

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

## Scheme of Teaching & Examination

### B.E. VI Semester Metallurgical Engineering

S. No	Board of Study	Subject Code	Subject	Periods per Week			Scheme of Exam			Total Marks	Credit L+ (T+P)/2
				L	T	P	Theory/practical				
							ESE	CT	TA		
1	Metallurgical Engineering	338611(38)	Foundry Engineering	4	-	-	80	20	20	120	4
2	Metallurgical Engineering	338612(38)	Theory and Technology of Heat Treatment	3	1	-	80	20	20	120	4
3	Metallurgical Engineering	338613(38)	Computer Programming and Applications in Metallurgical Industries	3	1	-	80	20	20	120	4
4	Metallurgical Engineering	338614(38)	Industrial Metallurgy	3	1	-	80	20	20	120	4
5	Metallurgical Engineering	338615(38)	Ferrous Extraction Metallurgy-I	3	1	-	80	20	20	120	4
6	Refer Table - I		Professional Elective -I	4	1	-	80	20	20	120	5
7	Metallurgical Engineering	338621(38)	Foundry Engineering Lab	-	-	3	40	-	20	60	2
8	Metallurgical Engineering	338622(38)	Computer Programming and Applications in Metallurgical Industries Lab	-	-	3	40	-	20	60	2
9	Metallurgical Engineering	338623(38)	Industrial Metallurgy Lab	-	-	3	40	-	20	60	2
10	Metallurgical Engineering	338624(38)	Theory and Technology of Heat Treatment Lab	-	-	3	40	-	20	60	2
11	Management	300625(36)	Managerial Skills	-	-	2	-	-	40	40	1
12			<b>Library</b>	-	-	1	-	-	-	-	-
<b>Total</b>				<b>20</b>	<b>5</b>	<b>15</b>	<b>640</b>	<b>120</b>	<b>240</b>	<b>1000</b>	<b>34</b>

L - Lecture T - Tutorial P - Practical, ESE = End Semester Exam CT Class Test TA - Teacher's Assessment

Industrial Training of twelve weeks is mandatory for B.E. students. It is to be completed in 2 equal parts. The first part must have been completed in summer after 4th sem. The second part is to be completed during summer after VI sem after which students have to submit training report which will be evaluated by the college teachers during B.E. VII sem.

S.No.	Board of Study	Subject Code	Subject
1	Metallurgical Engineering	338631 (38)	Furnace Technology & Instrumentation
2	Metallurgical Engineering	338632 (38)	Metallurgy of Rare Metals

**Note: (1)** - 1/4th of total strength of students subject to minimum of twenty students is required to offer in elective in the college in a particular academic session.

**Note: (2)** - Choice of elective code once made for an examination can not be changed in future examinations.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G)

Semester : VIth

Subject: Foundry Engineering

Total Theory Periods : 50

Total Marks in End Semester Exam : 80

Minimum number of class tests to be conducted: 2

Branch :Metallurgical Engineering

Code : 338611 (38)

Total Tut Periods - Nil

## Unit-1 INTRODUCTION:-

Classification of foundries, Important units, their location and products, scope and development of foundries in India.

**Patterns** – functions, types, materials used, construction and design of pattern, pattern allowances, pattern colours.

## Unit-2 Moulding Sands:-

General Characteristic, ingredients and their effects on properties of moulding sands and conditioning sources of foundry sands in India, sand additives, High temperature properties of sands. Testing of moulding sands. Banking and facing sands, sand conditioning.

**Cores**- Function, types, core sands, core binders, core preparation, core was, core supports.

## Unit-3 Moulding and Casting Processes:-

Various process of molding and casting like green and dry sand core sand, shell moulding, CO<sub>2</sub> process, permanent molds. Centrifugal investment, die casting. Moulding equipment, process details and applications.

## Unit-4 Gating and Feeding of casting:-

“Gating system and its design, Design of ingate, sprue, runner, gating ratio, requirement of an ideal gating system, types of gates, sources of gases in castings, feeders requirements and functions of feeders. Feeder design, degasification technique, mechanism of solidification, directional solidification and methods to achieve it Risers.

## Unit-5 Melting Practice:-

Principle of melting, construction and operation of hot and cold blast cupola for cast iron, Recent trends in cupola.

Melting of steel and alloy steels in Arc and induction furnace, melting, alloying and casting practice of Aluminium, copper metals and alloys.

Finishing, inspection and quality control, defects in castings and their remedies. Heat treatment of castings.

## Name of Text Books

1. Principles of metal casting by - Rosenthal
2. Modern foundry practice by -Howard
3. Handbook of metals by – ASM
4. Foundry principles by - W.H. Selmen
5. Steel foundry practice by - P. Vidya
6. Directional solidification of steel castings by - Wledawar

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI (C.G.)**

**Semester VIth**

**Subject: Theory and Technology of Heat Treatment**

**Total Theory Periods: 40**

**Total Marks in end Semester Exam: 40**

**Branch: Metallurgical Engineering**

**Code: 338612 (38)**

**Total Tutorial Period : 12**

**Experiment to be performed**

1. Preparation of non-ferrous metal for microscopic studies
2. To carryout electrolytic polishing of metals.
3. Determination of decarburized layer thickness
4. Study of micro-structure of tool steels.
5. Study of microstructure of stainless steels and other high alloy steels.
6. To carry out Annealing of steels.
7. Hardening of steel and study of associated microstructure and properties
8. Treating steel for having maximum machinability
9. To carry out normalizing of steel
10. To carry out tempering and studying its effect on properties.
11. To conduct Austempering of steels and S G cast Irons.
12. To carry out thermo-mechanical treatment of steel
13. Determination of hardenability of steels using Jominy End Quench tester.
14. To carry out Age-hardening of non-ferrous alloys.
15. Determination of phase diagram using x-ray diffractometer.

**List of Equipments/Machine Required:**

1. Metallurgical microscope of different magnifications
2. Furnaces.
3. Salt baths (molten)
4. Jominy Hardenability testing machine
5. X-Ray diffractometer.
6. Rolling and foarging machines
7. electrolytic polishing and Etching machine
8. Image analyzer
9. TEM, SEM, AND EPMA machines

**Recommended Books:**

1. Heat treatment of metals – By Vijendra Singh
2. Principles of metallographic lab. Practice – By Kehl.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI (C.G.)**

**Semester VIth**

**Subject:** Computer Programming and Application  
in Metallurgical Industries

**Branch: Metallurgical Engineering**

**Code: 338613 (38)**

**Total Theory Periods: 40**

**Total Tutorial Period : 12**

**Total Marks in end Semester Exam: 40**

- Unit – 1** General organization of computer, input/output device, compilation and execution of programs.  
Character of Fortran language, constant, variable, logic and flowchart, programming input read, write and format statement Programming Arithmetic statements, use of built in arithmetic functions, E- fields.
- Unit – 2** **Fortran** constructs – if then-end if, if-then-else-end if, nested if, Arithmetic if, GOTO statement, computed GOTO Statement, while DO, Continue. Multiple DO loops.
- Unit – 3** Declaration of one Dimensional Array, Input and output of 1-D Array using a DO loop, Searching and Sorting, Implied Do loops, 2-D Array, Functions and Subprograms.
- Unit – 4** **Introduction** of C Language, Variable, Constants, Operations, Expression Control Statement, Array, String and Functions using in C Language.
- Unit – 5** problem from various field of metallurgical Engineering
1. Thermodynamic Calculation
  2. heat transfer Calculation
  3. Application to iron and Steel Production
  4. Cooling of Pig Iron in transfer Ladle
  5. Casting Calculation
  6. Various Hardness Calculation table ( Implement either in Fortran or C Language)

**Name of Text Books:**

1. Rajaraman "Computer Programming - Fortran"
2. Y. Kanitkar – Let Us C
3. Robert D Pehlke – Unit Process of Extractive metallurgy
4. Class Notes.
- 5.

**Name of Reference Books:**

6. K D Sharma "Fortran Programming"
6. Suresh Dua – Simply C

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI (C.G.)**

**Semester VIth**  
**Subject: Industrial metallurgy**  
**Total Theory Periods: 40**  
**Total Marks in end Semester Exam: 40**

**Branch: Metallurgical Engineering**  
**Code: 338614 (38)**  
**Total Tutorial Period : 12**

**Unit – 1 Metal Joining Operation**

Scope of metal joining, welding processes and their influence on the design, welding terms and characteristics, basic principles and requirement of welding processes, weld preparation and design of welding joints, welding symbols.

**Unit – 2** Gas welding arc welding general, shielded metal arc welding, submerged arc welding gas tungsten arc welding, gas metal arc welding, plasma arc welding, stud welding, resistant welding, electro-slag welding, electron beam welding, problem based on welding.

**Unit – 3** Forge welding, cold welding, diffusion welding, carbon arc welding, atomic hydrogen welding, friction welding, induction welding, flash welding, laser welding, thermit welding, explosive welding, ultrasonic welding.

**Unit – 4** heat flow in welding temperature distribution, peak temperatures, cooling rate, welding metallurgy, structure of weld metal, weld composition, the heat affected zone, weldability, fracture behavior, weldability test, welding defects and remedies, Problem based on welding.

**Unit – 5 Welding of specific alloys**

Welding of cast iron, welding of copper alloy, aluminium alloy, stainless steel welding of dissimilar metal, welding of heat resistant alloy, residual stresses and distribution, testing and inspection, brazing and soldering, metal surfacing design of weldments, maintenance welding. Problem based on welding.

**Name of Text Books:**

1. The Science and practice of welding – A C ;Davies
2. Welding and welding technology – Richard L. Bittle
3. Welding process and technology – Raman and Eric N. simons
4. Modern metal joining technique – M Schwart
5. The metallurgy of welding – John Wiley

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

**Semester VIth**

**Subject: Ferrous Extraction Metallurgy -I**

**Total Theory Periods: 40**

**Total Marks in end Semester Exam: 40**

**Branch: Metallurgical Engineering**

**Code: 338615 (38)**

**Total Tutorial Period : 12**

**Unit – 1** History of Iron making in India, Modern development in Iron and steel industry in India. Development in the field of iron making. Indian and other resources of raw materials required for iron making. Beneficiation of iron ores and metallurgical coals, Sizing of iron ores, coke making. Agglomeration of iron ore fines, sintering and pelletising. Evaluation of properties of blast furnace burden materials and application to blast furnace performance.

**Unit – 2** Chemical processes in Blast Furnace, Reactions in Tuyere, hearth and bosh zone. Reduction and coke gasification, Reactions in stack and exit gases. Thermodynamics of Blast furnace process requirement in Blast furnace, critical hearth temperature, temp. profile in the furnace. Free energy and equilibrium consideration in Blast furnace A brief discussion on blast furnace stoichiometry and enthalpy balance. Basic idea of Blast furnace aerodynamics.

**Unit – 3** Blast furnace plant and operation-Modern blast furnace, plant layout, Details of construction of blast furnace and its main accessories; gas cleaning system, hot blast generation. Blast furnace refractories and blast furnace cooling system. Blowing in, Blowing out and banking of blast furnace, Role of burden charging and distribution in iron extraction. Irregularities in Blast furnace operation and their remedies. Blast furnace products Their quality control and disposal, coke rate and fuel efficiency of B.F. operations. Modern trends in Blast furnace practice-Production of super flux sinter, pellets, super flux and cold bonded pellets. Auxiliary fuel injection in the blast furnace. High temp. blast, humidified and oxy generated blast, high top pressure, Desulphurization of hot metal.

**Unit – 4** Alternate route for iron making charcoal blast furnace, low shaft furnace and electro thermal processes of iron making. Direct reduction processes, their classification, choice of DR process. Applicability and present status of Technology in India.

**Unit – 5** Production of Ferro-alloy industry in India. Beneficiation of indigenous raw materials for ferro alloy industry. Production of various ferro-alloys Fe-Mn, Fe-V, Fe-Cr etc. uses of ferro-alloys in iron and steel industry.

## **Name of Text Books:**

1. The manufacture of Iron – G.R. Bashforth
2. Modern Iron Making – Dr. R.h. Tupkary
3. Principles of Blast Furnace iron making – Dr. A K Biswas
4. production of ferro-alloys-Riss and Lipnitzky

## **Name of Reference Books:**

1. Making shaping and Treating of steel – US. Stel
2. Physical chemistry of iron and manufacture steel – Bods Worth C.h.S. Bell
3. The reduction of iron – Boadandy L. V. and S.j. Engell
4. The theory and practice – Blast Furnace ltd. – J.H. Siressearger
5. Symposium on ferro alloys
6. Blast Furnace Theory – I Practice Strauff

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

**Semester VIth**

**Subject: Furnace Technology & Instrumentation**

**Total Theory Periods: 50**

**Total Marks in end Semester Exam: 40**

**Branch: Metallurgical Engineering**

**Code: 338631 (38)**

**Total Tutorial Period : 12**

## **Unit-1 General Aspects and Heating Devices:-**

Metallurgical furnaces, classification and uses. Selection of refractory materials and overview of furnace construction, thrust calculation for roof arches and furnace bindings. Thermal performance and heat losses in furnaces. Furnace efficiency and Heat balance computation, sankey diagrams, Flame characteristics in combustion. Variable affecting heat utilization in flame furnaces. Burner designs and selection. Radiant tubes & their uses. Electric heating, Electric furnace productivity. Design of resistance heating for use in high, medium and infrared ranges of temperature. Theory of Induction heating, Inductor and crucible designs for coreless induction furnaces.

## **Unit-2 Furnace Aerodynamics and Heat – transfer Applications:-**

Buoyancy movement of gases; stack calculation, Types of drafts and draft control. Large pressure drop conditions, use of high pressure blowers and compressed air blast. Flow through tuyeres/lances. Jet movement of gases in furnaces and patterns of flow. Radiant heat transfer in gases and flames. Heat interaction from refractory linings. Convective heat transfer in duct systems of furnaces. Calculation of Transient condition of heating of charge by Heisler charts.

## **Unit-3 Instrumentation-**

Heat recovery aspects and Instrumentation, Waste Heat utilisation methods Recuperator and Regenerator calculations, Types of recuperators and regenerators and checker brick work. Design and calculations for production of protective atmospheres, vacuum production in furnaces. General concepts of Instruments, classification, elements of an instrument, their functions and characteristics. Dynamic response of Instruments. Primary and secondary Transducers. Transducers for pressure/vacuum measurement. Flow measuring devices and their selection guide.

## **Unit-4 Instrumentation-II**

Temperature measurement by Thermometers, thermocouples and thermopiles, Theory of Radiation Pyrometer, optical and Photo-electric and Infra-red pyrometer. Methods of temperature control in furnaces. Fundamentals of automatic control and control actions. Process Instrumentation, Instrumentation in the modern plant.

**Unit-V Design, Description and Applied Thermal calculation for the following industrial furnaces:-** Ingot heating soaking pits (Regeneration and Recuperation types), continuous pusher- type furnaces, walking beam furnaces, Roller hearth furnaces; Bell type furnaces and other heat treatment furnaces. Direct – Arc melting furnace, salt bath furnace.

## **Name of Text Books**

1. Krivandin and Markov, Metallurgical furnaces
2. Eckman, Industrial Instrumentation by- Wiley Eastern, 11985
3. Consideine and Ross, Hand book of by- Mcgraw Hill 1964
  - o Applied Instrumentation
4. Trinks and Mowinney, Industrial by- John Wiley and sons, New york, 1967
  - o furnaces, Vols. I & II
5. Thring science of flames and furnaces, by- Chapman and Hali, 1962

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI (C.G.)**

**Semester VIth**  
**Subject: Metallurgy of Rare Metals**  
**Total Theory Periods: 50**  
**Total Marks in end Semester Exam: 40**

**Branch: Metallurgical Engineering**  
**Code: 338632 (38)**  
**Total Tutorial Period : 12**

**Unit 1** Physicochemical principles in the production of U,Th

**Unit 2** Physicochemical principles in the Production of Zr, Ti, Be

**Unit 3** Physicochemical principles in the production of Pu, Mn and Cr

**Unit 4** Production of rare earths, semiconductor metals

**Unit 5** Refining principles and techniques. Fabrication, properties and applications.

**Texts/References**

- M. benedict and T.h. Pigford,k Nuclear chemical Engineering , McGraw Hill, 1957.
- C.A. Hampel,, Rare Metals Handbook, Reinholds, 1961.



**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI (C.G.)**

**Semester VIth**

**Branch: Metallurgical Engineering**

**Subject: Foundry Engineering Lab**

**Code: 338621 (38)**

**Total Practical Periods: 40**

**Total Tutorial Period: Nil**

**Total Marks in end Semester Exam: 40**

**Experiment to be performed**

1. Determination of AFS clay content in silica sand.
2. Determination of AFS fineness number of a given silica sand.
3. Preparation of a standard specimen for various testing of molding sand.
4. Determination of green compression strength of a molding sand.
5. Determination of green shear strength of a molding sand
6. Determination of green permeability of a molding sand
7. Determination of moisture content in a molding sand
8. Determination of mold hardness of a given molding sand
9. Determination of dry compression and shear strength of given molding sand.
10. Determination of permeability of a given dry molding sand.
11. Preparation of a core sand, preparation of a standard specimen and determination of mold hardness.
12. Determination of green tensile strength of a molding sand.
13. Determination of hot strength of a molding sand.
14. Determination of green compression and shear strength of a core sand.
15. Determination of hot strength of a core sand.

**List of Equipments/Machine Required:**

1. Grain fineness tester (sieve shaker)
2. Standard sand specimen rammer
3. Sand Muller.
4. Direct reading moisture teller.
5. Moisture determining apparatus using infrared heating
6. Permeability tester
7. Universal sand testing machine
8. dilatometer
9. Shatter Index tester
10. Mold hardness tester
11. Tensile testing machine
12. Muffle furnace
13. Core oven.

**Recommended Books:**

1. Lab manuals
2. Hand book of metals by ASM

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI (C.G.)**

**Semester VIth**

**Subject: Computer Programming and**

**Applications in Metallurgical Industries Lab**

**Branch: Metallurgical Engineering**

**Code: 338622 (38)**

**Total Tutorial Period : Nil**

**Total Practical Periods: 40**

**Total Marks in end Semester Exam: 40**

**Experiment to be performed**

1. Simple Addition of two no using FORTRAN language
2. Calculate the area of circle by using Fortran
3. Find the largest from given two no by using Fortran
4. Find the largest from given three no by suing Fortran
5. Find the sum of first n natural no by suing Fortran
6. Find the factorial of any input n by using Fortran
7. Find the sum of series =  $1+x+x^2+x^3+\dots$  N terms by suing Fortran
8. Red &I Write the 1D subscript variable
9. find the sum of all elements of 1D subscript variable
10. Find the larges & their position and arrange the elements of subscript variable in increasing order.
11. Read & Write 2d subscript variable
12. Find the sum of two 2d subscript variable
13. Calculate three roots of quadratic equation by sub programs
14. Calculate the area of circle by function
15. numerical problem based on Metallurgical Ind.

**List of Equipments/Machine Required:**

PIII/PIV computer and FORTRAN software.

**Recommended Books:**

1. Lab manual
2. Suresh Dua – Simply “C”

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI (C.G.)**

**Semester VIth**  
**Subject: Industrial Metallurgy**  
**Total Practical Periods: 40**  
**Total Marks in end Semester Exam: 40**

**Branch: Metallurgical Engineering**  
**Code: 338623 (38)**  
**Total Tutorial Period : Nil**

**Experiment to be performed**

1. Gas welding of different alloys
2. Shielded metal arc welding
3. Gas metal arc welding
4. Gas tungsten arc welding
5. plasma arc welding
6. Resistance Welding
7. Thermit welding
8. Electro-slag welding
9. Brazing
10. Soldering
11. Ultrasonic welding
12. Laser welding
13. electron beam welding
14. electro-gas welding
15. Submerged arc welding.

**List of Equipments/Machine Required:**

1. Gas welding equipment
2. Shielded metal arc welding equipment
3. Gas metal arc welding equipment
4. Gas tungsten arc welding
5. Plasma arc (microplasma welding Automated)
6. Brazing and soldering equipment
7. Thermit welding equipment
8. Ultrasonic welding equipment
9. Laser welding equipment
10. Electron-beam welding.

**Recommended Books:**

1. Lab manual
2. The metallurgy of welding by John Wiley

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

**Semester VIth**

**Subject: Theory and Technology of Heat Treatment**

**Total Practical Periods: 40**

**Total Marks in end Semester Exam: 40**

**Branch: Metallurgical Engineering**

**Code: 338624 (38)**

**Total Tutorial Period : Nil**

## **Experiment to be performed**

1. Preparation of non-ferrous metal for microscopic studies
2. To carryout electrolytic polishing of metals.
3. Determination of decarburized layer thickness
4. Study of micro-structure of tool steels.
5. Study of microstructure of stainless steels and other high alloy steels.
6. To carry out Annealing of steels.
7. Hardening of steel and study of associated microstructure and properties
8. Treating steel for having maximum machinability
9. To carry out normalizing of steel
10. To carry out tempering and studying its effect on properties.
11. To conduct Austempering of steels and S G cast Irons.
12. To carry out thermo-mechanical treatment of steel
13. Determination of hardenability of steels using Jominy End Quench tester.
14. To carry out Age-hardening of non-ferrous alloys.
15. Determination of phase diagram using x-ray diffractometer.

## **List of Equipments/Machine Required:**

1. Metallurgical microscope of different magnifications
2. Furnaces.
3. Salt baths (molten)
4. Jominy Hardenability testing machine
5. X-Ray diffractometer.
6. Rolling and foarging machines
7. electrolytic polishing and Etching machine
8. Image analyzer
9. TEM, SEM, AND EPMA machines

## **Recommended Books:**

1. Heat treatment of metals – By Vijendra Singh
2. Principles of metallographic lab. Practice – By Kehl.

## ***Chhattisgarh Swami Vivekanand Technical University, Bilai (C.G.)***

Semester: VI  
Subject: Managerial Skills  
Total Practical Periods: 28  
Total Marks in End Semester Exam: 40  
Minimum number of class test to be conducted: 2

Branch: Common to all Branches  
Code: 300625 (36)  
Total Tut Periods: NIL

### **Unit-I**

Managerial Communication Skills: Importance of Business Writing: writing business letters, memorandum, minutes, and reports- informal and formal, legal aspects of business communication, oral communication- presentation, conversation skills, negotiations, and listening skills, how to structure speech and presentation, body language.

### **Unit-II**

Managerial skills: Leadership: Characteristics of leader, how to develop leadership; ethics and values of leadership, leaders who make difference, conduct of meetings, small group communications and Brain storming, Decision making, How to make right decision, Conflicts and cooperation, Dissatisfaction: Making them productive.

### **Unit-III**

Proactive Manager: How to become the real you: The journey of self-discovery, the path of self-discovery, Assertiveness: A skill to develop, Hero or developer, Difference between manager and leader, Managerial skill check list, team development, How to teach and train, time management, Stress management, Self assessment.

### **Unit-IV**

Attitudinal Change: Meaning of attitude through example, benefits of positive attitude, how to develop habit of positive thinking, what is fear? How to win it? How to win over failure? How to overcome criticism? How to become real you? How to Motivate?

### **Unit-V**

Creativity – a managerial skill, Trying to get a grip on creativity.  
Overview of Management Concepts: Function of Management: Planning, organizing, staffing, controlling.

### **Text & Reference Books:**

1. Basic Managerial skills for all by E.H. McGrawth, Prentice Hall India Pvt Ltd,2006
2. How to develop a pleasing personality by Atul John Rego, Better yourself books, Mumbai, 2006
3. The powerful Personality by Dr. Ujjawal Patni & Dr. Pratap Deshmukh, Fusion Books, 2006
4. How to Success by Brian Adams, Better Yourself books, Mumbai, 1969