

**B. Tech. (Eighth Semester) Automobile Engineering
AE-418E COMBUSTION ENGINEERING**

L T P
4 - -

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks

NOTE: In the semester examination, the paper setter will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, selecting at least one from each unit.

UNIT I

Combustion of Fuels: Combustion equations, Theoretical air, excess air, air fuel ratio, equivalence ratio, exhaust gas composition, Air-fuel ratio from exhaust gas composition, and heating value of fuels.

UNIT II

Thermodynamics of Combustion: Thermo-chemistry, First law analysis of reacting systems, Adiabatic combustion temperature, Second law analysis of reacting systems, criterion for chemical equilibrium, Equilibrium constant for gaseous mixtures, Evaluation of equilibrium composition, chemical availability.

UNIT III

Kinetics of Combustion: Rates of reaction, Reaction order and molecularity complex reactions, chain reactions, Arrhenius rate equation, Collision theory, activated complex theory, Explosive and general oxidative characteristics of fuels.

Flames: Laminar and Turbulent flames, Premixed and Diffusion flames, Burning velocity and its determination, Factors affecting burning velocity, Quenching, Flammability and Ignition, Flame stabilization in open burners.

UNIT IV

Engine Combustion: Combustion in SI and CI engines, stages of combustion in SI and CI engines, Normal combustion and abnormal combustion, Emissions from premixed combustion, Emission from Non premixed combustion, Control of emissions.

TEXT BOOK

1. Stephen R.Turns, *An Introduction to Combustion*, McGraw Hill Book Company, 1996.

REFERENCE BOOKS

1. Irwin Glassman, *Combustion*, Third Edition, Academic Press, 1996.
2. Sharma. S. P and Chandramohan, *Fuels and Combustion*, Tata McGraw Hill Book Co., 1984.

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3. Samir Sarkar, *Fuels and Combustion*, Orient Longman, 1984.
4. Kuo. K. K, *Principles of Combustion*, John Wiley & Sons, 1984.
5. Heywood. J. B, *Internal Combustion Engine Fundamentals*, McGraw Hill Book Co., 1988.

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B. Tech. (Eighth Semester) Automobile Engineering
AE-420E AUTOMOTIVE AIR-CONDITIONING

L T P
4 - -

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks

NOTE: In the semester examination, the paper setter will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, selecting at least one from each unit.

UNIT I

Air Conditioning Fundamentals: Basic air conditioning system - location of air conditioning components in a car, schematic layout of a refrigeration system, compressor components, condenser and high pressure service ports, thermostatic expansion valve, expansion valve calibration, controlling evaporator temperature, evaporator pressure regulator, evaporator temperature regulator.

UNIT II

Air Conditioner – Heating System: Automotive heaters, manually controlled air conditioner, heater system, automatically controlled air conditioner and heater systems, automatic temperature control, air conditioning protection, engine protection.

UNIT III

Refrigerant: Containers handling refrigerants, tapping into the refrigerant container, refrigeration system diagnosis, diagnostic procedure, ambient conditions affecting system pressures.

UNIT IV

Air Routing and Temperature Control: Objectives, evaporator airflow through the recirculating unit, automatic temperature control, duct system, controlling flow, vacuum reserve, testing the air control and handling systems.

Air Conditioning Service: Air conditioner maintenance and service, servicing heater system removing and replacing components, trouble shooting of air controlling system, compressor service.

TEXT BOOKS

1. William H. Crouse and Donald I. Anglin - "Automotive Air conditioning" - McGraw Hill Inc. - 1990.
2. Boyce H.DWiggins - "Automotive Air Conditioning" - Delmar – 2002

REFERENCES

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1. Mitchell information Services, Inc - “Mitchell Automatic Heating and Air Conditioning Systems” - Prentice Hall Ind. - 1989.
 2. Paul Weiser - “Automotive Air Conditioning” - Reston Publishing Co., Inc., - 1990.
 3. MacDonald, K.I., - “Automotive Air Conditioning” - Theodore Audel series – 1978
 4. Goings.L.F. – “Automotive Air Conditioning” - American Technical services - 1974.
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**B. Tech. (Eighth Semester) Automobile Engineering
ME-420E NON CONVENTIONAL MANUFACTURING**

L T P
4 - -

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks

NOTE: In the semester examination, the paper setter will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, selecting at least one from each unit.

UNIT I

Unconventional machining processes, Rapid prototyping processes, their classification, considerations in process selection.

Ultrasonic Machining

Elements of process, design of cutting tool, metal removal mechanism, effect of parameters, economic considerations, limitations and applications, surface finish.

UNIT II

Electrochemical Machining

Elements of process, process chemistry, metal removal mechanism, tool design, accuracy, surface finish and work material characteristics, economics advantages, limitations and applications, Electrochemical grinding, debarring and honing, Chemical machining.

Electric Discharge Machining

Principle and mechanism of metal removal, generators, electrode feed control, electrode material, tool electrode design, EDM wire cutting, surface finish, accuracy and applications.

UNIT III

Jet Machining

Principal and metal removal mechanism of abrasive and water jet machining, process variables, design of nozzle, advantages, limitations and applications.

Plasma arc machining, Electron beam machining, laser beam machining, their principles and metal removal mechanism, process parameters, advantages and limitations, applications.

UNIT IV

Rapid Prototyping

Fundamentals, process chain, physics of processes, principles and process mechanism of SLA, SGC, LOM, FDM and SLS processes, their advantages and limitations, applications of RP processes, RP data formats, STL file format, STL file problems, STL file repair, other translators and formats.

Rapid Tooling Process

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Introduction, fundamentals, classification, indirect RT processes, Principles of Silicone Rubber Molding, Epoxy Tooling, Spray Metal Tooling, Pattern for Investment Casting, Vacuum Casting, and Vacuum forming processes, direct RT processes, Shape Deposition manufacturing, their advantages, limitations and applications.

Reference and Text Books:

1. Modern machining processes -By P.C. Pandey and M.S. Shan, 1 MI I.
2. Machining Science -By Ghosh and Mallik, Affiliated East West
3. Nontraditional Manufacturing processes -By G.F. Benedict, Maicel Dekker.
4. Advanced Methods of Machining -By J.A. McGeongh, Chapman and Hall.
5. Electrochemical Machining of Metals -By Rurnyantsev & Davydov, Mir Pub.
6. Rapid prototyping: Principles and applications in Manufacturing

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**B. Tech. (Eighth Semester) Automobile Engineering
ME-424E MANUFACTURING MANAGEMENT**

L T P
4 - -

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks

NOTE: In the semester examination, the paper setter will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, selecting at least one from each unit.

UNIT I

Manufacturing Systems Designs: Definition, Systems, Subsystems, Systems Approach Fundamentals, Systems Approach for designing, Manufacturing Systems, Systematic Layout Planning (SLP), Computerized Plant Layout-CRAFT, ALDEP, CORELAP, Assembly Line balancing, Problems and solutions of assembly lines, Group Technology & Cellular Systems, Classification & Grouping, overview of FMS. Strategic consideration for comparison of various systems.

Manufacturing Systems Economics: Concept of time value of money, Preparation of time profile of project, Single payment, Equal Series payment, various machine and project selection & evaluation techniques: Payback period, Present worth, Equivalent annual cost, Cost- benefit ratio, Evaluation for both equal & unequal life. Depreciation concept various methods-straight line, declining balance, Sum of the digits, Sinking fund.

UNIT II

New Product Development (NPD): Product Development, Customer Need, Strategies for New Product Development, Product life cycle, Product status. Corporate Design Strategies, Japanese Approach to NPD. PUGH total Design approach, PAHL & BEITZ Approach, Project Approach, Cross functional Integration –Design, manufacturing, Marketing, Concurrent Engineering, Modular Design, Standardization Value Engineering & Analysis.

Manufacturing Planning & Control Systems: Overview of Aggregate Planning Models, Linear Decision Rules, Management Coefficient, Direct Search Methods, Master Production Schedule, Modular Bill and Materials, Capacity planning & control, language, medium range, short range capacity planning, Toyota Production System, Just- in Time (JIT), Manufacturing –Philosophy, Elements, KANBAN, effects on layout, workers & vendors, optimized production technology (OPT).

UNIT III

Forecasting Methods: Forecasting Framework, Forecasting cost and accuracy, Forecasting Uses and Methods – Delphi, Exponential Smoothing, Forecasting Errors – MAD, Regression Methods-Linear Model for single & multiple variables, Brief idea of computerized forecasting systems.

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Material Requirements Planning (MRP): Definition of MRP systems. MRP versus Order point, MRP Elements, Types of MRP – MRP I & II. Structured Bill of Materials. Regenerative & Net change MRP, Operating an MRP, Integration of Production & Inventory Control.

UNIT IV

Maintenance & Reliability: Concept of preventive & breakdown maintenance, maintenance cost, optimal preventive maintenance simple replacement models-individual and group replacement, MAPI - methods, reliability definitions, failure analysis and curve, systems reliability- series parallel, redundancy, methods of improving reliability, MTBF, MTTR, Maintainability, availability, brief concept of terotechnology.

Text books:

1. Operations management – Schoroeder, Mc Graw Hill International
2. Production operations management – chary, TMH, New Delhi.

Reference books:

1. Production Operations Management – Adam & Ebert, PHI, New Delhi
2. Operational Management –Monks, Mcgraw Hill, Int.
3. Production & Operations Management – I. Hill, Prentice Hall Int.
4. Production Planning & Inventory Control – Narasimham etal, PHI, New Delhi
5. Production & Operation Management- Panneerselvam, PHI, New Delhi
6. Managing for Total Quality-Logothetis, PHI, New Delhi
7. Concept of Reliability Engineering –L.S. Srinath, Affiliated East West.
8. Revolutionizing Product Development – Wheelwright & Clark, Free press.
9. Management In Engineering – Freeman-Ball & Balkwill, PHI, New Delhi.
10. Production & operations management – Martinich, John Wiely , New Delhi.
11. The goal by Eliyahu M. Goldratt & Jeff Cox, Productivity Press India Ltd,, Bangalore
12. Toyota Production System by Taichi Ohno, Productivity Press India Ltd, Bangalore

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**B. Tech. (Eighth Semester) Automobile Engineering
ME-426E TOTAL QUALITY MANAGEMENT**

L T P
4 - -

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks

NOTE: In the semester examination, the paper setter will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, selecting at least one from each unit.

UNIT I

Concept of Quality, Quality as the basis of market competition, Historical review, Quality philosophy of Deming, Juran, Crosby etc., Obstacles, Integrating productivity and Quality.

Organization of Quality, Quality council, Total Quality Culture, Quality leadership, Quality awards, Total employee involvement, Quality circles, Attitude of top management, executives and workers, Operators responsibility of Quality, causes of operator's errors, Motivation.

UNIT II

Introduction to TQM, Models for TQM. TQM implementation, Advantages of TQM, Obstacles to TQM, TQM in service sector.

Concepts of Quality function deployment, cause and effect diagram, SWOT analysis, Continuous improvement, PDCA cycle, Supplier partnership, Supplier certification, Pareto diagram, Scatter diagram, Benchmarking, Taguchi's Quality Engineering, Failure mode and effect analysis, Total productive maintenance, Introduction to JIT, JIT Quality management, SQC, SPC, DPR, Kaizen, Six sigma concept.

UNIT III

Introduction to ISO 9000 series of standards, other quality systems, Implementation, Documentation, Internal audits, Registration, Closing Comments.

UNIT IV

Beyond ISO 9000 horizon, Introduction to ISO 14000, Series standards, Concepts of ISO 14001, EMS Benefits, ISO 10011- 10014, Quality systems.

SUGGESTED BOOKS:

1. Total Quality Management: By Bosterfield et al., Pearson Education India, 2001.
2. The Essence of Total Quality Management: By Johan Bank, Prentice Hall of India 2000.
3. Managing for Total Quality: By Logothelis Prentice Hall of India, 2000.

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4. Total Quality Management: By Sundra Raju, Tata Mcgraw Hills publishing company, 1997.
5. TQM and ISO 9000: By K.C. Arora, S.K. Kataria & Sons 2000.
6. ISO 9000 Quality System: By Dalde & Saurabh, Standard Publishing, 1994.

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B. Tech. (Eighth Semester) Automobile Engineering
AE-422E MATERIAL MANAGEMENT

L T P
3 1 -

Sessional: 50 Marks

Theory: 100 Marks

Total: 150 Marks

NOTE: In the semester examination, the paper setter will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, selecting at least one from each unit.

UNIT I

Introduction: Objectives of materials-the function of purchasing and material management-significance of specifications standardization- make or buy decision, buying process.

UNIT II

Materials Planning and Control: Material forecasting-selection inventory control-Spare parts management-Inventory systems-lead time analysis, administrative lead time, supplier lead time, transport lead time and inspection lead time-flow charting techniques to reduce various types of lead time- materials requirement planning- aggregate inventory management.

UNIT III

Storage and Distribution: Codification of materials-storage design-stores layout - storage systems and equipment - stores preservation - stores procedures - stock valuation and verification - ware housing and distribution management.

UNIT IV

Purchase Function: Purchasing policies and procedures-legal aspects of purchasing-selection of sources of supply-vendor evaluation and rating, vendor development-price, cost analysis.

Materials Accounting and Budgeting: Evaluation of materials management performance-Information systems and computer in materials management.

TEXT BOOK

1. Gopalakrishnan, P., *Purchasing and Materials Management*, Tata McGraw Hill, 1990.

REFERENCE BOOKS

1. Camer Lee and Donald M Dubble, *Purchasing and Materials Management*, Text and cases, Tata McGraw Hill, 1997.
2. Mark, J. V., *Operations Management*, McGraw Hill Publishers, 1984.
3. Westing, J. K., Fine, E.V. and Zone, C.T., *Purchasing Management Principles*, John Wiley & Sons, New York, 1986.

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B. Tech. (Eighth Semester) Automobile Engineering
AE-424E ENTREPRENEURSHIP DEVELOPMENT

L T P
3 1 -

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks

NOTE: In the semester examination, the paper setter will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, selecting at least one from each unit.

UNIT I

Entrepreneurship: Historical Perspective of Entrepreneurship-Entrepreneur-Traits of Entrepreneurs-Types of Entrepreneurs- Intrapreneur-Difference between Entrepreneur and Intrapreneur-Entrepreneurship in Economic growth, Factors affecting Entrepreneurial Growth, Major motives influencing Entrepreneur.

UNIT II

Business: Small Enterprises-definition, Classification- Characteristics, Web and e business - Ownership structure-Project Formulation- Sources of Information- Steps involved in setting up a business- -Identifying, Selecting a good business opportunity, Market survey and research, Techno economic feasibility assessment-Preliminary Project report –Project Appraisal – Project implementation-Network Analysis, Techniques of PERT/CPM.

UNIT III

Marketing & Growth Strategies: Principles of Marketing, Assessment of market needs, Demand Forecasting, Product Life cycle-Sales Promotion Strategies- Product mix-Advertising- Distribution Channels. Growth Strategies- Expansion, Diversification, Joint venture, Merger, Sub-contracting

UNIT IV

Institutional Support to Entrepreneurs: Institutional support to Entrepreneurs-Government policy for small scale industries, Institutions for entrepreneurial growth – various schemes-Self Help Group-Sickness in industry-causes-steps for correction and rehabilitation (Field work-Collection of information on schemes of Entrepreneurial Support and Presentation).

TEXT BOOKS

1. Khanka, S.S., *Entrepreneurial Development*, S.Chand & Co Ltd, New Delhi, 1999.
2. Philip Kotler, *Principles of Marketing*, Prentice Hall of India, 1995.
3. Lamer Lee and Donald W.Dobler, *Purchasing and Materials Management*, Tata McGraw Hill, 1996

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REFERENCE BOOKS

1. EDII –Faculty and External Experts, *A Hand Book of new Entrepreneurs*, Published by Entrepreneurship Development Institute of India, Ahmedabad, 1986
2. Saravanavel, P., *Entrepreneurial Development*, Ess Pee Kay Publishing House, Chennai, 1997

B. Tech. (Eighth Semester) Automobile Engineering
AE-426E INDUSTRIAL SAFETY AND ENVIRONMENT

L T P
3 1 -

Sessional: 50 Marks

Theory: 100 Marks

Total: 150 Marks

NOTE: In the semester examination, the paper setter will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, selecting at least one from each unit.

UNIT I

Accident Prevention: Definitions and theories:- Accident – Injury –unsafe act – unsafe condition – Dangerous occurrence –Theories and principles of accident causation – Cost of accidents – Accident reporting and investigations – Safety committees – need – types – advantages. Safety Education and training- Importance - various training methods – Accident prevention – Motivating factors – Safety suggestion schemes. Safety performance – Definitions connected with measuring safety performance as per Indian and International standards.

UNIT II

Safety in Material Handling: General safety consideration in material handling - Ropes, Chains, Sling, Hoops, Clamps, Arresting gears – Prime movers. Ergonomic consideration in material handling, design, installation, operation and maintenance of Conveying equipments, hoisting, traveling and slewing mechanisms. Selection, operation and maintenance of Industrial Trucks – Mobile Cranes – Tower crane.

Safety in Chemical Industries: Safety in the design process of chemical plants- Safety in operational and maintenance – Exposure of personnel, Operational activities and hazards – Safety in storage and Handling of chemical and gases – Hazards during transportation – pipeline transport – safety in chemical laboratories. Specific safety consideration for Cement, paper, pharmaceutical, petroleum, petro- chemical, rubber, fertilizer and distilleries.

UNIT III

Environmental Impact Assessment: Evolution of EIA – Concepts – Methodologies – Screening – Scoping — Checklist, Rapid and Comprehensive EIA – Legislative and Environmental Clearance procedure in India – Prediction tools for EIA. Assessment of Impact – Air – Water – Soil – Noise- Biological. Socio cultural environment – Public participation – Resettlement and Rehabilitation, Documentation of EIA .

UNIT IV

Regulations for Health, Safety and Environment: Factories act and rules; Indian explosive act - Gas cylinder rules. Environmental pollution act - Indian petroleum act and rules. Oil

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industry safety directorate (OISD) - Indian Electricity act and rules. Mines act and rules - Indian motor vehicles act and rules.

TEXT BOOKS

1. Handlin, W., *Industrial Hand Book*, McGraw-Hill, 2000.
2. Anton, T. J., *Occupational safety and health management*, (2nd ed.). New York, NY: McGraw Hill, Inc, 1989.

REFERENCE BOOKS

1. Heinrich, H.W., *Industrial Accident Prevention*, McGraw-Hill, 1980
2. Rudenko, N., *Material Handling Equipments*, Mir Publishers, Moscow, 1981.
3. Lees, F.P., *Loss Prevention in Process Industries*, Butterworths, NewDelhi, 1986.
4. Canter, R. L., *Environmental Impact Assessment*, McGraw Hill.

**B. Tech. (Eighth Semester) Automobile Engineering
ME-430E ENERGY MANAGEMENT**

L T P
3 1 -

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks

NOTE: In the semester examination, the paper setter will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, selecting at least one from each unit.

UNIT I

Inertial phase, audit and analysis phase, implementation phase, general methodology for building and site energy audit, site survey, methodology, site survey-electrical system, steam and water systems, building survey methodology, basic energy audit instrumentation, measurement for building surveys.

General principles, the requirements for human comfort, description of typical systems-dual duct HVAC system. Multi zone HVAC systems, variable and volume systems, terminal repeat system, evaporative systems, package system, basic principle governing HVAC system, package system, basic principle governing HVAC system operation, energy management opportunities in HVAC systems, modeling of heating and cooling loads in buildings, problems.

UNIT II

General principles, illumination and human comfort, basic principles of lighting system, typical illumination system and equipment, fundamentals of single phase and 3 phase A.C. circuits, energy management opportunities for lighting systems, motors and electrical heat, electrical and analysis and their parameters, peak, demand control, problems.

General principles, process heat, combustion, energy saving in condensate return, steam generation and distribution, automotive fuel control, hot water and water pumping, direct and indirect fired furnaces over, process electricity, other process energy forms-compressed air and manufacturing processes, problems.

UNIT III

General consideration, life cycle costing, break-even analysis, cost of money, benefit/cost analysis, payback period analysis, and prospective rate of to return, problems. Environmental conformation, passive design, conservation building envelope design consideration, integration of building system, energy storage problems.

UNIT IV

Energy management principle involving computers, basics of computer use, analysis engineering and economic calculations, simulation, forecast, CAD/CAM controls -

microprocessor and minicomputers, building cycling and control, peak demand limiting and control: industrial power management, problems.

TEXT BOOK:

1. Energy Management Principles by Criag B. Smith, Published by Pergamon Press.
2. Energy systems and developments – Jyoti Parikh, Oxford University Press.

REFERENCE BOOKS:

1. Energy – resources, demand and conservation with reference to India – Chaman Kashkari, Tata Mc Graw Hill Co. Ltd.
2. Integrated renewable energy for rural development – Proceedings of Natural solar energy convention, Calcutta.

B. Tech. (Eighth Semester) Automobile Engineering
ME-432E MANAGEMENT INFORMATION SYSTEM

L T P
3 1 -

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks

NOTE: In the semester examination, the paper setter will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, selecting at least one from each unit.

UNIT I

What is MIS? Decision support systems, systems approach, the systems view of business, MIS, MIS organization within the company management organizational theory and the systems approach. Development of organizational theory, management and organizational behaviour, management information and the system approach.

Evolution of an information systems, basic information systems, decision making and MIS, MIS as a technique for making programmed decision assisting information systems (r) strategic and project planning for MIS : General business planning, appropriate MIS planning-general, MIS planning -details.

UNIT II

Define the problems, set system objectives, establish system constraints, determine information needs, determine information sources, develop alternative conceptual ;designs and select one document the system concept, prepare the conceptual ;design report.

UNIT III

Inform and involve the organization, aim of detailed design, project management of MIS detailed design, identify dominant and trade off criteria, define the subsystems, Sketch the detailed operating subsystems and information flow. Determine the degree of automation of each operation, inform and involve the organization again, inputs, and processing, early system testing, software, hardware and tools, propose an organization to operate the system, document the detailed design, revisit the manager -user.

UNIT IV

Plan the Implementation , acquire floor space and plan space layouts, organize for implementation, develop, procedures for implementation, train (ho operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files, test the system, cutover, document the system, evaluate the MIS control and maintain the system (r). Pitfalls in MIS development: Fundamental weakness, soft spots in planning, design problems, implementation: The TARPIT.

TEXT BOOKS:

1. Management Information system by W.S. JawadeKar - Tata McGraw Hill.