancer was provided in <i>Lung Cancer</i> (2004) and	<i>Lung Cancer</i> 2004, msn Health, accessed on 12 June 2004, < http://content.health.msn.com/condition_center/lung_cancer/default.htm >.

The reference material should be listed in the alphabetical order of the first author. The listing should be typed 4 spaces below the heading "**REFERENCES**" in alphabetical order in single spacing. The name of the author/authors should be immediately followed by the year (in brackets) and other details. A typical illustrative list is given in **Appendix X**.

APPENDIX – IX: SAMPLE SECTIONS FROM A THESIS

2.1.2 Low Salt Dyes

Cibacron[®] LS is a range of compatible dyes including Yellow LS-2G, Red LS-6G, Red LS-B, Blue LS-3R, Green LS-3B and Navy LS-G. They are developed for outstanding productivity, repeatability and superior environmental safety in exhaust dyeing. The ecological benefits of Cibacron[®] LS dyes are summarized in Table 2.2.

The Cibacron[®] LS dyes are the first high concentrated reactive range in the world giving customer benefits of low transport costs, low stock holding and excellent build up. The other advantages include easy shade matching, outstanding reproducibility, fewer shade corrections and redyeing and non-sensitivity to variations in liquor ratio and fixation temperature (Buttler 1998).

Table 2.2 Ecological Benefits of Cibacron[®] LS Dyes

Property	Benefit
High fixation rate	Low dye concentration in effluent
Low electrolyte concentration	Low salt in effluent
Good washing off	Cost / time savings Lesser water and energy requirement
Ecologically selected cutting agents	Low BOD values
Halogen free chromophores	No AOX in effluent
No use of banned amines	No health risk to dyes and no risk of ban
High repeatability of dyeing	Less shading and stripping

Source: (Buttler 1998)

CHAPTER 4

RESULTS AND DISCUSSION

4.1 CONSUMPTION OF ELECTRONIC PRODUCTS

4.1.1 Domestic

The classification of the households surveyed during the present study on the basis of their income level is depicted in Figure 4.1.

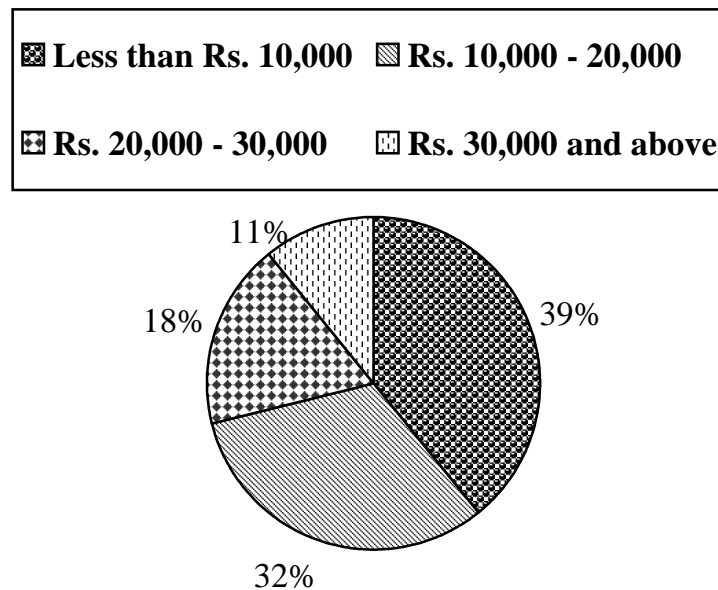


Fig 4.1 Classification of Consumer Samples Based on Income Level

It may be noted that 39 % of the respondents were from low-income class with income level less than Rs. 10,000 per month and 11 % belonged to the upper income class with income level above Rs. 30,000 per month. The average usage of the PC, TV and mobile phones by these households is presented in Table 4.1. The study revealed that per household usage of the PC ranges from 0.39 for low-income class to 1.70 for the upper income class, per household usage of TV ranges from 1.07 to 1.78 and that of mobile phone ranges from 0.88 to 1.70. The usage increases with the increase in the income level (Figure 4.2).

Table 4.1 Average usage of the PC, TV and Mobile phone by households

Sl No.	Income level (Rs.)	Sample size (Number of households)	Number of items used by the households			Average use of items per household		
			PC	TV	Mobile phone	PC	TV	Mobile phone
1	< 10,000	227	89	243	200	0.39	1.07	0.88
2	10,000 – 20,000	183	126	229	227	0.69	1.25	1.24
3	20,000 – 30,000	116	108	176	184	0.93	1.52	1.59
4	> 30,000	74	126	132	126	1.70	1.78	1.70

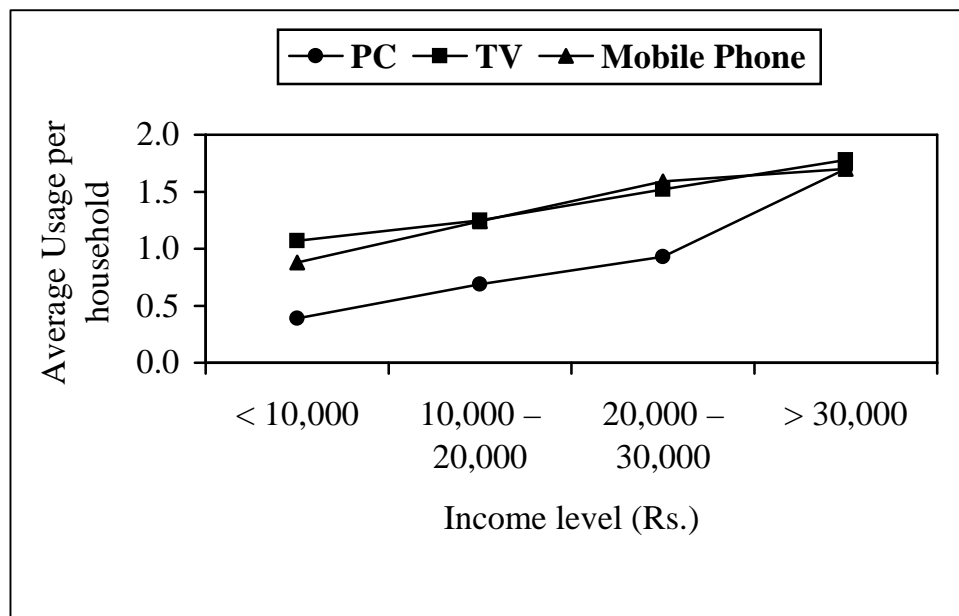


Fig 4.2 Average usage of the PC, TV and Mobile Phone Per Household

APPENDIX – X: SAMPLE SECTION FROM A LIST OF REFERENCE

REFERENCES

1. Abdul A. and Gibson T. (1986), 'Equilibrium batch experiments with six polycyclic aromatic hydrocarbons and two aquifer materials', *Hazardous Waste and Hazardous Materials*, Vol. 3, pp. 125-137.
2. Abichou T., Powelson D., Chanton J., Escoriaza S. and Stern J. (2006), 'Characterisation of methane flux and oxidation at a solid waste landfill', *J. of Environ. Engg.*, Vol. 132, pp. 220-228.
3. Acton D.W. and Barker J.F. (1992), '*In situ* biodegradation potential of aromatic hydrocarbons in anaerobic groundwaters', *J. Contam. Hydrol.*, Vol. 9, pp. 325-352.
4. Adani F., Calcaterra E. and Malagutti L. (2001), 'Preparation of a test for estimating biogas production from pretreated urban waste', Proceeding of Sardinia 2001 Eight International Landfill Symp., Sardinia 99, eds. Christensen T.H., Cossu R. and Stegmann R., CISA, Cagliari, Italy.
5. Aftring R. P., Chalker B. E. and Taylor B. F. (1981), 'Degradation of Phthalic Acids by Denitrifying, Mixed Cultures of Bacteria', *Appl. Environ. Microbiol.*, Vol. 41, pp. 1177-1183.
6. Ahel M. and Jelcic I. (2001), 'Phenazone analgesics in soil and groundwater below a municipal solid waste landfill', In: Daughton C.G., Jones-Lepp T., eds. *Pharmaceuticals and personal care products in the environment: scientific and regulatory issues*, Washington DC, American Chemical Society, pp. 100-115.
7. Akesson M. and Nilsson P. (1997), 'Seasonal changes of leachate production and quality from test cells', *J. of Environ. Engg.*, Vol. 123, pp. 892-900.
8. Albaiges J., Casado F. and Ventura F. (1986), 'Organic indicators of groundwater pollution by a sanitary landfill', *Water Res.*, Vol. 20, pp. 1153-1159.
9. Buttler B. (1998) 'Cibacron LS', Special feature on environmentally safe dyes, *Asia Pacific Tech. Monitor*, Vol.15, No.6, pp. 27 – 28.