Computer Application (CADD)

Subject Code
05302

Theory

<table>
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No. of Periods in one session: 60

Rationale and Objective:

<table>
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<tr>
<th>S.No.</th>
<th>Topics</th>
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<tr>
<td>01</td>
<td>Introduction to drafting package.</td>
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<tr>
<td>02</td>
<td>Understanding CAD commands.</td>
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<tr>
<td>03</td>
<td>Basic Drawing Techniques.</td>
<td>(12)</td>
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<tr>
<td>04</td>
<td>Drawing.</td>
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<tr>
<td>05</td>
<td>Plan and Elevation of two room storey building.</td>
<td>(08)</td>
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<tr>
<td>06</td>
<td>Multiscale Drawing.</td>
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<td>07</td>
<td>Plotting of drawing.</td>
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<td>08</td>
<td>Three Dimensional Drawing.</td>
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CONTENTS:

TOPIC: 01 – INTRODUCTION TO DRAFTING PACKAGE: [04]

01.01 AutoCAD- Version, Features, Methods of getting started, Opening of existing drawing, Starting of new drawing, Use of Templates, Starting Wizard, Drawing Area, Menus, Tool Bar & Starting up of drawing area.

TOPIC: 02 – UNDERSTANDING CAD COMMANDS: [08]

02.01 Starting Command :- toolbar icon, flyout toolbar, Pull down menus, Keyboard menus.

02.02 Executing Commands :- Working with command prompt, line circle, Area Erase, Zoom, Break, Object Snaps.

02.03 Ending Commands :- Fillet, Donut, Offsets, Fillet, Extending, Trimming, Move, Text, Dim, Hatch, Drag, Copy, Paste, Trim etc.

TOPIC: 03 – BASIC DRAWING TECHNIQUES: [12]

03.01 Relocating Entities :- Screen limits, Set units & Precision, UCS icon, Crosshair, Size option window.

03.02 Dimensioning :- Linear, Radial, Diameter and Angular Dimension.

03.03 Layers :- Layer specifications.

03.04 EntityControls :- Line type, Scale factor, Use of array and mirror commands.

03.05 W Block/Block :- Create Block files, Use of layers and Solid Commands.

03.06 Attributes :- Borders & Title Block Construction.

TOPIC: 04 – DRAWING: [08]

04.01 Other Mode, Grid Command, Ellipse Construction.
Laying out the walls, Exterior Wall Lines, Interior Wall, Cutting Opening in the walls, Creating Doors etc.

**TOPIC: 05 – PLAN AND ELEVATION OF TWO ROOM STOREY BUILDING:**

**TOPIC: 06 – MULTISCALE DRAWING:**

06.01 Sealing Drawing, Proto Drawing, Floor Drawing, Wall Detail Drawing.

**TOPIC: 07 – PLOTTING OF DRAWING:**

**TOPIC: 08 – THREE DIMENSIONAL DRAWING:**

08.01 3 D Modeling, Conversion of orthographic drawing, Z-plane viewing Topographic Map Drawing, Polylines Perspective View.

**Books Recommended:**

1. Computer Fundamental. - Dr. B. Ram.
5. AutoCAD. - Rice
6. AutoCAD. - Oumera
### Scheme of Examination for Final Examination

**F.M. : 80**

<table>
<thead>
<tr>
<th>Types of Questions</th>
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R. C. C. Structure

<table>
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Rationale & Objective:

The subject forms an important part of Civil Engineering curriculum. Concrete and steel are the most useful and versatile modern building materials.

A Civil Engineering Technician must have a sound knowledge of the subject so that he may be able to execute economical and sound design of structures by limit state design method based on specifications laid down in IS code 456-2000 in conjunction with seismic ductility detailing as per IS code 13920 and IS 4326.

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<tr>
<th>S.No.</th>
<th>Topics</th>
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<td>01</td>
<td>Loads and Stresses in R. C. C. structures</td>
<td>(04)</td>
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<tr>
<td>02</td>
<td>R. C. C. Beams(Single Reinforced)</td>
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<td>03</td>
<td>R. C. C. Beams(Double Reinforced)</td>
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<td>R. C. C. Flanged Beams (T &amp; L Beams)</td>
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<td>R. C. C. Slabs Spanning in one direction</td>
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<tr>
<td>06</td>
<td>R. C. C. Slabs Spanning in two direction</td>
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<td>R. C. C. Columns-Axial and Bi-Axial moment</td>
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<td>R. C. C. Footings and Foundation</td>
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<td>Pre-stressed Concrete</td>
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<td>Working Stress Method Design</td>
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CONTENTS:

TOPIC: 01 – LOADS AND STRESSES IN R. C. C. STRUCTURES :

01.01 Dead Load. Live Loads. Wind Loads.
01.02 Seismic Loads, Calculation of Design Seismic force and their distribution as per IS 1893:2002
01.03 Elementary idea about effect of temperature, shrinkage and creep on R. C. C. structures, Types of reinforcements and grades of concrete, their properties and permissible stresses
01.04 Method of design of R. C. C. Sections, Assumption in Limit State method, Stress-Strain relationship for steel and Concrete, Limit state of collapse in flexure.

TOPIC: 02 – R. C. C. BEAMS (SINGLE REINFORCEMENT) [L.S.]:

02.01 Bending strength of singly Reinforced Beams.
02.02 Calculation of stresses developed in steel and concrete.
02.03 Design of Singly reinforced beam section. Control of deflection and slenderness Limits for Beams.
02.04 Shear strength of R. C. C. beams, R. C. C. beams with vertical stirrups with bent up bars and with inclined bars (Stirrups), Functions of shear reinforcement, Design of shear Reinforcement, Seismic hooks.
02.05 Bond in R. C. C. beams, Bond stresses, Development length of reinforced bars in Tension.
02.06 Acquaintance with IS-provisions for curtailment of Tension. Reinforcement in beams, condition for curtailment of flexural reinforcement in tension zone, special requirement near points of zero moment for curtailment of tension Reinforcement, Bar splices.
TOPIC: 03 – R. C. C. BEAMS (DOUBLY REINFORCED): [06]

03.01 Necessity of Double Reinforced Section, location of Natural axis, Bending strength of Doubly reinforced beams.
03.02 Calculation of stresses developed in concrete and steel of Doubly reinforced beams.
03.03 Design of Doubly reinforced beam
03.04 Shear stresses in doubly reinforced beams
03.05 Acquaintance with IS provisions for curtailment of Tension. Reinforcement in beams, condition for curtailment of flexural reinforcement in tension moment for curtailment of tension Reinforcement, Bar splices.

TOPIC: 04 – R. C. C. FLANGED BEAMS (T & L BEAMS) [L.S.]: [05]

04.01 Effective width of flange, Location of Natural axis, Lever arm for T and L sections.
04.02 Bending strength of T Beam and L Beam.
04.03 Calculation of stresses developed in concrete and steel of T-Beams and L-Beams.

TOPIC: 05 – R. C. C. SLAB SPANNING IN ONE DIRECTION [L.S.]: [04]

05.01 Design of simply supported slab and continuous slab as per IS provision.
05.02 Design of Cantilever slabs, sunshade

TOPIC: 06 – R. C. C. SLAB SPANNING IN TWO DIRECTION [L.S.]: [05]

06.01 Behaviour of slabs spanning in two directions with corners not held down by Grass hoff-Rankine Method.
06.02 Restrained slab with corners held down as per IS 456-1978.
Shear in Two way slab, provision of corner reinforcement, idea about different end conditions and their B. M. coefficient.

**TOPIC: 07 – R. C. C. COLUMNS- AXIAL AND BI-AXIAL MOMENT**

[05] **[L.S.]**:

- **07.01** Effective length of compression members, equivalent sectional area of columns. Radius of Gyration of column section, Slenderness Ratio of compression members, I. S. criteria for eccentricity.
- **07.02** Strength of long and short columns (Square, Rectangular and Circular columns).
- **07.03** Design of long and short columns(Square, Rectangular and Circular column with helical Re-inforcement).
- **07.04** Beam Column joints and their seismic ductile detailing as per IS Code-13920(latest revision)

**TOPIC: 08 – R. C. C. FOOTING AND FOUNDATION**

[08] **[L.S.]**:

- **08.01** Types of independent footing, Depth of foundation, thickness of edge of footing, Liquefaction, Mitigation of Liquefaction.
- **08.02** Shear force in Footing.
- **08.03** Design of footing for masonary and concrete wall.
- **08.04** Design of footing for a square and rectangular column.

**TOPIC: 09 – PRE STRESSED CONCRETE**

[04]

- **09.01** Basic principle, assumption and stress diagram.
- **09.02** Methods of prestressing.
- **09.03** Advantages and disadvantages of prestressing.
- **09.04** General idea about losses in prestressing.
TOPIC: 10 – WORKING STRESS METHOD OF DESIGN:

10.01 Introduction and definition.
10.02 Basic assumptions.
10.03 Analysis of rectangular singly reinforced section.

Books Recommended:

**Text Books**

1. R. C. C. - J. Jha
2. çcfyr daØhV vfHkdYiu - fHkukspk ,oa f}osnh
3. çcfyr lhesaV daØhV - chñ ,uñ >k
4. R. C. C. - Agrawal
5. R. C. C. - Rama Ruthan
6. Concrete Structure for Diploma Holders - Vaziranil Ratwani
7. R. C. C. Structure Volume I - B. C. Punamia
8. Plain Reinforced Concrete - Jain
9. R. C. C. Design - Patwardhan
10. R. C. C. Theory & Design - Sah & Kale
11. R. C. C. - Malick & Gupta
12. Text Book of Concrete Technology - B. L. Gupta
13. Concrete Technology - Vaziraw & Chando
14. Concrete Technology - Gambhir
15. R. C. Structure - I. C. Syal
16. Prestressed Concrete - Vaziraw & Chando
17. Limit State Design - A. K. Jain
18. çcfyr lhesaV daØhV - xq;pj.k flag
### Scheme of Examination for Final Examination

**F.M. : 80**

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TRANSPORTATION ENGINEERING

Subject Code: 05304

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Rationale:

Transportation is vital for industrial and agricultural development of any region. Socio-economic progress is intimately linked with an efficient system of transportation of goods and people from one region to another. Transportation is, also, essential for strategic movements in case of defence emergencies. Hence construction of roads, rails & bridges form a very important job function of a civil engineering technician.

Objective:

The students will be able to:

- Define different terms in Highway, Railway & Bridge Engineering.
- Know about highways classification
- Know about the factors covering location of highways and their alignment.
- Know Sign and Signals, Traffic island, Highway Illumination, Traffic Planning and administration, No. of traffic lanes, Camber, Gradient, super elevation.
- Understand about Highway materials, Road constructions, Road drainage, Road Environment, Road maintenance.
- Know about Rails, Sleepers, Point and Crossing, Track construction, Stations and yards, Signalling and interlooking, Track maintenance.
- Know the classification of Bridges causeways and culverts, Afflux, Scour and crossings and their differences.
- Know how to align Piers, Abutment, wing walls and Approaches, Bridge Construction & Maintenance.

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<tr>
<td>02</td>
<td>Railway Engineering.</td>
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<tr>
<td>03</td>
<td>Bridge Engineering.</td>
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</tbody>
</table>

**CONTENTS:**

**TOPIC: 01 – HIGHWAY ENGINEERING:**

01.01 Importance & modes of Trasportation, Brief history of highway developments, highway classification, Organisations & Associations.

01.02 Highway Planning & Survey: Factors influencing road planning. Factors covering location of highways and their alignment. Highway survey.

01.03 Traffic Engineering: Traffic Survey; Traffic characteristics, traffic operations, Traffic Accidents, Traffic markings, Signs & Signals; Traffic Island; Highway illumination; Traffic planning & administration.

01.04 Geometric Design: Right of way; Width of formation Width of pavement; Number of Traffic Lanes; Camber; Gradient; Super elevation & Transition; Speed; Sight distance, Methods of providing super elevation; IRC specifications.

01.05 Highway materials: Sub grade soil, Stone Aggregates; Bituminous materials, Bituminous paving Mixes; Cement concrete.

01.06 Basic description of flexible, Rigid Pavements.
01.07 Road Construction : Construction of Earth Roads; Construction of Water Bound Mocadam Roads; Construction of Bituminous pavements; Construction of Cement concrete pavements.
01.08 Road Drainage : Need for Drainage, surface & underground drainage.
01.09 Road Environment : Environmental factors in Highway planning; Arboriculture.
01.10 Road Maintenance : Road accidents, its Remedial measures.

TOPIC: 02 – RAILWAY ENGINEERING: [15]

02.01 Introduction.
02.02 Permanent Way – Gauge of tracks, rails, sleepers, ballast, fixtures & fastenings.
02.03 Points & Crossing.
02.04 Track Construction.
02.05 Stations & Yards.
02.06 Signalling & Inter Locking.
02.07 Track Maintenance.

TOPIC: 03 – BRIDGE ENGINEERING: [15]

03.01 Introduction – Classification of Bridges, temporary & permanent bridges, causeways & culverts.
03.02 Investigation – Site Selection; Collection of Hydraulic design data; Lineal water way; Afflux; Economical span, Scour & Erosion & their differencer.
03.03 Foundation – Scour Depth; depth of foundation, types of foundation, pile, well Raft, Caisson & Coffer Dam.
03.04 Piers, Abutment, Wing Wall & Approaches.
03.05 Bridge Constructions & Maintenance – brief idea.
Reference Books:

1. Highway Engineering - Khanna & Justo
2. Highway Engineering - Sharma & Sharma
3. I R C standard
4. Railway Engineering - N.L. Arora
5. Railway Engineering - Anita
6. Bridge Engineering - Rangwala
7. Railways, Bridge & Tunnel - N. L. Arora
8. Introduction to Bridge - N. Krishamurthy
9. Highway Engineering - Kurkarni
10. jsyos] egkekxZ ,oa iqy bZthfu;jhax flag & xq:pj.k
11. jsyos] egkekxZ ,oa iqy bZthfu;jhax fonhZ & vkgqtk ,oa Iquhy jatu
12. IM+d] jsyos ,oa iqy bZthfu;jhax & Iquhy jatu
13. Railway, Road & Bridge - Singhal
14. A Course In Highway Engg. - Brinda
15. Transportation Engg. - Vazirani
16. Principles of Bridge Engg. - Brinda
17. Road, Rail Bridge & Tunnel Engg. - B.L. Gupta

SCHEME OF EXAMINATION FOR FINAL EXAMINATION  F.M. : 80

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Rationale and Objective:

The Subject Mechanics of Structure forms a core subject for developing the concepts required in the design of various structure. The application of theoretical principles to practical field situation is essential. Integration of the principles to field problems would help the students in understanding the concepts.

Students will be able to:

- know various elements of structures
- understand the basic principles
- analyse a given problems

apply the basic principles in the problems

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<td>01</td>
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<td>(08)</td>
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<tr>
<td>02</td>
<td>Stresses in beam.</td>
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<tr>
<td>03</td>
<td>Combined direct and bending stress.</td>
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<td>04</td>
<td>Fixed &amp; continuous beam.</td>
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<tr>
<td>05</td>
<td>Slope and deflection of beam.</td>
<td>(08)</td>
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<tr>
<td>06</td>
<td>Columns and struts.</td>
<td>(06)</td>
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<td>Torsion.</td>
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<td>Dams of Retaining wall.</td>
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Total : (60)
CONTENTS:

**TOPIC: 01 – PRINCIPLE PLANES AND STRESSES:**

01.01 Definition of principal planes and principal stresses.
01.02 Different state of stresses – Normal stresses; tangential stresses on oblique planes of a body subject to axial stresses.
01.03 Normal and tangential stresses on oblique planes of a body subjected to stresses acting on two mutually perpendicular planes with or without shear stress.
01.04 Resultant stresses on oblique plane, principal stresses and principal planes, maximum shear stress and its planes. Condition for oblique plane to be principal plane.
01.05 Analytical and graphical solutions Diagramatic representation of principal planes, Principal stresses, shear stress, Resultant Stress and its obliquity, Maximum obliquity.

**TOPIC: 02 – STRESSES IN BEAM:**

02.01 Theory of simple bending, position of neutral axis, moment of resistance. Distribution of bending stress across the section, bending stress in symmetrical and unsymmetrical section Modulus, flexural strength of a section.
02.02 Shearing stress at a section in loaded beam, Distribution of shear stresses over Rectangular, circular, I,T.-section, & Triangular sections.
02.03 Relation between maximum and average shear stress.
03.01 Concept of direct and eccentric loads, eccentricity about one principal axis or both principal axis.

03.02 Stress distribution, nature of stress condition for no tension or zero stress at one extreme fibre, limit of eccentricity, Middle third rule, core or kernal of Section for various section columns.

03.03 Columns and chimney subjected to lateral wind pressure stress distribution at base.

04.01 Concept of fixity, effect of fixity, advantages and disadvantages.

04.02 Fixed end moments, its nature, bending moment and shear force diagrams for fixed beams of uniform section subjected to concentrated loads and uniformly distributed loads over entire span or a part of span.

04.03 Continuous beam-Introduction, theorem of three moments, concept of moment distribution method.

04.04 B.M.D & S.F.D for continuous beam with simply supported end, overhanging end span and fixed ends.

05.01 Concept of slope and deflection, stiffness of beam. Slope and deflection of members subjected to pure bending moments for statically determinate beam, Relation between slope, deflection and radius of curvature.

05.02 Differential equation method of calculating deflection & slope.

05.03 Maccaulay’s method, Moment area method.

05.04 Slope & deflection for simply supported, cantilever and over hanging beam subjected to U.D.L & concentrated loads.
05.05 Introduction of propped cantilever propped at mid of simply supported for U.D.L over entire span.

**TOPIC: 06 – COLUMNS & STRUTS:**

06.01 Definition and classification, and condition, assumptions.
06.02 Buckling of axially loaded compressive members, effective length, radius of gyration, slenderness ratio.
06.03 Euler’s theory for long columns, buckling load, safe load, limitation of Euler’s theory.
06.04 Empirical formula, Rankine formula, I.S. code formula, Johnson’s formula.

**TOPIC: 07 – TORSION:**

07.01 Concept of torsion and twisting moment theory of pure torsion, twist angle, polar moment of Inertia. Torsional equation, Polar modulus, Torsional rigidity.
07.02 Power transmitted by a shaft, shear stress distribution across a section of solid and hollow circular shaft.
07.03 Shafts of varying section, Torsion of composite concentric shaft.

**TOPIC: 08 – DAMS & RETAINING WALL:**

08.01 Introduction, pressure intensity at the base of dam and retaining wall, earth pressure, angle of repose.
08.02 Condition of stability of a dam & retaining wall, Maximum & Minimum stress distribution at the base.
08.03 Middle third rule, limit of eccentricity.
Books Recommended:

1. Strength of materials - M. Chakraborti
5. Theory of Structures vol I & II - Vazirani & Ratwani
6. Strength of materials - Ramarutham
7. Strength of material Part I & II - B.N. Bose
8. Strength of materials - G.H. Ryder

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Environmental Engineering

Subject Code
05306

Theory

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</table>

Rationale and Objective:

Environmental Engineering is the only Subject of Civil Engineering which directly related to the human health and therefore it is known as Public Health Engineering. It is also utilized to control the environment for the protection of health and comfort of all living beings on this earth as well as human being. No life can exist without water or it can be said that water is an essential for life as air is. With the rapid industrialization and abrupt growth in population increases water quantity demand and also affects its quality. The standard quality of water or portable water can not be imagined without proper sanitation. As this problem is related to the community, the environment around our society can not be untouched in Technician Education System of developing country like India in general and our State, Bihar in particular. Therefore, this subject has been divided into three groups as:-

(A) Water Supply Engineering,
(B) Sanitation Engineering, and
(C) Environmental Engineering.
The following topics with contents are capable in generating the knowledge, skill and proper attitude of technicians to provide potable water as it is not replicable and they will be able to motivate the users for adoption of Sanitary practices which will create hygienic environment.

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<tr>
<th>S.No.</th>
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<td>Quality of Water</td>
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<td>Treatment of Water</td>
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<td>05</td>
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<td>07</td>
<td>Drains &amp; Sewers</td>
<td>(02)</td>
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<td>08</td>
<td>Sewer Appurtenances</td>
<td>(03)</td>
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<td>Characteristics &amp; Examination of Sewage</td>
<td>(04)</td>
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<td>Ecosystem Ecological Balance of Nature</td>
<td>(09)</td>
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<td><strong>Total :</strong></td>
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</tbody>
</table>

**CONTENTS:**

**TOPIC: 01 – WATER SOURCES :** [02]

01.01 Need for protected water sources.
01.02 Types of water sources(Surface sources & Under ground water sources).
01.03 Factors affecting choice of water supply sources.
TOPIC: 02 – QUANTITY OF WATER:

02.01 Water Requirement for different purpose & B. I. S. Standards for per capita consumption of water.
02.02 Factors affecting the rate of water demand.
02.03 Different methods for estimation of population and Numerical problems associated with it.

TOPIC: 03 – QUALITY OF WATER:

03.01 Methods & Precautions in collecting water samples.
03.02 Water Analysis (Laboratory Method).
03.02.01 Physical Analysis.
03.02.02 Chemical Analysis.
03.02.03 Bacteriological Analysis.
03.03 Water Borne Diseases.
03.04 B.I.S. & WHO standards of potable water.

TOPIC: 04 – TREATMENT OF WATER:

04.01 Different types of impurities in water.
04.02 Objectives of water treatment.
04.03 Water treatment processes.
04.03.01 Sedimentation (Principle & types of sedimentation Tanks only)
04.03.02 Sedimentation with coagulation. (Necessity, principle, common coagulants and choice of Coagulant, Optimum coagulant, Dose determination, Coagulation process and its limitations only)
04.03.03 Filtration (Objects, theory and classification of filtration, comparison between slow sand Filters & Rapid sand Filters and Washing Methods of Filters only)
04.03.04 Disinfection
(Objective, criteria for a good disinfectant, Methods of disinfection, Different Forms and classification of chlorination only)

04.03.05 Typical Layout of a water Treatment plant.

**TOPIC: 05 – CONVEYANCE & DISTRIBUTION OF WATER:** [10]

05.01 Intake (types and selection of site only)
05.02 Different types of pipes.
05.03 Use of valve (sluice valve, Pressure Relief Valves, Check Valves, Air Relief Valves & Drain Valves).
05.04 Description & Working Principle of Fire Hydrant.
05.05 Distribution System of Water.
(Gravity, Pumping & Dual System)
05.06 Methods of Distribution.
(Dead End, Grid Iron, Radial and Ring System).
05.07 Types of Reservoirs.
(Earth Reservoir, Masonry & R. C. C. Reservoir, Elevated Reservoirs- Stand pipes & Elevated tanks.)
05.08 General Layout of water supply arrangements for Residential Building only.

**TOPIC: 06 – SEWAGE DISPOSAL:** [02]

06.01 Common Technical Terms used in Sanitary Engg.
06.02 Methods of Disposal Sewage.
(Conservancy system, Water Carriage System and their comparison)
06.03 Sewerage System
(Comparison among combined, separate & Partially separate system only)
TOPIC: 07 –DRAINS & SEWERS:

07.01 Common sections of drains and sewers.
07.02 Types of Sewers & Cleaning of Sewers.
07.03 Minimum, Maximum & Self Cleaning Velocity for design of Sewers.

TOPIC: 08 –SEWERS APPURtenances:

08.01 Locations, functions & construction of Manholes, Drop hole, Street inlet, Catch Basins, Flushing Tanks, inverted syphons & Regulators.

TOPIC: 09 –CHARATERISTICS & EXAMINATION OF SEWAGE:

09.01 Methods of Sampling of Sewage.
09.02 Physical, Chemical and Biological Properties.
09.03 Aerobic and Anaerobic Decomposition.
09.04 B.O.D. and C.O.D. tests.

TOPIC: 10 –SEWAGE TREATMENT & DISPOsAL:

10.01 Objectives of Sewage Treatment.
10.02 Classification of Treatment Processes
(Preliminary, Primary & Secondary treatment including Disinfection).
10.03 Principle Description advantages & disadvantages of intermittent Sand Filters & trickling filters.
10.04 Activated Sludge Process
(Concept, Operation, Advantages & Disadvantages only).
10.04.01 Methods of aeration and aerator.
10.04.02 Simple methods of sludge Disposal.
10.05 Sewage Disposal  
(Natural & Artificial methods).

10.06 Miscellaneous Treatment of Sewage  
(Oxidation Pond, Aerated Lagoons, Oxidation Ditch &  
Anaerobic Lagoons.)

10.07 Sanitary Latrine.

10.07.01 Various Flushing Systems.

10.07.02 Principle, Working and Design of Septic Tank including  
numerical problems related to the design of septic tank for  
different numbers of users.

10.08 Construction, Operation & Maintenance of Bio-gas Plant.

**TOPIC: 11 –ECO-SYSTEM & ECOLOGICAL BALANCE OF NATURE:**

11.01 Definition of common technical terms related to  
Environmental Pollution.

11.02 Water Pollution (Cause & its effects)

11.03 Air Pollution (brief idea, Classification, sources & its effect)

11.04 Noise Pollution (concept and effects on human health)

**Books Recommended:**


7. ty IEHkj.k] IQkbZ ,oa i;kZoj.k bathfu;jh - Gurucharan Singh

Reference Books:

13. lkslk;Vh ,oa i;kZoj.k vfHk;kaf=dh] Standard Pub., Delhi-110006 - K. N. Vyas
15. Relevent B. I. S. Code, B.I.S. -
16. Environmental Health & Technology, Pragati Prakashan, Meerut - Khudesia V. P. & Khudesia Ritu
17. Water Pollution, Pragati Prakashan, Meerut - Khudesia V. P.
18. Air Pollution, Pragati Prakashan, Meerut - Khudesia V. P.
19. Physio-chemical Examination of Waste Sewage & Industrial Effluent, Pragati Prakashan, Meerut - Manivasakam N.
# SCHEME OF EXAMINATION FOR FINAL EXAMINATION

F.M. : 80

<table>
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The above table refers to the annual examinations only.
Rationale:

Knowledge of Hydrology facilitates the engineers to estimate amount of water which can be stored or diverted for irrigation purpose. Irrigation is a multi disciplinary subject which is related mainly to Engineering as well as Agriculture and others. So far as construction and maintenance of works to obtain water from the source and lead it to the field is concerned, it is a part of engineering when as proper quantity and by best method is concerned it is a part of agriculture. But to ensure a correct and economical design of an irrigation system an engineer must be familiar with the latter aspects of irrigation, as well. Therefore the technicians of civil Engg. should acquire the knowledge of Hydrology and Irrigation Engineering for need of rising population of the country.

Objective:

The broad objectives of this paper are the following:
1. The technicians should be able to improve the area under his system by not only supplying the supplemental needs of the crops for water but also by improving the drainage where necessary for taking improved yields from the land
2. They may, also, be able to under take the reclamation of waste and alkaline lands where this can be carried out through the agency of water.
3. They should know the process of development of single and for multi purpose water resources projects, management of floods.

In order of obtain the above objectives the following topics are introduced:

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<th>S.No.</th>
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<th>Periods</th>
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<td>03</td>
<td>Water Requirement of corps.</td>
<td>(06)</td>
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<td>04</td>
<td>Lift Irrigation.</td>
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<td>Flow Irrigation.</td>
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<td>Diversion Headworks.</td>
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<td>07</td>
<td>Storage Headworks.</td>
<td>(04)</td>
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<td>08</td>
<td>Irrigation Structures.</td>
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<td></td>
<td>(a) Cross Drainage works.</td>
<td>(03)</td>
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<td>(b) Head Regulators cross Regulators, falls, escape and Regulators</td>
<td>(03)</td>
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<tr>
<td>09</td>
<td>River Training works and Flood Management</td>
<td>(06)</td>
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<td>Miscellaneous topics</td>
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**Total:** (60)

**CONTENTS:**

**TOPIC: 01 – INTRODUCTION:** [02]

Water Resources of India with special references to Bihar, Definition of Hydrology and Irrigation necessity and importance, advantages and disadvantages of irrigation prospects of water resources development single and multipurpose, development of irrigation facilities in India with special reference to Bihar, Irrigation a multi disciplinary works.
**TOPIC: 02 – HYDROLOGY:**

Scope and Hydrologic cycle, rain fall and its measurement, raingauges automatic and non-automatic, average rainfall over catchment, types of catchment runoff, estimation of peak flood flow of a stream from:

(i) HFL data section of a straight reach stream and

(ii) Catchment area formula, stream gauging, measurement of stream flow.

**TOPIC: 03 – WATER REQUIREMENTS OF CROPS:**

Function of water in plant growth, consumptive use of water, crops seasons of Bihar, important crops of Bihar Agroclimatic zones of Bihar, crops water Requirements Duty, delta and base period concept, Climatological approach (Modified panmen method only) Irrigation frequency. Gross command area culturable command Area, intensity Irrigation and elementary knowledge of soils in relation to crops.

**TOPIC: 04 – LIFT IRRIGATION:**

Necessity, advantages, limitations, Different Lifting methods: manual and mechanical wells – location, different types, construction of wells.

Tube wells – Types and methods of boring, yield of wells – Derivation of the formula Merits and demerits of well irrigation.

**TOPIC: 05 – FLOW IRRIGATION:**

Introduction, classes of irrigation canals, canal alignment, typical cross section of canals, layout of main canal, branch canal and distribution system, design of regime irrigation canals by Lacry’s formula and Kennedy’s theory, use of sluices Kutter’s and Mannings formulae, canal lining – purpose, advantages and disadvantages.
TOPIC: 06 – DIVERSION HEAD WORKS:

Definition, object, general layout of a diversion head works, function of different component parts, divide wall, under sluice, fish ladder, head regular, aprons etc.
(a) Weir–types, masonry weir, concrete weir, rockfill weir, functions of weir, typical cross section of a concrete weir.
(b) Barrages – Use and their functions, components parts and typical cross section of a barrage.

TOPIC: 07 – STORAGE HEAD WORKS:

(a) Dams – Types – Concrete dam, Rock fill dams and earthen dams, essential characteristics of dam with their component parts, condition of stability of dams, causes of failure of earthen dams, seepage in earthen dams and its control through drainage.
(b) Spillways and Gates – Functions, elementary idea of different types of spillways and gates.

TOPIC: 08 – IRRIGATION STRUCTURES:

(a) Cross drainage works – Functions, types, aquaduct, siphon, syphonic aquaduct, super passage, inlet and outlets, level crossing.
(b) Head regulators, cross regulators, falls and escapes.

TOPIC: 09 – RIVER TRAINING WORKS AND FLOOD MANAGEMENT:

Functions, stages of river, meandering of rivers, methods of river training cut offs marginal and retired embankments, guide bunds, spurs of groynas dykes, bank protection works, causes of inundation by floods: preventive and curative measures of flood management.
TOPIC: 10 – INTRODUCTION:

(a) Siltation in canals, their causes and remedy.
(b) Waterlogging – Causes and preventive measures, reclamation of waterlogged areas, curative and preventive methods.
(c) Soil conservation methods.
(d) Sprinkler irrigation and drip irrigation.
(e) Watershed management.

Books Recommended:


Reference Books:

1. Design of Irrigation Structures. - Varsheney & Gupta.
3. Irrigation Engineering, TMH. - Mazumadar.
5. flapkbZ baftfu;jhax - xq:pj.k flag.
7. FlapkbZ baftfu;jhax - Mh0nkl.
11. Irrigation Engineering - Shahstra Budhi
12. Irrigation & water Power Engg. - Punamia
13. Do - Pryani
15. Irrigation practise & Design - Khaslani
16. Irrigation Engg. - B.L. Gupta
### Types of Questions

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The above table refers to the annual examinations only.
Rationale and Objective:

It is well known that the important function of a Civil Engg technician is to supervise the constructional work of the structure. During supervision, the technician. Concrete technology and method of construction of structures so that he may establish the proper link between him and the mason on the above basis. The present curriculum has been divided into three groups as (a) Construction Practice of Earthquake Resistant Building (b) Concrete Technology and (c) Building Construction Technology.

The following Topics with the concrete are able to generate the knowledge, skill and proper attitude of technician towards the construction of structure in strict accordance with the presented specification and detail drawings.

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<th>Periods</th>
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<td><strong>Group-A : Construction Practice of Earthquake Resistant Buildings</strong></td>
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<td>01</td>
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<td><strong>Group-B : Concrete Technology</strong></td>
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Group-C : Building Construction Technology

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<td>05</td>
<td>Facing (05)</td>
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<td>06</td>
<td>Provision in Modern Building (06)</td>
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<td>07</td>
<td>Precast Building Component (05)</td>
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<td>08</td>
<td>Acoustics of Building (04)</td>
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<td>Maintenance of Building (06)</td>
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<td>Building by laws &amp; Safety Measures (04)</td>
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</table>

CONTENTS:

**TOPIC: 01 - DETAILING AS PER IS 4326:**

01.01 Building Configuration to minimise Seismic Vulnerability

01.02 Separation of Adjoining Structures

01.03 Details of Separation or Crumble Section, Staircases

01.04 Types of Construction-Framed & Box type strengthening measures doe opening in walls.

01.05 Different Bands in a Building and reinforcement detailing at bands.

01.06 Improving earthquake resistance of earthen buildings

**TOPIC: 02 –MATERIAL FOR CEMENT CONCRETE:**

02.01 Cement Portland Cement-Specification and tests prescribed by B I S in respect of fineness, consistancy, soundness, setting time and compressive strength, Reactions with water.

02.02 Aggregate: Classification of aggregates and their specifications(particle shape, texture, bend of aggregates, Moisture content of aggregate.

02.03 Sand Bulking of Sand fineness modulus.
02.04 Water-Specification of water for manufacturing concrete.

02.05 Admixture-Function of admixtures, their purpose Limits and their use, classification of admixtures like water proofing agents. Air Entering agents Retarders. Accelerators and Gas forming agents.

**TOPIC: 03 – PREPARATION & PROPERTIES OF CONCRETE:**

03.01 Measurement of materials, Bulking and moisture content of aggregates constancy, segregation and Bleeding of concrete. Durability of concrete, Water Cement ratio.

03.02 Workability of concrete-Factors affecting workability and its limitation, slump test, compaction Factor test.

03.03 Compressive and tensile strength of concrete-compressive strength cube and cylinder strength, Young’s modulus of Elasticity of concrete, Creep of concrete, strength in diagonal tension and tensile strength of concrete.

**TOPIC: 04 – FLOORS:**

04.01 Suitability of different types of floor in several Civil Engg. Construction. Method of construction of suitable type of floors in workshop.

**TOPIC: 05 – FACING:**

05.01 Decorative finish for exterior plastering wall with marble, gravel, mosaic vengal tiles.

05.02 Decorative finish for interior use of plywood. Laminated boards, glass, wall papers, ceronic tiles and special paints, artificial ceiling and concealed lighting.
TOPIC: 06 – PROVISION IN MODERN BUILDING:

06.01 Lifts and escalators, arrangement for heating and cooling of rooms, use of exhaust fans specially water supply and sanitary fittings.

TOPIC: 07 – PRECAST BUILDING COMPONENT:

07.01 Standardisation of elements-Wall, lintel, slabs and mass production, joints in precast construction, Modular coordination.

TOPIC: 08 – ACCOUSTICS OF BUILDING:

08.01 Technical terms used in acoustics of building. Requirements for sound effects. Factors to be considered in acoustics of buildings, optimum time of reverberation.
08.02 Sound absorbing materials-Requirements of a good sound absorbing materials. Acoustics analysis and its correction.
08.03 Sound-Insulation and method of sound insulation.

TOPIC: 09 – MAINTENANCE OF BUILDING:

09.01 Maintenance of building-Classification, Routine maintenance and Special Repairs. Detailed study for different types of repair work under Routine maintenance and special repairs.

TOPIC: 10 – MISCELLANEOUS TOPICS:

10.01 Elementary idea of
1. Antitermite treatment
2. Fire resistance
10.02 Termite detection factors in building, termite proofing methods.

**TOPIC: 11 – BUILDING BY LAWS & SAFETY MEASURES:**

11.01 Building by laws, necessities, principles, provision as per national building code.

11.02 Safety programme for construction, safety measures at construction site i.e. barricades strong scaffolding, red signals, helmet etc. Precaution to be taken to avoid accidents. Precautions for health hazards and safety measures while using chemicals for antitermite treatments.

**Books Recommended:**

1. Soil Mechanics & Foundation Engg., Standard Book House, Delhi-6 - Dr. B. C. Purnamia
3. Building Construction Technology (Hindi), ASI - Gupta
5. Relevant Indian Standard - B. I. S.
7. Concrete Structure Vol. IV - Vazirani & Ratwani
8. A Text Book of Building Construction - Sushil Kumar
9. Hkou fuekZ.k VsDuksykWth - Gurucharan Singh
10. Hkou fuekZ.k - G. D. Aggrawal
11. Hkou fuekZ.k - Das
12. Building Construction - Sushil Kumar
13. Building Construction - Ranga Wala
15. Building Construction - Vazirani
16. Building Construction - Punania
17. Building Material & Construction - C B R I. Roorki
18. Building (Tech & Valuation) - T. T. T. I., Madras
19. E1’nk ;kaf=dh - J. Jha
20. Soil Mechanics - Punamia

**SCHEME OF EXAMINATION FOR FINAL EXAMINATION**

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<th>Types of Questions</th>
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The above table refers to the annual examinations only.
**Rationale & Objective:**

Calculation of the detailed quantities of materials and working out their costs for all projects, minor or major, is the major objective of a junior Engineer / Technician. As the calculation are based on the detailed drawings of the structure / project, the junior engineer / technician must be thoroughly conversant with the drawings so as to be committed to the structure / project. The student must be supplied with the required drawings by the institution and the subject be taught with a more practical basis.

After going through the course, a student is expected to develop the knowledge and understanding of the terms associated with the subject. He is able to develop the skill to estimate the quantity of the materials as well as to calculate the cost involved there in.

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<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
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<tr>
<td>01</td>
<td>Estimate of R. C. C. and steel works.</td>
<td>(20)</td>
</tr>
<tr>
<td>02</td>
<td>Estimate of Bridges and Culverts.</td>
<td>(10)</td>
</tr>
<tr>
<td>03</td>
<td>Water Supply and Sanitary works.</td>
<td>(08)</td>
</tr>
<tr>
<td>04</td>
<td>Specifications.</td>
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<td>05</td>
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<td>Valuation.</td>
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</table>

**Total :** (60)
CONTENTS:

**TOPIC: 01 – ESTIMATE OF R. C. C. AND STEEL WORKS:**

- 01.01 Estimate of R. C. C. slab, beam & T-beam.
- 01.02 Estimate of a column with foundation.
- 01.03 Estimate of a cantilever Retaining wall.
- 01.04 Estimate of a steel roof truss.

**TOPIC: 02 – ESTIMATE OF BRIDGES AND CULVERTS:**

- 02.01 Estimate of a R. C. C. slab culvert.
- 02.02 Detailed estimate of a slab culvert with splayed wing walls and Return walls.

**TOPIC: 03 – WATER SUPPLY AND SANITARY WORKS:**

- 03.01 Estimate of water-supply and sanitation works for residential buildings.

**TOPIC: 04 – SPECIFICATIONS:**

- 04.01 General.
- 04.02 Aims of Specification.
- 04.03 Types of Specification.
- 04.04 Method of preparation of specification.
- 04.05 General and detailed specification.
- 04.06 Specification for the following items of works.
  - 04.06.01 P. C. C. / R. C. C. work in foundation.
  - 04.06.02 Damp proof course at plinth.
  - 04.06.03 Brickwork in foundation, plinth and super structure.
  - 04.06.04 R. C. C. work in beams and slabs.
  - 04.06.05 Patent stone flooring.
04.06.06 Plastering.
04.06.07 Lime Terracing.

**TOPIC: 05 – ANALYSIS OF RATES:**

05.01 Purpose.
05.02 Importance, Requirement and procedure of Rate-Analysis.
05.03 Factors affecting rate analysis.
05.04 Analysis of rates for the following items of works:
  05.04.01 L. C. / P. C. C. in foundation.
  05.04.02 R. C. C. work in foundation.
  05.04.03 Brickwork in foundation, plinth and super structure.
  05.04.04 R. C. C. work in beams and slabs.
  05.04.05 Patent-stone flooring.
  05.04.06 Terrazo flooring.
  05.04.07 Plastering.

**TOPIC: 06 – WATER APPLICATION METHODS AND THEIR EFFICIENCIES:**

06.01 Objects of valuation.
06.02 Importance and methods of valuation.
06.03 Different forms of value.
06.04 Outgoing and depreciations.
06.05 Mortage and assessment rights.
06.06 Year’s purchase and security.
06.07 Valuation based on gross income, net income and capitalised value.
06.08 Fixation of rent as per P. W. D. practice.
06.09 Fixation of municipal taxes.
Books Recommended:

2. Estimating & Costing - G. S. Birdi
4. Estimating & Costing - Rangwall
5. Valuation - Rangwall
6. Civil Engg. Contract & Estimate - B. S. Potio

SCHEME OF EXAMINATION FOR FINAL EXAMINATION

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The above table refers to the annual examinations only.
Rationale & Objectives:

S.No. | Topics                                                      | Periods |
------|-------------------------------------------------------------|---------|
01    | The Earthquakes                                             | (06)    |
02    | Vibrations of Single Degree of freedom System               | (20)    |
03    | Vibration of Multiple Degrees of Freedom System             | (08)    |
04    | Earthquake Motion & Reponse                                 | (06)    |
05    | Aseismic Design of Structures                               | (20)    |

Total: (60)

CONTENTS:

**TOPIC: 01 – THE EARTHQUAKES [06]**

01.01 Earthquakes
01.02 Epicentre, hypocentre and earthquake waves
01.03 Measurement of Ground Motion
01.04 Cause of Earthquake (Plate tectonic)
01.05 Intensity and Isoseismals of an earthquake
01.06 Magnitude and Energy of an earthquake
01.07 Relationship of fault length, affected area and duration with magnitude
01.08 Consequences of earthquakes
01.09 Sesimic Zoning
01.10 Risk Maps
01.11 Strong Ground Motion Arrays

TOPIC: 02 – VIBRATIONS OF SINGLE DEGREE OF FREEDOM  [20]

SYSTEM:

02.01 Types of Vibrations
02.02 Degrees of Freedom
02.03 Spring action and damping
02.04 Equation of motion of single degree of freedom
02.05 Free Vibrations of Undamped systems having single degree of freedom
02.06 Combination of stiffnesses
02.07 Vibration of Damped System having single degree of freedom
02.08 Dry Friction Damping
02.09 Negative Damping
02.10 Forced Vibration of a Undamped System
02.11 Forced vibrations of a damped system
02.12 Equivalent viscous damping
02.13 Vibration isolation
02.14 Vibration Measuring Instruments
02.15 System subjected to transient forces
TOPIC: 03 – VIBRATION OF MULTIPLE DEGREES OF FREEDOM

03.01 Introduction
03.02 Two Degrees of freedom
03.03 Many degrees of freedom
03.04 Forced vibration – earthquake excitation

TOPIC: 04 – EARTHQUAKE MOTION AND RESPONSE:

04.01 Introduction
04.02 Strong motion earthquakes
04.03 Numerical method for spectra
04.04 Elastic spectra
04.05 Ground velocity and displacement
04.06 Inelastic spectra

TOPIC: 05 – ASEISMIC DESIGN OF STRUCTURES:

05.01 Design data and philosophy of design
05.02 Multistorey Buildings(G+2) Design-Analysis Design
05.03 Earthquake resistant construction of buildings
05.04 Ductility provisions in reinforced concrete construction
05.05 Base Isolation
05.06 Capacity building Design and Pushover Analysis
05.07 Retrofitting of Buildings

Books Recommended:

1. Earthquake Resistant Design & Analysis - Jai Krishna.
2. Dynamic of Structures - Mario Paz.
6. Dynamics of Structures - Claugh & Penzien.
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Rationale:

Irrigation provides livelihoods for hundreds of millions of people in developing countries. In parts of South Asia, where it has been a massive thrust in rural and national development, extensive irrigation network, co-exist with the greatest concentration of rural population in the world. In India, due to limitation of topography, climate, soils, present technology, handling of pollutants etc., all the surface and ground water cannot be fully utilized. The actual quantity of water for irrigation, however, is likely to reduce in view of the growing demands of water for other human needs and industry. This there is urgent need of the course is being introduced for the Civil Engineering students as an Elective that the interested students may be benefited.

Objective:

The students should be able to:

1. Understand Soil-Water – Plant Relationship
2. Estimate Evapotranspiration for a given set of data
4. Understand micro level planning, layout of chaks, sub-chaks, water courses. Field Channels and Field Drains.
5. Understand Structures in water courses and water measuring devices.
6. Understand land leveling and land consolidation.
7. Understand importance of farmer’s participation in water and land management.

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<tr>
<td>01</td>
<td>Water Resources of India with special reference to Bihar.</td>
<td>(04)</td>
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<tr>
<td>02</td>
<td>Soil-Water-Plant Relationship.</td>
<td>(10)</td>
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<tr>
<td>03</td>
<td>Conjunctive use of surface and ground water.</td>
<td>(02)</td>
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<tr>
<td>04</td>
<td>Micro level planning.</td>
<td>(04)</td>
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<tr>
<td>05</td>
<td>Water Application Methods.</td>
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<tr>
<td>06</td>
<td>Structures and water measuring devices in watercourses.</td>
<td>(06)</td>
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<tr>
<td>07</td>
<td>Land leveling and Land consolidation.</td>
<td>(06)</td>
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<tr>
<td>08</td>
<td>On-farm Drainage System.</td>
<td>(08)</td>
</tr>
<tr>
<td>09</td>
<td>Operation and Maintenance of micro level system.</td>
<td>(05)</td>
</tr>
<tr>
<td>10</td>
<td>Water–shed management.</td>
<td>(04)</td>
</tr>
<tr>
<td>11</td>
<td>Farmer’s participation in Irrigation water Management.</td>
<td>(05)</td>
</tr>
</tbody>
</table>

**Total:** (60)

**CONTENTS:**

**TOPIC: 01 – WATER RESOURCES IN INDIA WITH, SPECIAL REFERENCE OF BIHAR:**

01.01 Introduction, national Water Policy and State Water Policy.
01.02 Irrigation potential of India with special reference to Bihar, Irrigation management objectives.

**TOPIC: 02 – SOIL-WATER-PLANT RELATIONSHIP:**

02.01 Importance of Study of soil-water-plant relationship, introduction to physical and chemical properties of soils used for agricultural purposes, eg. Field capacity, wilting point, Available soil moisture and management allowable deficit.
02.02 Water requirement of crops, consumptive use, Availability of soil-water, duty and delta, factors Affecting duty.

02.03 Evapotranspiration by modified panmen method, Cropping pattern and cropping intensity.

02.04 Crop-coefficient (Kc), Crop-evapotranspiration, Effective rainfall, Special irrigation needs of crops.

02.05 Estimation on Net Irrigation Requirement, Field Irrigation Requirement and Gross irrigation Requirement and assessment of peak fortnightly Demand of irrigation water.

**TOPIC: 03 – CONJUNCTIVE USE OF SURFACE AND GROUND WATER:**

03.01 Importance of ground water and planning for its integrated use with canal water.

**TOPIC: 04 – MICRO LEVEL PLANNING:**

04.01 Introduction, micro level planning, topographical survey, soil survey, layout of chaks and sub-chaks, layout of water courses, field channels and field drains, farms roads.

**TOPIC: 05 – WATER APPLICATION METHODS:**

05.01 Water application methods, eg. Border, Furrow, Basin. Drip, Sprinkler systems etc.

**TOPIC: 06 – STRUCTURES AND WATER MEASURING DEVICES:**

06.01 Structures in water courses-outlets, Turnouts / Division box, falls, cross-drainage works etc.

06.02 Water measuring devices, needs and importance in Water management, V-notch and cut-Throat flumes.
TOPIC: 07 – LAND LEVELING AND LAND CONSOLIDATION:

07.01 Land shaping, Land grading, designs of land shaping-Plane or centroid method and profile method.
07.02 Land consolidation – Advantages, Acts of land Consolidation with reference to Bihar.

TOPIC: 08 – ON FARM DRAINAGE SYSTEM:

08.01 Definition of water logging and drainage in irrigated areas, selection of a drainage system, causes and effects of water logging and its remedial measures.
08.02 Type of drains investigation, planning and design of surface drains.
08.03 Quality of irrigation water, salinity and alkalinity, causes and remedial measures, Leaching and Leaching requirements, land Reclamation techniques with special reference to Bihar.

TOPIC: 09 – OPERATION AND MAINTENANCE OF MICRO-LEVEL SYSTEM:

09.01 Needs and objectives of scientific operation plan, parameters governing operation plan, warabandi system with special reference to Bihar and farmer’s involvement in execution of operation plan.
09.02 Maintenance of on farm development works.

TOPIC: 10 – WATERSHED MANAGEMENT:

10.01 Watershed Management, water harvesting techniques, Soil conservation measures and catchment area treatment.
TOPIC: 11 – FARMER’S PARTICIPATION IN IRRIGATION WATER MANAGEMENT:

11.01 Needs and strategies of formation of Farmers organisation, acts, rules and byelaws, rights and duties of water users Association.

Books Recommended:

2. On-Farm Development Works, Publication No : 12, - Walmi, Aurangabad, Maharashtra

Reference Books:

1. Soil-water-plant Relationship Publication No : 33, - Walmi, Aurangabad, Maharashtra.
9. Ground water Assessment and Management - Karnath.
11. Flood control & Drainage Engineering. - S.N. Ghosh
## SCHEME OF EXAMINATION FOR FINAL EXAMINATION

**F.M. : 80**

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The above table refers to the annual examinations only.
Town Planning and Architecture

Subject Code
05310C

Theory

<table>
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<tr>
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<td>L T P/S</td>
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Full Marks : 100
Annual Exam. : 80
Internal Exam. : 20

Rationale and Objective:

Town planning is considered as art of shaping and guiding the physical growth of the town creating buildings and environment to meet the various needs such as social, cultural, economic and recreational and to provide healthy conditions for both rich and poor to live to work and to play or relax. The course will benefit those students who are interested in the town planning and Architecture and opt for the subject as an elective.

The objective of the course is to make the students familiar with the terms associated with the subject, the students will develop the knowledge and understanding of every aspect of the town planning and architecture.

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<tr>
<th>S.No.</th>
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<td>Introduction.</td>
<td>(02)</td>
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<tr>
<td>02</td>
<td>Growth of Town.</td>
<td>(03)</td>
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<tr>
<td>03</td>
<td>Elements of city plan.</td>
<td>(04)</td>
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<td>04</td>
<td>Surveys.</td>
<td>(03)</td>
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<td>05</td>
<td>Zoning.</td>
<td>(03)</td>
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<td>06</td>
<td>Housing.</td>
<td>(03)</td>
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PART-B : Architecture

12 Principles of Architecture. (03)
13 Fundamental Planning of Building. (05)
14 Architectural Composition. (08)
15 Site Selection and orientation of Residential Buildings. (08)

Total : (60)

CONTENTS:

PART-A : TOWN PLANNING

TOPIC:01 -INTRODUCTION: [02]

01.01 Aims and objectives of town planning Principles of town planning Necessity of town planning, from of planning.

TOPIC: 02 -GROWTH OF TOWN: [03]

02.01 Origin of town, types of town stage in the growth of town, methods of external growth.

(i) Growth according to origin.
(ii) Growth according to direction.
TOPIC: 03 -ELEMENTS OF CITY PLAN:

03.01 Introduction, elements of city plan, Distribution of lands, Methods of financing a Town planning scheme, aesthetics of Town planning
- Creative measures
- Preventive measures
- Destructive measures

TOPIC: 04-SURVEYS:

04.01 Necessity, collection of Data. Types of surveys.
04.02 Town Survey
- Physical Surveys
- Social survey
- Economic survey
- Traffic survey
04.03 Regional survey, National survey, Social & Economic Survey, performa for social economic survey, methods employed to collect data, preparation of maps and drawing, report.

TOPIC: 05-ZONING:

05.01 Importance of zoning, classification of zoning, use of zoning, Height of zoning, Density of zoning, zoning power.

TOPIC: 06-HOUSING:

06.01 Introduction, layout of residential units, Neighbourhood, unit planning, principles of neighbourhood planning, Reilly plan, Radburn plan, Types of layouts, classification of housing, Housing problem in India, Agencies for Housing scheme.
TOPIC: 07 - SLUMS:

07.01 Meaning of slum, causes of slums, effects of slums, precaution to be taken against formation of slums, slum clearance, Financial Assistance for slum, clearance scheme.

TOPIC: 08 - NECESSITY OF RECREATIONAL FACILITIES:

08.01 Features of public recreational system. Selection of sites for parks and play grounds. Types of recreational systems, various forms of recreational amenities, standard of open space, Landscape Architecture.

TOPIC: 09 - PUBLIC BUILDING AND TOWN PLANNING:

09.01 Importance of public buildings, selection of site for Public buildings, grouping of public buildings.

TOPIC: 10 - COMMUNICATION AND TRAFFIC CONTROL:

10.01 Function of Roads, Requirements of ideal city, Aesthetics of Road, Factors to be considered in the design to town road. Classification of roads. Roads system traffic Management traffic congestion in cities Disadvantages of traffic congestion. Traffic control, types of road junction, parking facilities Traffic Control devices.

TOPIC: 11 - MASTER PLAN:

11.01 Definition of the master plan, necessity of master plan. Maps to be prepared, Features of master plan.
PART-B : ARCHITECTURE

TOPIC: 12 -PRINCIPLES OF ARCHITECTURE: [03]


TOPIC: 13 -FUNDAMENTAL PLANNING OF BUILDING: [05]

13.01 Objects of fundamental planning, methods of determination of various room sizes, Anthropometric diagrams.

TOPIC: 14 -ARCHITECTURAL COMPOSITION: [08]

- Points - Rythems
- Lines - Contrast
- Figures and planes - Harmony
- Forms - Character
- Scale - Style
- Proportion - Materials & Structures
- Unity - Textures
- Focus - Ornamentations
- Balance - Colours
- Monotony - Light and Shades
- Truth
TOPIC: 15 - SITE SELECTION AND ORIENTATION OF RESIDENTIAL BUILDINGS:


Books Recommended:

1. Architectural composition and Design of Houses, - J.D. Yadav
   Saral Prakshshan, Aligarh
2. Architecture - Talbot Hamlin
3. Town Planning - Rangwala
4. Town Planning & Architecture - Birdi

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Rural Engineering Technology

Subject Code
05310D

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Rationale:

It is a known fact that approximately two third population of our country lives in villages. The development of our country depends on the development of the rural area. A civil engineering technician is required to acquaint himself/herself with all forms of rural problems and the technologies required to minimise the problems which in turn, will help development.

A civil engineering technician who is interested in rural development must be conversant with the rural planning, housing problems in rural area, problems of drinking water and sanitation, the technology involved in their rectification.

The subject is being introduced as an elective so that the interested students may increase his/her knowledge, understanding and skill in the field of rural development.

Objective:

After completion of the course, a student will be able to:

- Be conversant with the existing technological problems of the rural mass.
- Supervise all the rural construction works.
- Understand a rural problems.
- Plan, Design, supervise and guide the rural man in technical matter.
- Communicate with the rural artisans.
S.No. | Topics                                                                 | Periods |
------|----------------------------------------------------------------------|---------|
01    | Rural Socio Economic Survey.                                         | (18)    |
02    | Rural Planning on Housing.                                            | (14)    |
03    | Rural Sanitation and water supply.                                    | (12)    |
04    | Rural Roads.                                                         | (04)    |
05    | Rural Modern Technology.                                              | (05)    |
06    | Renewable sources of energy.                                          | (04)    |
07    | Preparation of Rural Project.                                         | (03)    |

Total: (60)

CONTENTS:

**TOPIC: 01 – RURAL SOCIO ECONOMIC SURVEY:** [18]

01.01 Preparation of Questionnaires.
01.02 Preparation of Formats.
01.03 Methodology of collecting data and place the same in survey questionnaires (Students should be assigned one neighbourhood village/Mohalla to collect data in a group of five).
01.04 Assessment and analysis of Survey Report.
01.05 Finding and Report Writing.

**TOPIC: 02 – RURAL PLANNING AND HOUSING:** [14]

02.01 Preparation of master plan on a given land–Survey report (Land survey report to be obtained from anchal).
02.02 Principle of Neighbourhood planning.
02.03 Essential needs of House Planning
02.04 Techniques on Low cost Housing with Locally available materials as per recommendations of N.B.O. C.B.R.I. and other organisations.
Methods of affecting improvements in the existing houses in respect of

- Ventilation.
- Water Proofing.
- Sanitation.

**TOPIC: 03 – RURAL SANITATION AND WATER SUPPLY:**

03.01 Existing methods of water supply and sanitations.
03.02 Methods of conversion of dry latrines into pit Sanitary latrines.
03.03 Design and construction of different types of latrines for family size of 5 to 10 members.
03.04 Provision of potable water from
  - Wells.
  - Tube wells.
  - Impounding Reservoirs.
03.05 Methods of Existing Water Supply Systems in Rural Area.
03.06 Improving drainage system in village.

**TOPIC: 04 – RURAL ROADS:**

04.01 Study of Present road conditions and causes.
04.02 Techniques on construction of rural roads by soil stabilization.
04.03 Problems of rural roads and their remedial measures
TOPIC: 05 – RURAL MODERN TECHNOLOGY:  

05.01 Introduction, various facts of Rural Technology to suit different conditions in  
- Agriculture.  
- Irrigation.  
- Grain Storage.  
- Transportation.  

05.02 Ferro-cement Technology and its adoption in rural areas for construction of storage bins and water tanks.  

05.03 Methods of manufacturing  
- Lime  
- Bricks  
- Tiles in rural areas  

05.04 Identification of problems in Minor irrigation works and their remedies.  

TOPIC: 06 – RENEWABLE SOURCES OF ENERGY:  

06.01 Introduction to Renewable sources of Energy.  
06.02 Construction and maintenance of Bio-gas Plant.  
06.03 Uses of  
- Solar Cooker.  
- Wind Mills.  
- Solar Water Heater.  
- Solar Water Battery Cells.  

TOPIC: 07 – PREPARATION OF RURAL PROJECT:  

07.01 Collection of data  
07.02 Different aspect of a rural project  
07.03 Methods of Preparation of a Rural Project
BOOKS AND JOURNALS:

2. Handouts of I.S.T. sponsored Seminars/Summer Schools/Winter Schools etc.
3. Report on ministry of Rural Developments, Govt. of India.
4. Indian Rural Problems - Nanawati and Angaria
5. Handouts of I.R.D.P. and D.R.D.A.

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Rationale & Objective:

The construction industry plays a significant role in development of national economy. Almost half of the total outlay in any five year plan is utilized for construction activities which constitute an integral part of all development projects. During last four decades, the construction industry in India has undergone large scale mechanisation with rapid change and advancement in construction practices as well as in the management of construction work.

The term construction is no longer limited only to the physical activities involving men, materials and machinery but covers the entire gamuts of activities from conception to realization of a construction, project. The course will benefit the students who prefer to become professionals in construction planning & project management. The objectives of the course are to make students:

- Know the terms associated with the subject
- Understand the process of planning & Management
- Comprehend the importance of Inspection & Quality control
- Understand the methods of Inspection & Quality control in construction technology
- Know the causes of hazards so that he may take up all the steps to ensure safety in construction.
- Understand C.P.M., P.E.R.T. methods of project Management
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<td>Construction Planning.</td>
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<td>Construction Management.</td>
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<td>04</td>
<td>Inspection and quality control.</td>
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<td>05</td>
<td>Safety in Construction.</td>
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<td>06</td>
<td>Network Planning – CPM &amp; PERT.</td>
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Total: (60)

CONTENTS:

**TOPIC: 01 – INTRODUCTION TO CONSTRUCTION PLANNING AND MANAGEMENT:**

01.01 Significance of Construction Management.
01.02 Objectives and Functions of Construction Management (Objectives and Functions).
01.03 Types of construction.
01.04 Resources for Construction Industry.
01.05 Stages in Construction.
01.06.01 Owner.
01.06.02 Engineers and Architect
01.06.03 Contractor.

**TOPIC: 02 – CONSTRUCTION PLANNING:**

02.01 Introduction to planning.
02.02 Stages of planning.
02.03 Scheduling.
02.03.01 Scheduling by Bar charts.
02.04 Preparation of materials, equipment, Labour and finance Schedule:
02.04.01 Preparation of Material Schedule.
02.04.02 Preparation of Labour schedule.
02.04.03 Preparation of Equipment (Machinery) schedule.
02.04.04 Preparation of finance schedule.
02.05 Limitation of Bar Chart

**TOPIC: 03 – CONSTRUCTION MANAGEMENT:**

03.01 Principles of Organisation.
03.02 Communication, leadership and Human Relations.
03.03 Types of Organisation:
  03.03.01 Line Organisation
  03.03.02 Line and staff organisations.
  03.03.03 Functional organisation.
03.04 Organisation for a construction firm.
03.05 Site organisation:
  03.05.01 Important Duties/Role of an Executive Engineer
  03.05.02 Important Duties/Role of an Asstt. Engineer
  03.05.03 Important Duties/Role of a junior Engineer
  03.05.04 Role of Mistry/skilled worker.
03.05.05 Role of Labours.
03.05.06 Important Duties/Role of the project manager in construction firm.
03.06 Temporary services.
03.07 Job layout.
  03.07.01 Purpose of layout.
  03.07.02 Factors of fitting job layout.
  03.07.03 Preparation of job layout.
03.08 Summary

**TOPIC: 04 – INSPECTION AND QUALITY CONTROL:**

04.01 Need for inspection and Quality Control.
04.02 Principles of Inspection.
04.03 Enforcement of specifications.
04.04 Stages of Inspection and quality control.
04.04.01 Earth work.
04.04.02 Masonary.
04.04.03 R.C.C.
04.04.04 Sanitary and water supply services.
04.04.05 Electrical Services.
04.05 Technical services and Inspection team.
04.06 Testing of structures.
04.06.01 Non-destructive Tests.
04.06.02 Full scale load test
04.06.03 Leak proof and dampness Test

**TOPIC: 05 – SAFETY IN CONSTRUCTION:**

05.01 Importance of safety.
05.02 Safety measures.
05.02.01 Safety measures for excavation.
05.02.02 Safety measures for Drilling and Blasting.
05.02.03 Safety measures for Hole Bituminous work.
05.02.04 Safety measures for scaffolding, ladders, form work and other equipments.
05.03 Fire safety.
05.03.01 Fire safety in buildings.
05.04 Safety campaign.
05.05 Summary.

**TOPIC: 06 – NETWORK PLANNING-CPM & PERT:**

06.01 Construction Management and Techniques
06.02 CPM.
06.03 PERT
Books Recommended:

1. Construction Planning & Management. - Elliof & Gambhir
2. Construction Planning & Management - Shree Nath
3. Construction Planning & Management - Puriboy
4. Construction Management & A/C - Harpal Singh
5. Construction Management & A/C - Vazirani
6. Construction Management & A/C - J.L. Sharma
7. Construction Management & A/C - Agarwal
8. Project Planning & Control with PERT & CPM - Punamia
9. CPM & PERT - Srinath
10. Construction Planning & Equipment - By Satnarayan
11. Construction Planning & Management - M. Verma
12. dULVªzD'ku EkSustesaV ,oa ,dkbmaV - ch0 ,y0 xqlrk
13. fuekZ.k izca/k ,oa Je laca/kd - ts0 >k0
14. Project Management and P.W.D. code -

SCHEME OF EXAMINATION FOR FINAL EXAMINATION  F.M. : 80

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
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<tbody>
<tr>
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<td>Test Skill</td>
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<td>05</td>
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<tr>
<td>Short Answer type</td>
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<td>10</td>
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<tr>
<td>Long Answer type</td>
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<tr>
<td>Total Marks</td>
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The above table refers to the annual examinations only.
Computer Application Lab. (CADD)

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>05311</th>
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### Practical

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
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<tbody>
<tr>
<td>L T P/S</td>
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<td>40</td>
<td>10</td>
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</table>

| No. of Periods in one session | 60 |

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>No. of Project</th>
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<tbody>
<tr>
<td>01</td>
<td>Drawing.</td>
<td>02</td>
</tr>
<tr>
<td>02</td>
<td>Plan and Elevation of two room storey building.</td>
<td>03</td>
</tr>
<tr>
<td>03</td>
<td>Multiscale Drawing.</td>
<td>01</td>
</tr>
<tr>
<td>04</td>
<td>Plotting of drawing.</td>
<td>01</td>
</tr>
<tr>
<td>05</td>
<td>Three Dimensional Drawing.</td>
<td>01</td>
</tr>
</tbody>
</table>

SCHEME OF EXAMINATION FOR FINAL EXAMINATION

F.M. : 40
Rationale & Objective:

Civil Engineering technician has to work as construction supervisor in the field. He should have knowledge of and skill to inspect site works and machine i.e. concrete, vibrator for compaction etc. He is required to be technically sound, confident and cost conscious. So, the construction practical is very important for a Civil Engineer.

The objectives of model mix, rod bending, casting, preparation of surfaces, flooring etc.

List of Construction Practical (Any six out of following):

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Preparation of model form work for</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) R. C. C. Beam</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) R.C.C. Slab</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(c) R.C.C. Column</td>
<td></td>
</tr>
</tbody>
</table>
Bending, Binding and placing re-inforcement into the form work for (Any two of following):
(a) R.C.C. beam
(b) R.C.C. Slab
(c) R.C.C. Column
(d) An isolated column tooling
(e) Lintel with sun shade.

Preparation of concrete mix in required proportion having a given slump by manual, by concrete mixer and casting a miniature R.C.C. member compaction by compaction rod by vibrator and curing.

Preparation of surface for I.P.S. Flooring, laying, cutting and finishing for at least 1 square meter area.

Construction of water bond macadam road (box cutting providing requisite chamber, brick paying & brick edging only in the form of model work.

Study of water supply and sanitary fittings works.

Study of fitting and fining of doors & windows.

Books Recommended:

1. Bhawan Nirman Technology. - B.L. Gupta
2. Bhawan Nirman Takniki. - Gur Charan Singh
3. Building Construction. - Sushil Kumar
5. Building Construction. - Ahuja
6. Hand Book of Building Engg., N.B.O. (Delhi). -
7. Indian Standard Codes (Relevant). -

SCHEME OF EXAMINATION FOR FINAL EXAMINATION F.M. : 80
Inplant Training and Visit to Works

Subject Code

05313

Sessional

No. of Periods
in one session
4 weeks
continuous

No. of Periods
per week

L T P/S

Full Marks : 100
Annual Exam. : 60
Internal Exam. : 40

Rationale:

A student is required to develop his knowledge skill and attitudes gained while joining through different course. It is desirable to expose the students to the world of work to be familiar with the real life situations and understand the problem there in. The “In plant training and visit to work “being introduced for the final year diploma technicians for Civil Engineering with the above objective in view. This course will help the students to observe how the technical, managerial, quality control safety and other principle are being applied in real life situation. They will be able to observe the technique of decision making on the shop floor. He will also, be able to observe the technique of decision making on the shop floor. He will, also be able to observe how his sub-ordinate perform in their day to day work and co-ordinate shop floor activities. The course will also, help bring attitudinal changes in a student.

Objective:

A student will be able to:

- Understand the working of the machines, tools and equipments more clearly.
- Write down the specifications of the machines, tools, equipments.
- Know the process of material storing / material management.
- Learn to maintain office records / filing.
- Know the process of planning, implementation and monitoring.
• Learn the skill shop floor co-ordination.
• Know the skill of office management and inventory Control.
• Understand the process of production.
• Know the skill of quality control.
• Know the organizational set-up and plant Layout.
• Locate the plants and industries related to Civil Engineering State and Nation wise.
• Find out Characteristics, Functions, and activities of those industries.
• Find out opportunities and method of recruitments.
• Know the source of raw materials and markets for industries.
• Find out the special characteristics of the industries.
• Observe and understand special machines, which they may not have been in their institutes.
• Observe the energy consumption in on industry method to same energy.
• Try to learn techniques to same energy.
• Observe the environment Pollutants and learn how to minimize environmental Pollution.

CONTENTS

Part-A

Inplant Training

The training of the students should be in any organisation, which is involved in :

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Civil construction work.</td>
</tr>
<tr>
<td>02</td>
<td>Civil Design work.</td>
</tr>
<tr>
<td>03</td>
<td>Irrigation.</td>
</tr>
<tr>
<td>04</td>
<td>Planning &amp; Erection.</td>
</tr>
<tr>
<td>05</td>
<td>Any other which is relevant to civil Engineering.</td>
</tr>
</tbody>
</table>
Part-B

Visit to Works

Project studies (Visit to works): Journal in respect of study of any TWO of the following Project:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>An Irrigation Project:-&lt;br&gt;- Study of different elements of a Dam/Barrages,&lt;br&gt;- Site including river training works,&lt;br&gt;- Silt excluder,&lt;br&gt;- Divide wall,&lt;br&gt;- Head regulator,&lt;br&gt;- Scour Slice gates,&lt;br&gt;- Intake of main canal&lt;br&gt;- Cross Regulators&lt;br&gt;- Cross Drinage Works&lt;br&gt;- Spillway, etc.</td>
</tr>
<tr>
<td>02</td>
<td>A multi storeyed Framed Building Project under construction:&lt;br&gt;- Study of different components of Buildings including&lt;br&gt;- Sub-structure and super-structure&lt;br&gt;- Study of re-inforcement used in different members,&lt;br&gt;- Details of concrete sections,&lt;br&gt;- Details of joints,&lt;br&gt;- Construction&lt;br&gt;- Planning&lt;br&gt;- Erection Technique</td>
</tr>
</tbody>
</table>
03 A reinforced cement concrete or a pre-stressed concrete of a steel:
  - Bridge project
  - Study of different members
  - Support conditions
  - Connection between members
  - Details of Joints
  - Associated River training works

04 A Road project under construction:
  - Alignment of Road
  - Data of sub-structures and super structures of Road
  - Study of geometrical elements & junctions

05 A water supply scheme:
  - Study of works at source
  - Water Purification system
  - Water testing devices
  - Storage system
  - Pumping system
  - Supply net-work

06 A Sewerage System:
  - Study of collection system
  - Sewer network
  - Pumping station
  - Sewerage Treatment Plant
  - Disposal of sludge and water

07 A Railway Station Yard:
  - Study of Railway Yard including Plot form
  - Tracks
  - Signals
- Interlocking system
- Points & Crossings
- Regulation of Rolling stock

REPORT WRITING:

Report writing The report on each project/ scheme shall include sketches, wherever necessary, of all works studied with relevant data.

SCHEDULE FOR TRAINING:

• Planning/Office Management - One Week

• Shop floor - Two Weeks

• Testing/Quality Control/Stores - One Week

SCHEME OF EXAMINATION

Marks Distribution

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>-</td>
<td>40 %</td>
</tr>
<tr>
<td>Regularity</td>
<td>-</td>
<td>10 %</td>
</tr>
<tr>
<td>Discipline</td>
<td>-</td>
<td>10 %</td>
</tr>
<tr>
<td>Report</td>
<td>-</td>
<td>10 %</td>
</tr>
<tr>
<td>Viva</td>
<td>-</td>
<td>10 %</td>
</tr>
<tr>
<td>External</td>
<td>-</td>
<td>60 %</td>
</tr>
<tr>
<td>Report/Journal</td>
<td>-</td>
<td>20 %</td>
</tr>
<tr>
<td>Viva</td>
<td>-</td>
<td>40 %</td>
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</tbody>
</table>
Rationale:

Projects are intended to provide students with an ability to tackle new problems with inquisitiveness. The project is included in the course to develop skill to plan, organize, conduct survey, investigate, collect relevant course and will also provided an opportunity to develop skill to integrate knowledge and skill gained while going through other subjects.

Objective:

The students will be able to develop skill to:

- Plan.
- Organise.
- Conduct survey.
- Investigate.
- Collect relevant data.
- Take decision.
- Prepare a project or technical report.
- Present the report before a seminar.
S.No.    | Topics
---------|--------
01       | Road project.
02       | Other project.

CONTENTS

**TOPIC: 01- ROAD PROJECT:**

01.01 ½ Kilometer length :
The road project will be allotted to the student by the faculty in charge of the project.

**TOPIC 02 : -OTHER PROJECT (ANY ONE FROM THE FOLLOWING):**

02.01 Bridge Project (S. L. R. bridge).
02.02 Irrigation project (Barrage project/Dam project/Canal project Tube well project).
02.03 Drainage project (one colony / command of one outlet/ small chour 100 hectares).
02.04 Water supply scheme – one colony (minimum ten houses).
02.05 Sanitary engineering scheme one colony (minimum ten houses).

The above mentioned Project Report will include the following :

1. Location survey.
2. Reconnaissance survey.
3. Investigation & survey work.
4. Design and Office work (generally based on studies in theory subjects. (In case of deign work beyond the syllabus.).
5. Preparing working drawing, estimating materials, Drawing section, layout plans, Schematic diagrams plans and elevations, other details.
7. Construction planning.

Project work/ project report should be presented in the form of a seminar for developing confidence and communication skill among the students.

NOTE:-

For completion of Project Work a duration of two weeks at a stretch will be provided.

Project work will be allotted to the students just in the beginning of the session. Each student will be given a separate work under the supervision of a teacher. Total number of students may be divided among the number of teachers available. The teacher concerned will select separate problem for each student under him and allot it to him at the beginning of the session. Problems selected should preferably conform to the syllabus. If it is outside of the syllabus then it must be within the field of Civil engineering.

References:

1. I. S. codes and manuals.
2. Text Books of concerned subjects.
Civil Engineering Lab.

Subject Code
0631

Sessional

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
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</thead>
<tbody>
<tr>
<td>L  T  P/S</td>
<td>100</td>
<td>60</td>
<td>40</td>
</tr>
</tbody>
</table>

No. of Periods in one session
60

Rationale and Objectives:

The civil engineering laboratory is a subject which will help student to understand the theory that he has studied by performing experiments and verifying results.

Besides the above the objective of the course are to develop measuring skills, skill to observe experimental date, put the data in a tabular form, draw graphs, read the graph and analyse the result. It will bring confidence in a student.

CONTENTS:

Preparation of Journal based on any eight experiments of the following:-

01 Determination of fineness modular of fine aggregate.
02 Determination of fineness modular of course aggregate.
03 Determination of bulking the sand.
04 Determination of Thickness index and elongation index of aggregate.
05 Determination of Normal consistency of cement.
06 Determination of Intial setting time of comment.
07 Determination of Final setting time of comment.
08 Determination of Soundness of comment.
Determination of tensile strength of cement after 3 days & after 7 days curing.

Determination of compressible strength of concrete after 7 days; 14 days & 28 days of curing of M 15 grade of concrete.

Slump test.

Determination of turbidity of water.

Determination of PH value of water.

Determination of flash point of bitumen by a bell’s flash point apppration or by pensky master apparatus.

Determination of softening point of bituminous material by Ring and Bell apparatus.

Determination of consistency of bituminous material by penetration test.

Abrasion test of road material.

Books Recommended:

1. Lab manual for soil mechanics, material testing, - Water & Bitumen. standard publishers & distributors Delhi.
2. Material testing lab manuals. - Kanshik.
COURSE OF STUDY

FOR

PART – III Diploma

IN

Civil Engineering

THREE YEARS DIPLOMA

COURSE
## THEORY

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>SUBJECTS</th>
<th>SUBJECT CODE</th>
<th>TEACHING SCHEME</th>
<th>EXAMINATION - SCHEME</th>
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<td>Periods per week</td>
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<td>1.</td>
<td>Professional Studies &amp; Entrepreneurship</td>
<td>00301</td>
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<tr>
<td>2.</td>
<td>Computer Application (CADD)</td>
<td>05302</td>
<td>03</td>
<td>60</td>
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<tr>
<td>3.</td>
<td>R.C.C. Structure</td>
<td>05303</td>
<td>03</td>
<td>60</td>
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<tr>
<td>4.</td>
<td>Transportation Engineering</td>
<td>05304</td>
<td>03</td>
<td>60</td>
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<tr>
<td>5.</td>
<td>Mechanics of Structure</td>
<td>05305</td>
<td>03</td>
<td>60</td>
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<tr>
<td>6.</td>
<td>Environmental Engineering</td>
<td>05306</td>
<td>03</td>
<td>60</td>
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<tr>
<td>7.</td>
<td>Hydrology &amp; Irrigation Engineering</td>
<td>05307</td>
<td>03</td>
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<td>8.</td>
<td>Construction Technology-II</td>
<td>05308</td>
<td>03</td>
<td>60</td>
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<tr>
<td>9.</td>
<td>Quantity Surveying &amp; Costing-II</td>
<td>05309</td>
<td>03</td>
<td>60</td>
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<tr>
<td>10.</td>
<td>Elective</td>
<td>03</td>
<td>60</td>
<td>03</td>
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- Earthquake Resistant Design & Construction: 05310A
- Water & Land Management: 05310B
- Town Planning and Architecture: 05310C
- Rural Engineering Technology: 05310D
- Constructional Planning & Project Management: 05310E

Total :- 1000

## PRACTICAL

<table>
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<th>Sr. No.</th>
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<th>SUBJECT CODE</th>
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<td>Periods per Week</td>
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<td>Construction Practice Lab.-II</td>
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Total :- 150
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<td></td>
<td>Periods per Week</td>
<td>Periods in one session (Year)</td>
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<tr>
<td>13.</td>
<td>In Plant Training &amp; Visit to Work (Preferably 4 weeks)</td>
<td>05313</td>
<td>04 weeks in one session</td>
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<tr>
<td>14</td>
<td>Civil Engg. Lab.</td>
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<td>15.</td>
<td>Professional Studies &amp; Entrepreneurship</td>
<td>00315</td>
<td>02</td>
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<td>16</td>
<td>Project Work &amp; Its Presentation Seminar</td>
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<td>02 weeks in one session</td>
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Total :- 350

Total Periods per week 42
Total Marks = 1500