

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits (L+T+P)	Theory						Total Marks
			Major		Minor		Sessional		
			Max marks	Min Marks	Max marks	Min Marks	Max marks	Min Marks	
TMCT-101	<u>Advance Mathematics</u>	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skills and reasoning. Each objective question should have four choices to pick up from. Remaining five questions carry 08 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concept, knowledge and application. Candidates are required to answer all the questions.

Syllabus

Theory:

Unit 1:

Numerical solution of Partial Differential Equation (PDE): Numerical solution of PDE of hyperbolic, parabolic and elliptic types by finite difference method.

Unit 2:

Integral transforms: general definition, introduction to Mellin, Hankel and Fourier transforms and fast Fourier transforms application of transforms to boundary value problems in engineering.

Unit 3:

Integral equations: Conversion of Linear Differential equation (LDE) to an integral equation (IE), conversion of boundary value problems to integral equations using Green's function, solution of Integral equation, IE of convolution type, Abel's IE, Integral differential equations, IE with separable variable, solution of Freehold

Equation with separable kernels, solution of Fredholm and Volterra equations by method of successive approximations.

Unit 4:

Calculus of Variation: Functional and their Variation, Euler's equation for function of one and two independent variables, application to engineering problems.

Unit 5:

FEM: Variation functional, Euler Lagrange's equation, Variation forms, Ritz methods, Galerkin's method, discretization, finite elements method for one dimensional problem.

Reference Books:

1. CF Froberg, Introduction to numerical analysis.
 2. SS Sastry, Introductory methods of numerical analysis
 3. Krasnov, Kiselev and Makarenko, Integral equations
 4. Buchanan, Finite element Analysis (Schaum Outline S), TMH
 5. Krishnamurthy, Finite element analysis, TMH
 6. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Hill.
 7. Advance Engineering Mathematics by Ervin Kreszig, Wiley Eastern Edd.
 8. Applied Numerical Methods with MATLAB by Steven C Chapra, TMH
 9. Numerical Methods in engineering, Salvadori and Baron
 10. Theory and problems of Numeric analysis (Schaum Outline S), Schied, TMH
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AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits (L+T+P)	Theory						Total Marks
			Major		Minor		Sessional		
			Max marks	Min Marks	Max marks	Min Marks	Max marks	Min Marks	
TMCT-102	<u>Construction Materials</u>	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skills and reasoning. Each objective question should have four choices to pick up from. Remaining five questions carry 08 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concept, knowledge and application. Candidates are required to answer all the questions.

Syllabus

Theory:

UNIT-I

Material Science:

Classification, Standardization, Codification and Variety. Details of Micro Structure of Different construction Materials, Different effects on materials of construction.

UNIT-II

Properties of Materials:

Environmental Influences : Thermal effects : Effect of Chemicals, Fire resistance, Corrosion and Oxidation, Radiation. Properties of fresh & hardened concrete. Shrinkage & creep of concrete.

UNIT-III

Concrete:

Design and production of concrete ingredients, Additives and admixtures. Special concretes e.g. light weight, Heavy weight, Ready mix concrete, Fibre Reinforced concrete etc.

UNIT-IV

New Construction Materials:

Polymer materials, Thermo - Plastic, Polymer Concrete, Composite materials, Ferro cement, Ferro concrete, Building materials from Agricultural & Industrial wastes.

UNIT-V

Quality control in construction:

Various aspects, Principle of statistical quality control. Different techniques of materials and process Quality control, Destructive and non-destructive Testing of Materials, I.S. and international procedures of testing.

Reference Books:

1. Ammer, D.A. Material Management Irwin Publishers Illionis, 1972.
2. White A.H. Engineering materials, MC Graw - Hill.
3. Deb. A., Engineerig materials, world press.
4. Billmeyer Jr. F.W. Text Book of Polymer Science, Interscience Publishers Inc.
5. Golding Brage Polymers and Resins Nortrand.
6. Schmidt A.X. & Marties CA "Principle of High Polymer Theory & Practice" MC Graw - Hill.
7. Stille, J.K. "Introduction to Polymer Civil Engineering " Johwiley.
8. Winding C.C. & Hiatt G.D. "Polymetric".

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Department: Civil Engineering

Subject Code	Subject Name	Credits (L+T+P)	Theory						Total Marks
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TMCT-103	<u>Advanced Geotechnical Engineering</u>	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skills and reasoning. Each objective question should have four choices to pick up from. Remaining five questions carry 08 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concept, knowledge and application. Candidates are required to answer all the questions.

Syllabus

Theory:

UNIT-I

Site Investigations & Stress Distribution in soils:

Brief review of various methods of subsurface explorations, soil sampling, subsurface soundings, Geophysical explorations. Stress distribution beneath loaded areas by Boussinesq Westergaard's and Steinbrenner methods. New mark's influence chart. Contact pressure distribution. Settlement analysis.

UNIT-II

Well Foundations & Cofferdams:

Types of caissons , Wells, and their design criteria. IS and IRC codes and their provisions. Tilt and Shift in wells and their rectifications. Types, Design data for cellular dams, stability analysis. interlock Stresses, Methods of design of cellular coffer dams.

UNIT-III

Machine Foundations:

Theory of Vibrations. Single and double degree of freedom system. Damped and undamped vibrations. Types of machine foundations, mass spring model of analysis. Apparent mass of soil. Design of block foundations for impact type of machinery. Indian standard on Design and Construction of Foundations for Reciprocating machines.

UNIT-IV

Foundations on Expansive Soils:

Characteristics and treatment of expansive soils. Construction techniques in expansive soils. Use of under-reamed piles and their design criteria, CNS Layer techniques. Construction on collapsible soil.

UNIT-V

Rock Mechanics:

Problems in Rock mechanics, Classification of rocks, physical, geological and Mechanical properties of rocks, mechanics of rock, deformation and fracture under load. The range and scope of Rock mechanics in relation to civil engineering projects.

Reference Books:

1. Soil Mech. & Found. Engg. by Dr. K.R. Arora - Std. Publishers Delhi.
2. Soil Mech. & Found. by Dr. B.C.Punmia- Laxmi Publications, Delhi.
3. Modern Geotech Engg. by Dr.l Aram Singh - IBT Publishers, Delhi.
4. Geotech Engg. by C. Venkatramaiah - New Age International Publishers, Delhi.
5. 5. Soil Mech. & Found. Engg. by S.K. Garg- Khanna Publishers, Delhi.
6. Soil Testing for Engg. by T.W. Lambe - John Wiley & Soms. Inc.
7. Relevant I.S. Codes

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TMCT-104	Construction Technology	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

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Syllabus

Theory:

Unit 1:

Advanced Pavement Construction Techniques:

Pavement Construction using Bitumen, Hot mix plant, Concrete Road Construction, Fibre Reinforced Pavement Construction, Low Cost Road Construction Techniques.

Unit 2:

Form Work and Temporary Structures:

Design and construction features of different types of Temporary Structures. Stationary and slip form work Techniques, Special features of insitu construction. Stripping and Removal of form works, Form works for special structures e.g. shells, bridges, towers etc.

Unit 3:**Steel Construction :**

Shop and insitu construction techniques, different connections. High strength bolts, Clearances and Tolerances, Erection of steel structures like Bridges, Trusses Chimneys, Power Houses.

Unit 4:**Prestressing :**

Plants, Equipment for Prestressed Construction, Different Techniques of Prestressing. Prestressing of Bridge girders, water tanks and special structures

Unit 5:**Techniques of Heavy and Special Structures:**

Dams, Bridges, large span roofs, high rise Buildings, off shore Platforms, Pipelines, Tunnels and other underground structures, Safety measures in Construction

Reference Books:

1. Mohan Rai & M.P. Jai Singh; Advance in Building Materials & Construction,.
2. S.C. Rangwala; Engineering Materials
3. Sushil Kumar; Building Construction,
4. B.C. Punmia; Building Construction ,.
5. Building Construction, Metchell
6. Construction Technology, Chudley R.
7. Civil Engineering Materials, N. Jackson.
8. Engineering Materials, Surendra Singh.

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			Max marks	Min Marks	Max marks	Min Marks	Max marks	Min Marks	
TMCT-105	Low Cost Building Materials And Construction Techniques	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

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Syllabus

Theory:

Unit 1:

Concepts of low cost materials:-

Soil, Fly ash, Ferro cement, Lime, Fibers, Stone Dust, Boulders and oversize metal, Bitumen etc.

Unit 2:

Low cost building material products:-

- (a) Walls - Stabilized and sun dried, soil blocks & bricks, Hollow concrete blocks, stone masonry blocks, Ferro-cement partitions.
- (B) Roofs - Precast R.C. Plank & Joists roof, precast channel roof, Precast L-panel roof, Precast

Funicular shells, Ferro cement shells, Filler Slab, Seasal Fibre roof, Improved country tiles, Thatch roof.

Unit 3:

Low cost construction Techniques and Equipment:-

- (a) Techniques: - Rat trap bond construction, Precast R.C. and Ferrocement technique, Mud Technology.
- (b) Equipments: - Brick molding machine, Stabilised soil block making machine and plants for the manufacturing of concrete blocks.
- (c) Low Cost Roads :-

Unit 4:

Low cost sanitation:-

- (a) Waste water disposal system
- (b) Low cost sanitation for rural and urban areas
- (c) Ferro cement Drains

Unit 5:

Cost analysis and comparison:-

- (a) Low cost materials
- (b) Low cost techniques

Reference Books:

1. Mohan Rai & M.P. Jai Singh; Advance in Building Materials & Construction,.
2. S.C. Rangwala; Engineering Materials.
3. Construction Technology, Chudley R.
4. Civil Engineering Materials, N. Jackson.
5. Engineering Materials, Surendra Singh.
6. Y.P.Gupta; [Economics and Management of Concrete Construction and its Maintenance](#); New age international.
7. A.K.lal; [Handbook of Low Cost Housing](#); New age international.

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			Max marks	Min Marks	Max marks	Min Marks	Max marks	Min Marks	
<u>TMCT-106</u>	<u>Lab I Computer Workshop</u>	1(0+0+1)	25	08	25	08	00	00	50

List of Experiments

- I. To determine the various tools used in AutoCAD.
- II. To determine the advance technique used in StadPro.
- III. To determine the commands used in AutoCAD & StadPro.

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			Major		Minor		Sessional		
			Max marks	Min Marks	Max marks	Min Marks	Max marks	Min Marks	
<u>TMCT-107</u>	<u>Lab II Advance Construction I</u>	1(0+0+1)	25	08	25	08	00	00	50

List of Experiments

- I. To determine the various test used for aggregate (course & fine)
- II. To find the workability of given mix of concrete by Slump cone test.
- III. To determine the Mix design. Design the Mix for M40 concrete as per IS 456:2000

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			Major		Minor		Sessional		
			Max marks	Min Marks	Max marks	Min Marks	Max marks	Min Marks	
TMCT-201	Construction Management	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

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Syllabus

Theory:

Unit 1:

Contract Management - I :

Types of Construction contract, Lump sum, Unit rate, cost plus-fee, Cost Plus percentage-fee, Incentive Contracts, Nature of Contract, Contract Documents and Contracting procedures, contract revisions, Negotiated contracts, contract claims.

Unit 2:

Contract Management - II :

Technical Specifications, Drawings, Tender Bond, Labour and Material Payment Bonds, Scrutiny of Tenders, acceptance, letter of indent. Important Contract clauses, Terms of Payment, retention acceptance and final payment, maintenance period, Time for Completion, Extension of time, Variation in work and conditions, claims and disputes, liquidated damages, Termination rights and responsibility of client, Architect, Engineer, Contractor, Professional liability. Disputes in contracts, Sub-contracts Purchase orders as contracts. Insurance Contract and Claims. Arbitration, Accounts.

Unit 3:

Tender Management :

Advance Techniques of Estimating. Principles of Analysis of rates and Specification, writing for different types of construction industries, capital structure, Theories.

Unit 4:

Legal Frame Work of Construction :

Constitutional provisions relating to Business and industry, Master Plans, Indian Contract Act. Arbitration act.

Unit 5:

Labour Laws and Legislation :

Contract labour (RRA) ACT 1970, laws relating to wages, bonus & industrial disputes

Reference Books:

1. Y.P.Gupta; [Economics and Management of Concrete Construction and its Maintenance](#); New age international.
2. [Keith Potts](#); Construction Cost Management: Learning from Case Studies; [Routledge PUBLISHER](#)
3. B S Ramaswamy ;Contracts & Their Management; Lexis-Nexis Neix

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Subject Code	Subject Name	Credits (L+T+P)	Theory						Total Marks
			Major		Minor		Sessional		
			Max marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	
TMCT-202	Prefabrication Design & its Construction Tech.	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skills and reasoning. Each objective question should have four choices to pick up from. Remaining five questions carry 08 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concept, knowledge and application. Candidates are required to answer all the questions.

Syllabus

Theory:

Unit 1:

Prefabricated Construction :

Prefabricated construction, necessity, Advantages, disadvantages, Mass produced steel, reinforced concrete and masonry systems, Industrialised buildings.

Unit 2:

Modular Construction :

Modular coordination, basic module, planning and design modules, Modular grid systems, National Building Code Specification, Standardization, Dimensioning of products, Preferred dimensions and sizes, tolerances and deviations layout and processes.

Unit 3:

Prefabricates :

Classification, foundation, columns, beams, roof and floor panels, wall panels, clay units, box prefabricates, erection and assembly

Unit 4:

Design of prefabricated Elements :

Lift points, beams, slabs, columns, wall panels, footings, design of joints to transfer axial forces, moments and shear forces.

Unit 5:

Construction Techniques :

Large panel construction, Lift slab system, Glover system, constains' jack-block system, Constain V-Plate system, Bis on system, Silber-Kuhi System, control of construction processes.

Equipments, horizontal and vertical transportation.

Reference Books:

1. Colin davies;The prefabricated home; Reaction books
2. James Timberlake; Moduler Construcation; Wiley Public

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			Major		Minor		Sessional		
			Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	
TMCT-203	Construction Equipment And Material Management	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

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Syllabus

Theory:

Unit 1:

Planning and Selection of Construction Equipment :

Advantage of mechanization of Construction industry. Merits of Labour intensive construction. Planning for construction equipments. Analytical studies, equipment operation. Selection of construction machinery & equipments.

Unit 2:

Production Estimates, Sizing and Matching :

Cycle time capacity ratings and output of Excavators, Power shovels, drag lines, scrapper, bulldozers, tractor shovels rippers, motor graders etc. Sizing and matching. Capacity ratings and output of compactors, aggregate processing plant concrete production plants etc..

Unit 3:

Economics of Construction Equipment :

Equipment working rates, Investment cost, Depreciation cost, major repair cost. Cost of fuel and lubricants. Cost of labour, servicing and field repairs, overheads. Recommendations of statutory bodies

Unit 4:

System Approach :

Problems of equipment management. Application of CPM in equipment management. Application of the assignment model, transportation model and waiting line models in equipment management.

Unit 5:

Material Management :

Materials planning and budgeting. Role and functions at different levels of management and budgeting variations. Stages of materials management. A.B.C. analysis. Advantages, mechanics purpose cautions, limitations and tabular analysis.

Purchasing parameters and inter relationships. Time source quantity, price, quality, grading systems. Special purchasing systems. Obsolesence. Scrap disposal.

Reference Books:

1. B S Ramaswamy ; Contracts & Their Management; Lexis-Nexis Neix
2. Gupta Chitale; Material Management ; PHI
3. [Douglas D. Gransberg](#) , [Calin M. Popescu](#), [Richard Ryan](#) ;Construction Equipment Management for Engineers, Estimators, and Owners; CRC Publication

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TMCT-204	Financial Management In Construction Industries	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

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Syllabus

Theory:

Unit 1:

Personnel Management :

Principle of personnel management. Qualities of a personnel manager. Objective of personnel management. Personnel policies and programmes. Organizational structure of personnel department. Man power resources. Human resource planning. Job analysis. Performance standards, work rules. Recruitment and selection process. Tests and interview. Induction orientation and indoctrination. Policies, promotion, demotion, transfers etc. Training of personnel. Need for training. Principles of training programmes. Types of training programmes on the job training policy and implementation. Task analysis identification and methodologies. Evaluation of training and post training follow up. Performance appraisal-rating scales,

rankings etc. Management development programmes. Wage and salary management. Principles of wages and salary administration. Factors influencing wages. Types of wages and salary structure. Theory of wages. Minimum fair and living wages. Types of wages. Wage incentives. Types of incentive schemes. Profit sharing features-Fringe benefits general scope. Different types of fringe benefits and awards.

Unit 2:

Labour Management :

Industrial relations in construction industry. Principles of industrial relationships.

Functional requirements and programme, Industrial disputes, causes of disputes. Types Of disputes. Procedures of the settlement of industrial disputes. Implementation mechanism. Trade Unions - Principles of industrial trade unionism. Objectives and functions. Essentials of trade union. Objectives, forms levels and growth of worker's participation in management. Collective bargaining. Principles and main features of collective bargaining. Different industrial Regulations and labour laws and acts - Industrial Health and Safety. Occupational hazards. Provisions under factory act. Accident and safety at construction sites. nature and causes of accident. Safety Programmes and their principles. Factors effecting accidents etc.

Unit 3:

Waste Management :

Introduction to waste and waste management, the concept of productivity and its inter relationship with productivity. Systems concept of waste. Complementarity of waste and resource management. Identification of construction waste material waste, man power waste, energy waste, space waste time waste, equipment waste, capital waste, utilities and services waste. Data and information waste. Design of waste reduction in construction. Reduction, Collection, recycling treatment and disposal of waste in construction systems. Modelling of resources and waste flow in construction systems waste management and cost reduction. Roles of legislation and government

Unit 4:

Financial Management :

Managerial Economics & Financial Statement Nature and scope of managerial economics. Economic theories. Demand analysis and fore casting . Elasticities of demand. Cost and production analysis. Pricing decisions, Policies and practices. Break even analysis. Time value of money, Economics. Comparisons using time value of money basic of comparisons. Decision making amongst alternatives. Cash flow, discounted cash flow. Cash flow forecasting, Project appraisal through financial statements. Statement analysis. Financial ratio analysis, Trend analysis yield. Taxation and inflation, Sinking fund provisions. Risks and uncertainties. Project risk and firm risk. Replacement analysis. Finances & working capital. Capital budgeting & Performance budgeting. Benefit-cost ratio. Project selection, Control and evaluation, Pre-project and post project evaluation.

Unit 5:

Capital Generation & Financial Accounting Banking :

Financial Institutes like IFCI, IBI, International financing etc. Book keeping process in construction. The acciybtacey cycle. Journals, ledgers etc. for labour cost, materials and purchases miscellaneous ledgers and accounting procedures, types of financial statements in Govt.

Reference Books:

1. William E. Coombs & William J. Palmer; Construction Accounting and Financial Management; CRC Publication.
2. Padhi ; Labor & Industrial Laws; PHI

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TMCT-205	Appropriate Technology And Energy Conservation	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

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Syllabus

Theory:

Unit 1:

Appropriate technology –

Concept and its role in the present circumstances

Unit 2:

Rural Housing & Rural Environmental Technologies –

Planning, use of locally available materials, construction techniques. Concept and scope in rural areas planning of water supply schemes in rural areas, development of preferred sources of water, springs, wells, infiltration wells infiltration galleries, collection of rain water, specific problems and methods in rural water supply and treatment. Treatment and disposal of waste water, community and sanitary latrines. Compact and simple waste water disposal systems, biogas plants

Unit 3:

Rural roads –

Planning of rural roads, Socio-economic aspects, materials for rural roads, design aspects, drainage problems, and maintenance of rural roads

Unit 4:

Energy Conservation

Energy production, distribution and utilization, a review of global situation. Energy Trends, renewable and nonrenewable sources, research reviews. Building designs and energy factors affecting energy budget in buildings and settlements, Design of buildings for minimising energy.

Solar, Wind and Tidal energies, a review and their adoptability

Unit 5:

Low energy materials, construction techniques and environmental control.

Reference Books:

1. ; D.[Mukherjee](#) & S.[Chakrabarti](#) [Fundamentals of Renewable Energy Systems](#); Newage publication
2. D.S. [Chauhan](#) ; [Non- Conventional Energy Resources](#); New age publication

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<u>TMCT-206</u>	<u>Lab III Construction Management Software</u>	1(0+0+1)	25	08	25	08	00	00	50

List of Experiments

- I. To prepare the various specification used for building materials.
- II. To determine the percentage of water required for preparing cement paste of standard consistency.
- III. To determine the basic requirement of construction management technique in civil engineering.

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(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits (L+T+P)	Theory						Total Marks
			Major		Minor		Sessional		
			Max marks	Min Marks	Max marks	Min Marks	Max marks	Min Marks	
<u>TMCT-207</u>	<u>Lab IV Advance Construction</u>	1(0+0+1)	25	08	25	08	00	00	50

List of Experiments

- I. Design the aspects of Energy efficient green building.
 - II. To determine the different mixes using low cost materials.
 - III. To determine the setting time & Compressive strength of different low cost material mixes.
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			Major		Minor		Sessional		
			Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	
TMCT-301	Advanced Highway Construction	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skills and reasoning. Each objective question should have four choices to pick up from. Remaining five questions carry 08 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concept, knowledge and application. Candidates are required to answer all the questions.

Syllabus

Theory:

Unit 1:

Earthwork and Soling :

Classification of types of highway construction, Suitability of each type under Indian conditions. Selection of base course and surface course. Selection of soils, construction of embankments, excavation and compaction equipment's. Field and laboratory tests for quality control. Stone soling, brick soling, current practices. Construction of earth roads, gravel roads, soil stabilised roads, water bound macadam. Paved roads (i) bricks (ii) stones

Unit 2:

Bituminous Construction:

Properties, requirements and specifications of materials, equipments and plants. Detailed construction procedure of each type. Field and laboratory tests for quality control. Choice of binders under different conditions. IRC, British, and MOST Specifications. Bituminous surface treatments, interface treatments- primecoat, and tackcoat, surface dressing and seal coat, grouted or penetration macadam, bituminous bound macadam, Sheet asphalt, bituminous concrete, mastic asphalt, dense tar surfacing

Unit 3:**Cement Concrete Road Construction :**

Necessity of providing a base course under cement concrete road construction. Selection of materials, constructions methods, detailed construction procedure, Quality control tests (Lab. and Field). Construction equipments. Classification of various types of joints, necessity of providing each type, method of construction of joints, load transfer devices, dowel bars, tie bars. joints filler and sealer materials, IRC Specifications

Unit 4:**Reinforced Cement Concrete Road Construction :**

Necessity of providing reinforcement in cement concrete pavements, continuously reinforced concrete pavements, prestressed concrete pavements and fibre reinforced concrete pavements. Selection of the mix, compaction method and construction procedure for each type. Recommendations under Indian conditions

Unit 5:**Construction Planning and Management :**

CPM/PERT in Highway Construction

Reference Books:

1. R.K.Khitoliya ; [Principles of Highway Engineering](#) ; Dhanpat rai publication
2. S.K. Khanna & C.E.G. Justo & A.Veeraragavan ; Highway Engineering ; Nem Chand & Bro

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Department: Civil Engineering

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			Major		Minor		Sessional		
			Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	
TMCT-302 A	ADVANCED FOUNDATION ENGINEERING	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skills and reasoning. Each objective question should have four choices to pick up from. Remaining five questions carry 08 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concept, knowledge and application. Candidates are required to answer all the questions.

Syllabus

Theory:

Unit 1:

Bearing Capacity, Terzaghis analysis, Computations of bearing capacity factors. Skempton's analysis. Meyerhof's analysis. Balla's theory. Hansen's theory. Design of Shallow Foundations

Unit 2:

Pile Foundation :

Use of piles, Types of piles, Design of Piles, Group action in cohesive and cohesionless soils. Negative skin friction. Laterally loaded piles. Piles under inclined loads, pile load test, Hrennikoff Method.

Unit 3:

Engineering with Geosynthetics:

Introduction Basic Mechanism of reinforced earth strength characteristics of reinforced soil.

Unit 4:

Bridge Substructures :

Introduction, elements of bridge substructure, stability analysis of well foundation, design of pier & abutments, sinking of wells

Unit 5:

Marine Substructures :

Introduction, Types of Marine structures elements, design criteria, design of gravity wall, piled wharf structure breakwaters

Reference Books:

1. V. N. S. Murthy ; Advanced FOUNDATION Engineering ; CBS Publisher

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Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits (L+T+P)	Theory						Total Marks
			Major	Minor	Sessional				
			Max marks	Min Marks	Max marks	Min Marks	Max marks	Min Marks	
TMCT-302 B	ADVANCED DAM DESIGN AND CONSTRUCTION	4(3+1+0)	50	17	20	7	30	12	100

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skills and reasoning. Each objective question should have four choices to pick up from. Remaining five questions carry 08 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concept, knowledge and application. Candidates are required to answer all the questions.

Syllabus

Theory:

Unit 1:

Gravity Dams :

River valley projects and their purpose, preliminary investigations and surveys, Selection of site for a reservoir; Types of Dams and their choice. Stability factors; Stresses, Elementary profile, low and high Dams, Forces acting on a Dam. Evolution of the profile of a Dam by Method of Zones, Practical profiles. Design of openings in Gravity Dams, contraction joints. Foundation treatment by Grouting

Unit 2:

Spillways:

Design of ogee spillway section, Bucket and Energy Dissipation arrangements : Design and Details of siphon, Shaft, side channel, and chute spillways, Miscellaneous types of spillways. Design of spillway crest gates and sluice gates, hoisting Machines

Unit 3:

Elementary Design of Arch Dams :

Definition of an Arch Dam, classification of Arch Dams. Principles of Elastic Theory and applied Trial Load Analysis, Inclined arches, Dome-Dams, Details and Methods of analysis

Unit 4:

Earth Dams :

Introduction, Design criteria, against over topping, Control of seepage, Theory of flownets for homogeneous and Zoned embankments. Pore pressure, Stability of slopes, Methods of Analysis, slip circle Method, Protection of slopes, Protection against free passage of water, Rockfill dams

Unit 5:

Application of Photoelasticity to the Design of Dams. Use of the Electrical Analogy Method in the Design of Dams, stress computations with embedded Electrical Instruments.

River Diversion for construction of Dams, Constructional aspects in the Execution of River Valley projects.

Reference Books:

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