MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI

TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES

COURSE NAME : CIVIL ENGINEERING GROUP

COURSE CODE : CE/CS/CR/CV

DURATION OF COURSE : 6 SEMESTERS for CE/CS/CR (8 SEMESTERS for CV) **WITH EFFECT FROM 2012-13**

SEMESTER : SECOND **DURATION : 16 WEEKS**

PATTERN : FULL TIME - SEMESTER **SCHEME : G**

SR. NO	SUBJECT TITLE	Abbre viation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME									SW (17200)
							PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)		
				TH	TU	PR		Max	Min	Max	Min	Max	Min	Max	Min	
1	Communication Skills $	CMS	17201	02	--	02	03	100	40	--	--	25#	10	25@	10	50
2	Engineering Mechanics β	EGM	17204	03	01	02	03	100	40	--	--	--	--	25@	10	
3*	Applied Science Physics	APH	17207	02	--	02	02	50	100 40	25@	50 20	--	--	--	--	
	Applied Science Chemistry	ACH	17208	02	--	02	02	50		25@		--	--	--	--	
4	Construction Materials	CMA	17209	03	--	--	03	100	40	--	--	--	--	--	--	
5	Engineering Mathematics $	EMS	17216	03	01	--	03	100	40	--	--	--	--	--	--	
6	Development of Life Skills $	DLS	17010	01	--	02	--	--	--	--	--	25@	10	--	--	
7	Workshop Practice (Civil)	WPC	17012	--	--	04	--	--	--	--	--	--	--	50@	20	
			Total	**16**	**02**	**14**	**--**	**500**	**--**	**50**	**--**	**50**	**--**	**100**	**--**	**50**

Student Contact Hours Per Week: **32 Hrs.**

THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.

Total Marks : **750**

@ Internal Assessment, # External Assessment, [ ] No Theory Examination, $ - Common to all branches, β - Common to CE, ME,EE and CH Groups

Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, ,OR-Oral, TW- Term Work, SW- Sessional Work

- Conduct two class tests each of 25 marks for each theory subject. Sum of the total test marks of all subjects is to be converted out of 50 marks as sessional work (SW).
- Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms.
- Code number for TH, PR, OR and TW are to be given as suffix 1, 4, 8, 9 respectively to the subject code.

* Applied Science is divided into two parts- Applied Science (Physics) and Applied Science (Chemistry). Theory examination of both parts as well as practical examination of both parts will be conducted on separate days. Sum of theory marks of both parts shall be considered for passing theory examination of Applied Science. Similarly it is also applicable to practical examination. It is mandatory to appear theory and practical examination of both parts. Remaining absent in any examination of any part will not be declared successful for that examination head.

* **Candidate remaining absent in examination of any one part of Applied Science subject i.e. Physics, Chemistry will be declare as Absent in Mark List and has to appear for examination. The marks of the part for which candidate was present will not be processed or carried forward.**

Communication Skills [CMS]

F.Y. Diploma : Sem. II

[All Branches]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	25#
Term Work	–	25@
Sessional Work (Two Test)	–	25 (each)

@ - Internal Assessment; # - External Assessment

SYLLABUS

Topic 1 Introduction to Communication

Specific Objective

– Describe the process of communication.

Content

- Definition of communication
- Process of communication
- Types of communication -- Formal, Informal, Verbal, Nonverbal, Vertical, Horizontal, Diagonal

Topic 2 Effective communication

Specific Objective

– Identify the principles and barriers in the communication process

Content

- Principles of communication.
- Barriers to communication
  - **(a) Physical Barrier**:
    - Environmental (time, noise, distance & surroundings)
    - Personal (deafness, stammering, ill-health, spastic, bad handwriting)
  - (b) **Mechanical** : Machine oriented
  - **(c) Psychological:** Day dreaming, prejudice, emotions, blocked mind, generation gap, phobia, status inattentiveness, perception.
  - **(d) Language** : Difference in language, technical jargons, pronunciation & allusions.

Topic 3 Non verbal & Graphical communication

Specific Objective

– Effective use of body language & nonverbal codes

– View and interpret graphical information precisely.

Contents

3.1 Non- verbal codes:

- Proxemics
- Chronemics
- Artefacts

3.2 Aspects of body language (Kinesics)

- Facial expression
- Eye contact
- Vocalics, paralanguage
- Gesture
- Posture
- Dress & appearance
- Haptics

3.3 Graphical communication

- Advantages & disadvantages of graphical communication
- Tabulation of data & its depiction in the form of bar graphs & pie charts.

Topic 4 Listening

Specific Objective

– Effective use of listening

Contents

- Introduction to listening
- Listening versus hearing
- Merits of good listening
- Types of listening
- Techniques of effective listening

Topic 5 Formal Written Communication

Specific Objectives

– Use different formats of formal written skills.

Contents

- Office Drafting: Notice , memo & e-mail
- Job application with resume.
- Business correspondence: Enquiry letter, order letter ,complaint letter, adjustment letter.
- Report writing: Accident report, fall in production, investigation report.
- Describing objects & giving instructions

Reference :

1. Text book of Communication Skills, (*MSBTE Mumbai*) MSBTE, Mumbai.
2. CD On Communication Skills, (*MSBTE*) MSBTE, Mumbai.
3. Communication Skills (*Joyeeta Bhattacharya*) Reliable Series.
4. Communication Skills (*Sanjay Kumar, Pushpa Lata*) Oxford University Press.
5. Website: www.mindtools.com/page8.html-99k
6. Website: www.khake.com/page66htm/-72k
7. Website: www.BM Consultant India.Com
8. Website: www.letstak.co.in
9. Website: www.inc.com/guides/growth/23032.html-45k

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Engineering Mathematics [EMS]

F.Y. Diploma : Sem. II

[AE/CD/CE/CH/CM/CO/CR/CS/CV/CW/DE/ED/EE/EI/EJ/EN/EP/ET/EV/EX/ FE/IC/IE/IF/IS/IU/ME/MH/ MI/MU/PG/PS/PT]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	–
Term Work	–	–
Sessional Work (Two Test)	–	25 (each)

SYLLABUS

Topic 1 Complex number

- **Complex number**

Specific objectives

– Find roots of algebraic equations which are not in real.

- Definition of complex number, Cartesian, polar and exponential forms of complex number.
- Algebra of complex number such as equality, addition, subtraction, multiplication and division.
- De- Moivre's theorem with simple examples.
- Euler's form of circular functions, hyperbolic functions and relation between circular and hyperbolic functions.

Topic 2 Differential Calculus

2.1 Function

Specific objectives

– Identify the function and find the value of function.

- Definition of function, range and domain of function.
- Value of function at a point.
- Types of functions and examples.

2.2 Limits

Specific objectives

– To evaluate limit of function.

- Concept and definition of limit.
- Limits of algebraic, trigonometric, logarithmic and exponential functions with examples.

2.3 Derivatives

Specific objectives

– Find the derivatives by first principle.

– Solve problems using rules and methods of derivatives

- Definition of derivatives, notation, derivatives of standard function using first principle.

- Rules of differentiation such as, derivatives of sum or difference, product, and quotient with proofs.
- Derivative of composite function with proof (Chain rule)
- Derivatives of inverse trigonometric functions using substitution
- Derivatives of inverse function.
- Derivatives of implicit function.
- Derivatives of parametric function.
- Derivatives of one function w.r.t another function.
- Logarithmic differentiation.
- Second order differentiation.

Topic 3 Numerical Method

3.1 Solution of algebraic equation

Specific objectives

– Find the approximate root of algebraic equation
- Bisection method
- Regula falsi method
- Newton Rapshon method

3.2 Numerical solution of simultaneous equations

Specific objectives :

– Solve the system of equations in three unknowns.
- Gauss elimination method
- Jacobi's method
- Gauss Seidal method

Reference :

1. Mathematics for Polytechnic (*S.P. Deshpande*) Pune Vidyarthi Griha Prakashan – Pune.
2. Calculus : Single Variable (*Robert T. Smith*) Tata McGraw Hill.
3. Advanced Engineering Mathematics (*Dass H.K.*) S. Chand Publication – New Delhi.
4. Fundamentals of Mathematical Statistics (*S.C. Gupta & Kapoor*) S. Chand Publications – New Delhi.
5. Higher Engineering Mathematics (*B.S. Grewal*) Khanna Publication – New Delhi.
6. Applied Mathematics (*P.N. Wartikar*) Pune Vidyarthi Griha Prakashan – Pune.
7. Websites : www.khan academy

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Applied Physics [APH]

F.Y. Diploma : Sem. II

[CE/CS/CR/CV]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	2 Hrs.	50
Practical Exam	–	25@
Oral Exam	–	–
Term Work	–	–
Sessional Work (Two Test)	–	25 (each)

SYLLABUS

Topic 1 Motion

Specific Objectives:

- State equations of motion.
- Apply laws of motion to solve problems.
- Differentiate between linear and circular motion,
- State meaning of centripetal acceleration, centripetal force

1.1 Rectilinear and Angular Motion

- Equations of motion:-$V=u+at$, $S=ut+1/2at^2$, $V^2=u^2+2as$ (no derivation), distance traveled by particle in n^{nt} second, (only equation), Uniform velocity, uniform acceleration and uniform retardation, equations of motion for motion under gravity.
- Definition of angular displacement, angular velocity, angular acceleration, relation between angular velocity and linear velocity, three equations of angular motion (no derivation) angular distance traveled by particle in n^{nt} second (only equation).

1.2 Kinetics and Work Power Energy

- Definitions of momentum, impulse, impulsive force with formulae, statements of Newton's laws of motion with equations, applications of laws of motion—recoil of gun.
- Definition of work, power and energy, equations for potential energy. kinetic energy, work -energy principle.

1.3 Projectile Motion and circular motion

- Definition of a projectile motion, angle of projection, trajectory, time of flight and range with formulae.
- Definition of a circular motion, centripetal acceleration, centripetal force, definition of centrifugal force, and its applications.

Topic 2 Nondestructive Testing of materials

Specific Objectives:

- Describe the method of production of ultrasonic waves
- Use NDT methods for quality testing of materials in industry

2.1 Ultrasonic

- Ultrasonic waves-properties, production of ultrasonic waves by piezoelectric method.

2.2 Non –destructive testing methods

- Destructive and Nondestructive testing, advantages of NDT, limitations of N.D.T., different N.D.T. Methods used in industries, criteria for selection of NDT method, Liquid penetration Testing (LPT): principle, procedure and applications, Ultrasonic testing methods:-principle, procedure and applications.

Topic 3 Acoustics and Indoor Lighting

Specific Objectives:

- Find the Conditions for good acoustics
- Determine factors affecting acoustical planning of auditorium
- Apply Inverse square law of photometry
- Find working and applications of Bunsen's photometer

3.1 Acoustics

- Echo, reverberation, standard reverberation time, Sabine's formula, conditions for good acoustics, factors affecting acoustical planning of auditorium.

3.2 Indoor lighting

- Definition of luminous intensity, intensity of illumination with their SI units, inverse square law of photometry, Bunsen's photometer - ray diagram, working and applications, need of indoor lighting, indoor lighting schemes and factors affecting indoor lighting.

Topic 4 Modern physics

Specific objectives

- State the concept of photocell
- State applications of X – ray
- State properties of LASER

4.1 Photo electricity

- Photon (quantum), Plank's hypothesis, energy of photon, properties of photons.
- Photo electric effect: Circuit diagram, process of photoelectric emission, definitions:- threshold frequency, threshold wavelength, stopping potential, characteristics of photoelectric effect.
- Work function, Einstein's photoelectric equation, photo resistor (LDR) –symbol, principle, applications, photoelectric cell:- principle, applications.

4.2 X-rays

- Origin of X-rays, production of X-rays using Coolidge's X-ray tube, minimum wavelength of X-ray, properties of X-rays, applications of X- rays: engineering, medical and scientific.

References :

1. Engineering Physics (*R.K.Gaur and S.L.Gupta*) Dhanpat Rai Publication, New Delhi.
2. Fundamental of Physics (*Resnick and Hailday*) Wisley Toppan Publishers – England.
3. Engineering Physics (*V. Rajendran*) Tata McGraw-Hill Publications.
4. Physic, IGNOU-School of Engineering & Technology.
5. Physics- Std XI, Std XII, HSC board/c CBSE Board.
6. Conceptual Physics (P.G.Hewitt) Pearson Education, (10^{th} edition).
7. A text book of engineering Physics (*M.N. Avadhanulu, P.G. Kshirsagar*) S.Chand & co. Ltd
8. Websites : http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html
   http://physics.info
   http://physics.org
   http://about.com
   http://classroom.com
   http://101science.com

9. Videos : http://www.youtube.com/watch?v=ZmhuCIL5BqQ: work power energy
http://www.youtube.com/watch?v=8kOSth5QgF4: motion in one dimension, rectilinear motion
http://www.youtube.com/watch?v=SsIaL3L6Jg4 :projectile motion
http://www.youtube.com Laser cutter
http://www.cmslaser.com
10. CDs : Educational Cd of NCERT, Educational cd of Pearson education India
11. PPT : www.dboccio.com/Physics%20PowerPoints/Work,%20Energy,
www.slideshare.nt/donpraju/laser-ppt
www.research.usf.edu/cs/rad/laser-ppt
www.studyvilla.com/laser-ppt-ruby laser
www.khanacademy.com

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Applied Chemistry [ACH]

F.Y. Diploma : Sem. II

[CE/CS/CR/CV]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	2 Hrs.	50
Practical Exam	–	25@
Oral Exam	–	–
Term Work	–	–
Sessional Work (Two Test)	–	25 (each)

SYLLABUS

Topic 1 Metallurgy

Specific Objectives

- Explain the process of extraction of iron from its ore.
- Explain different processes of Heat treatment.
- State effects of alloying elements on properties of steels.

1.1 Metallurgy

- Definitions of metallurgy, ores of iron.
- Extraction of pig iron by smelting in Blast furnace with chemical reactions in different zones, products of blast furnace- composition, properties and applications of pig iron, slag and flue gases.
- Properties and applications of commercial forms of iron- pig iron, cast iron, wrought iron.

1.2 Steels

- Definition of steel, preparation of steel from pig iron using open hearth process, basic oxygen process.
- Classification of plain carbon steel- low carbon, medium carbon, high carbon steels with their properties and applications.
- Heat Treatment of steels: Definition and purposes of -hardening, tempering, annealing, normalizing.

Topic 2 Corrosion

Specific Objectives

- Explain Mechanism of atmospheric corrosion and immersed corrosion.
- Describe different methods of protection of metal from corrosion

2.1 Corrosion

- Corrosion, Types of corrosion
- Atmospheric Corrosion: Definition, mechanism of oxidation corrosion, types of oxide films and their significance, factors affecting rate of atmospheric corrosion.
- Immersed Corrosion: Definition, mechanism of immersed corrosion by galvanic cell action- with evolution of hydrogen gas and absorption of oxygen gas, factors affecting immersed corrosion.

2.2 Protection of metals by

- Modification of environment, modification of properties of metal, electrochemical protection by sacrificial anodic protection and impressed current cathodic protection, use of protective coatings.

- Application of metallic coatings: By galvanising, tinning, metal spraying, electroplating, metal cladding, cementation- sherardizing, chromising, colourising.
- Application of non-metallic coatings: paint-definition, characteristics, constituents of paint and their functions.

Topic 3 Water

Specific Objectives:

– State the causes of hardness of water.
– Describe the method for removing hardness from water.

3.1 Hardness of water

- Types of impurities in natural water.
- Definitions of hard and soft water, causes of hardness, types of hardness, definition and degree of hardness, in ppm and equivalents of $CaCO_3$, estimation of hardness by EDTA method, Numericals.
- Adverse effects of hard water in:
  – Industries: paper industry, textile industry, dyeing industry, sugar industry.
  – Domestic applications: washing, bathing, cooking, drinking.
  – Boilers: boiler corrosion, caustic embrittlement, scale and sludge formation.

3.2 Water treatment

- For industrial applications: Principle, diagram, working, chemical reactions, regeneration, advantages-Permutit / Zeolite process and Ion exchange process.
- For domestic applications: Water quality parameters for potable water, treatment of water for domestic application by screening, sedimentation, coagulation, filtration, sterilization.
- Chlorination method of sterilization- using chlorine gas, bleaching powder, chloramines.
- For sea water: Desalination of sea water by reverse osmosis.

Topic 4 Cement and Lime

Specific Objectives:

– Select appropriate materials used in construction.
– Understand properties of cement and lime.

4.1 Cement

- Portland cement: Definition, chemical composition, average compound composition, functions of constituents. Setting and hardening of Portland cement with chemical reactions, function of gypsum in cement.
- Special Cements: Properties and application of water proofing cement, super sulphate cement, plaster of paris.
- Mortar and Concrete: Definition, formation, properties and applications.

4.2 Lime

- Definition, formation, properties and uses of quick lime, slaked lime, hydrated lime.
- Classification of lime: Composition, properties and uses of fat lime, lean lime.

References :

1. Engineering Chemistry (*Jain & Jain*) Dhanpat Rai and Sons.
2. Engineering Chemistry (*S.S. Dara*) S. Chand Publication.
3. Engineering Chemistry (*R. Sivasankar and N. Sivakumar*) Tata McGraw-Hill Publishing Company Limited.
4. Engineering Materials and Metallurgy (R. Srinivasan) Tata McGraw-Hill Education Private Limited.
5. Polytechnic Chemistry (*Vedprakash Mehta*) Jain brothers
6. Websites : http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_metals
   http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_ceramics
   http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_polymers
   http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_composites
   http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_fluids
   http://www.ausetute.com.au/corrosion.html
   http://www.youtube.com/watch?v=8s8rcnxqLIw
   http://www.sherardizing.com/resources/files/9_Sherardizing_Corrosion.pdf (Sheradizing)
   http://www.galvanizeit.org/aga/animation/4728?keepThis=true&TB_iframe=true&height=480&width=6 (Galvanizing)
   http://www.ehow.com/list_6725219_different-types-metal-cladding.html (Metal Clading)

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Engineering Mechanics [EGM]

F.Y. Diploma : Sem. II

[AE/CE/CH/CR/CS/CV/EE/EP/FE/ME/MH/MI/PG/PT/PS]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	–
Term Work	–	25@
Sessional Work (Two Test)	–	25 (each)

@ - Internal Assessment

SYLLABUS

Topic 1 Simple Machines

Specific Objectives:

- Calculate velocity ratio for given machine.
- Find Efficiency of given machine.

Contents

1.1 Definitions

Simple machine, compound machine , load , effort , mechanical advantage, velocity ratio, input of a machine ,output of a machine efficiency of a machine , ideal machine, ideal effort and ideal load, load lost in friction, effort lost in friction.

1.2 Analysis

Law of machine, maximum mechanical advantage and maximum, efficiency of a machine, reversibility of a machine, condition for reversibility of a machine, self locking machine. Simple numerical problems.

1.3 Velocity Ratio for simple machines

Simple axle and wheel, differential axle and wheel, Weston's differential pulley block, single purchase crab, double purchase crab, worm and worm wheel, geared pulley block, screw jack, calculation of mechanical advantage, efficiency, identification of type such as reversible or not etc.

Topic 2 Force systems

Specific Objectives :

- Define related terms in mechanics.
- Calculate Components of forces.

Contents

2.1 Fundamentals and Force systems

Definitions of mechanics, Engineering mechanics, statics, dynamics, Kinetics, Kinematics, rigid body, classification of force system according to plane coplanar and non coplanar ,sub classification of coplanar force system- collinear , concurrent, non concurrent, parallel, like parallel, unlike parallel, general etc. Definition of a force, S.I. unit of a force, representation of a force by vector and by Bow's notation method. Characteristics of a force, effects of a force, principle of transmissibility.

2.2 Resolution of a force and Moment of a force

Definition, Method of resolution, along mutually perpendicular direction and along two given direction. Definition of moment, S. I. unit, classification of moments, sign convention, law of moments Varignon's theorem of moment and it's use, definition of couple, S.I. unit, properties of couple with example.

Topic 3 Composition of Forces

Specific Objectives:

- Calculate resultant analytically for given force system.
- Calculate resultant graphically.

Contents

3.1 Analytical method

Definition of Resultant force, methods of composition of forces, Law Of parallelogram of forces, Algebraic method for determination of resultant for concurrent and non concurrent, parallel coplanar force system.

3.2 Graphical method

Space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent and parallel force system only.

Topic 4 Equilibrium

Specific Objectives:

- State conditions of equilibrium for given force system.
- Calculate reactions of beams for different static loading.

Contents

4.1 Equilibrant and Lami's Theorem

Definition of equilibrant, relation between resultant and equilibrant, equilibrant of concurrent and non-concurrent force system. Analytical and graphical conditions of equilibrium for concurrent, non-concurrent and parallel force system, free body and free body diagram. Statement and explanation of Lami's theorem, Application of Lami's theorem for solving various engineering problems.

4.2 Beams

Definition, Types of beams (cantilever, simply supported, overhanging, fixed, continuous), Types of end supports (simple support, hinged, roller), classification of loads, point load, inclined point load, uniformly distributed load. Analytical method to determine reactions of simply supported, cantilever and over hanging beam subjected to point loads and UDL and graphical method to determine reactions for beams subjected to vertical point loads & udl only.

Topic 5 Friction

Specific Objectives

- Define terms related to friction.
- Apply conditions of equilibrium for forces acting on a body associated with friction.

Contents

5.1 Definition

Friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction, angle of repose and coefficient of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages.

5.2 Equilibrium of body on Horizontal and inclined plane

Equilibrium of body on horizontal plane subjected to horizontal and inclined force. Equilibrium of body on inclined plane subjected to forces applied parallel to the plane only. Concept of ladder fraction.

Topic 6 Centroid and Centre of Gravity

Specific Objectives:

- Calculate centroid of composite plain figures.
- Calculate centre of gravity of composite solids.

Contents:

6.1 Centroid

Definition of centroid. Moment of an area about an axis. Centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle and quarter circle. Centroid of composite figure with not more than three geometrical figures.

6.2 Center of gravity

Definition, center of gravity of simple solids such as cylinder, sphere, hemisphere, cone, cube, and rectangular block. Centre of gravity of composite solids with not more than Two simple solids. (Hollow solids are not expected.)

References :

1. Engineering Mechanics (*R.S.Khurmi*) S. Chand & Company Ltd.
2. Engineering Mechanics (*Shames and Rao*) Pearsion Education.
3. Engineering Mechanics (*R.C.Hibbeler*) Pearsion Education.
4. Applied Mechanics (S. Ramamruthum) Dhanpat Rai & Sones, Delhi.
5. Essentials of Engg. Mech. (S Rajasekaran) Vikas Publishing House Pvt. Ltd.

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Construction Materials [CMA]

F.Y. Diploma : Sem. II

[CE/CS/CR/CV]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	–
Term Work	–	–
Sessional Work (Two Test)	–	25 (each)

SYLLABUS

Topic 1 Over view of Civil Engineering

Specific Objectives:

- State criteria for selection of construction materials.
- Classify various construction materials.

Contents:

- Role of Civil Engineering in human life - Building Construction, Transportation Engineering, Environmental Engineering, Irrigation Engineering, Construction Management. (applications only)
- Criteria for Selection of construction materials on the basis of carrying prescribed load, serviceability, Aesthetically pleasing, economical, environmental friendly.
- Broad classification of materials – Natural, Artificial, Special, Finishing and Recycled construction materials.

Topic 2 Natural Construction Materials

Specific Objectives:

- Classify various Natural construction materials
- State various properties of Natural construction materials
- List applications of Natural construction materials

Contents

2.1

- Stone – Physical Classification of rocks; Requirements of good building stone, characteristics of stone, Quarrying and dressing of stone.
- Timber – Timber as construction material, structure of timber, properties of good timber, seasoning of timber, defects in timber.

2.2

- Bituminous materials and mixtures: Terminology, different types of asphalt, bitumen, tar used in Civil Engineering works, their properties and uses
- Lime – Manufacture of lime, classification, field slaking of lime and properties of lime
- Soil –terminology- sand, silt, clay and their suitability in construction work.

Topic 3 Artificial Construction Materials

Specific Objectives:

- List various artificial construction materials.
- State functions of various components of cement Plant.
- Describe applications of artificial construction materials.

Contents :

3.1

- Bricks – Brick earth and its constituents. Conventional bricks and Standard bricks. Characteristics of good brick, Classification of burnt clay bricks and their suitability, special bricks. Manufacturing of burnt clay bricks. Common Field tests on Bricks- shape and size, colour, sound, hardness test, finger scratch test, water absorption test.
- Tiles –flooring and roofing tiles. Characteristic of good tiles, different types of tiles depending upon material used, sizes of tiles, uses of tiles, wall cladding

3.2

- Materials for making concrete-: Cement – definition, Manufacturing of cement, types of cements – ordinary Portland, white cement colour cement and their suitability. Different brand name of cement, common pickings available in markets, common field tests on cement- lumps visible, colour, hand feeling , water float test. Aggregate – Definition, types of aggregate - coarse aggregate, fine aggregates (size). Artificial sand – properties and advantages, suitability.
- Pre cast concrete products – concrete blocks- hollow, solid concrete blocks, pavement blocks, balustrades, their properties and uses.

3.3

- Plywood, particle board and veneers their properties and uses.
- Glass – properties- thickness and weight, thermal conductivity, light and heat translation, durability sound insulation, types of glass- soda lime glass, lead glass and borosilicate glass. Glass used for cladding.

Topic 4 Special Construction Materials

Specific Objectives:

- List various Special construction materials
- State various properties of Special construction materials
- State applications of Special construction materials

Contents

- Water proofing and damp proofing materials – Brand names, packings available properties and uses.
- Termite proofing materials -need ,names and uses
- Thermal insulating materials- properties, names and situations where used
- Sound insulating materials- properties, names and situations where used
- Fibres – Types –Jute, Coir, Steel Fibres, Carbon Fibres, Glass Fibres, Plastic Fibres, Asbestos Fibres properties and uses
- Miscellaneous materials – artificial timber, ferrocrete, adhesives, epoxy and Geosynthetic materials, ceramic materials -properties and uses.

Topic 5 Finishing Materials

Specific Objectives:

- List various finishing materials
- State various properties of finishing materials
- State applications of finishing materials

Contents

- Plastering Materials – Mortars: Lime Mortar, Cement Mortar, Special Mortars – Properties, proportion, situations where used

- Plaster of Paris – Constituents, properties and uses POP finishing boards, sizes, purpose.
- Paints, Distempers and Varnishes – types, properties and uses.
- Cladding materials – properties, names of different cladding materials and uses.
- Linoleum- properties, sizes, use, method of fixings to floor

Topic 6 Building materials from Agro and Industrial wastes

Specific Objectives:

- List various Agro and Industrial wastes used in construction
- State various properties of Agro and Industrial wastes as a construction materials
- State applications of Agro and Industrial wastes as a construction materials

Contents

- Properties and uses of -: Rice husk, Bagasse, coir fibres, straw, coconut and Areca nut tree trunks, coconut leaf, Fly ash, Blast furnace slag, Granite and marble polishing waste, construction waste, Sawdust, Plastic, Polymer, rubber waste.

References :

1. Civil Engineering Materials (*Shan Somayaji*) Pearson.
2. Building construction illustrated (*Francis D.K. Ching*) Wiley India
3. Olin's Construction Principles, materials and methods (*H Leslie Simmons*) Wiley India
4. Elements of civil Engineering (*Anurag Kandya*) Charotar
5. Building materials Technology (*L Reed Brantley*) Tata McGraw – Hill
6. Engineering Materials (*Sharma*) PHI Publication
7. Civil Engineering Materials (*NITTTR Chandigarh*) NITTTR Chandigarh
8. Construction Materials (*D. N. Ghose*) Tata McGraw – Hill
9. Building Materials (*S. K. Duggal*) New International.

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Development of Life Skills [DLS]

F.Y. Diploma : Sem. II
[All Branches]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	–	–
Practical Exam	–	–
Oral Exam	–	25@
Term Work	–	–

@ - Internal Assessment

SYLLABUS

Topic 1 SELF ANALYISIS

Specific Objectives

– To introduce oneself.

Contents

1.1 Need of Self Analysis
1.2 Attitude and types (positive, negative, optimistic and pessimistic) Guidelines for developing positive attitude.

Topic 2 STUDY TECHNIQUES

Specific Objectives

– To identify different process and strategies.
– To improve reading, listening and notes taking skills.

Contents

2.1 Learning strategies
2.2 Learning process
2.3 Organization of knowledge
2.4 Reading skills
2.5 Listening skills
2.6 Notes taking
2.7 Enhancing memory

Topic 3 INFORMATION SEARCH

Specific Objectives

– To search information as per the need.

Contents

3.1 Sources of information
3.2 Techniques of information search (library, internet, etc)

Topic 4 SELF DEVELOPMENT

Specific Objectives:

– To set primary goals using SMART parameters.
– To Priorities the work effectively.
– To cope up with stress effectively.

Contents

4.1 Goal setting and its importance.

4.2 Characteristics of Goal setting (**SMART**- **S**pecific, **M**easurable, **A**ttainable, **R**ealistic, **T**ime bound)

4.3 Time Management - Importance, prioritization of work, time matrix, time savers, and time wasters.

4.4 Stress Management - Definition, types of stress, causes of stress, managing stress, and stress busters.

Topic 5 PRESENTATION TECHNIQUES

Specific Objectives

- To plan for presentation.
- To prepare contents for presentation.

Contents

5.1 Importance of presentation.

5.2 Components of effective presentation (Body language, voice culture , rehearsal, etc)

5.3 Preparing for presentation.

5.4 Use of audio/video aids. (audio, video, transparency's, PowerPoint presentations, etc)

5.5 Performing presentation (Seminars, paper presentations, compering, etc)

Topic 6 GROUP DISCUSSION

Specific Objectives

- To understand the concept of group discussion
- To know the purpose of group discussion

Contents

6.1 Group discussion concept and purpose

6.2 Method of conduction

Reference :

1. Target setting and goal achievement (*Richard Hale and Peter Whitlam*) Kogan Page.
2. Successful Presentation Skills (*Andrew Bradbury*) The Sunday Times – Kogan
3. Effective Presentation (*Ros Jay and Antony Jay*) Pearson – Prentice Hall.
4. Handbook on Development of Life Skills (*Subject Experts – MSBTE*) MSBTE
5. Effective Communication and Soft Skills (*Nitin Bhatnagar and Mamta Bhatnagar*) Pearson
6. Business Communication and Soft Skills (*D. Sudha Rani*) Pearson.
7. Personality Development and Soft Skills (*Barak K Mitra*) Oxford University Press
8. Soft Skills for Managers (*Dr. T. Kalayani Chakravarti and Dr. Latha Chakravarti*) Biztantra

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Workshop Practice [WPC]

F.Y. Diploma : Sem. II

[CE/CS/CR/CV]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	–	–
Practical Exam	–	–
Oral Exam	–	–
Term Work	–	50@

@ - Internal Assessment

SYLLABUS

Shop 1 WOOD WORKING SHOP

Content:

Assignment

1. Draw sketch of wood turning lathe, label the components, precaution in wood turning, draw sketch of carpentary tools use for turning.
2. Visit to local carpetnary shop to show different carpentary operations and joinery work.

Demonstration

1. Observe the operations of wood working process like plaining, marking, chiseling, grooving and turning of wood.
2. Practice different wood working process and turning of wood.

Job

Job of standard size (Salable / marketable, articles shall be prepared)

1. Prepare one composite job from the following involving different joints turning & planning, surface finishing by emery paper, varnishing etc. like square stools, tea table, chaurang, table lamp, bed, sofaset, book rack, cabinet, notice board, showcase and table chairs etc. Including calculation of the cost of material and labour cost required for the job from the drawing.

2 One job on turning like sofaset leg: chaurang leg etc

Shop 2 WELDING SHOP

Content

Assignment

1. Write a short the process for arc welding, gas welding, gas cutting, draw standard symbol for welding.

Demonstration

1. Observe the process of arc welding, gas welding, gas cutting.
2. Practice for welding in different situation.

Job

Job of standard size (Salable / marketable, articles shall be prepared)

1. Prepare any one composite job from the following involving butt joint, lap joint, welding process, from the following like grill, door frame, window frame, waste paper, baket, chappal stand, corner flower stand, table frame (square pipe 25 mm, cooler frame (folding type). Including calculation of the cost of material and labour cost required for the job from the drawing.

Shop 3 SMITHY SHOP

Content

Assignment

1. Draw sketches of different forging tools, and write its purpose. Draw lable sketch of power hammer.
2. Described different forging processes like, shaping, caulking, fullering & setting down operation.

Demonstration

1. Observe the operation of different process like, shaping, caulking, fullering etc.

Job

Job of standard size (Salable / marketable, articles shall be prepared)

1. Prepare any one like crane hook, plane hook, eye hook, door hook, flat chisel, square alun key, hook & peg. Including calculation of the cost of material and labour cost required for the job from the drawing.

Shop 4 PLUMBING SHOP

Content

Assignment

1. Draw sketches of different pipe fitting and accessories. State its purpose.
2. List different sizes of G.I. and flexible pipe used for fitting. List different adhesive solvent. Used for fitting.

Demonstration

1. Observe the operation threading to G.I. pipe with jointing & jointing of PVC pipe.
2. Observe the preparation of actual pipe line layout by using different accessories.
3. Practice for actual pipe line by using PVC pipe and accessories without using adhesive.

Job

Job of standard size (Saleable / marketable, articles shall be prepared)

1. Prepare any one complete job for G.I. pipe with socket, plug, elbow, with operation of cutting, threading and fitting. Including calculation of the cost of material and labour cost required for the job from the drawing.

Shop 5 SHEET METAL SHOP

Content

Assignment

1. Draw sketches of different tools and machine use for sheet metal work & state it purpose.
2. Draw the sketch of soldering gun and revetting tools and describe the process of both.

Demonstration

1. Observe the different the sheet metal operation like cutting, bending, edging, curling, lancing, soldering and revitting.
2. Practice for operation like sheet cutting, bending, edging, curling, lancing, soldering & revetting.

Job

Job of standard size (Salable / marketable, articles shall be prepared)

1. Prepare any one complete job from following letter box, trunk, grain container, water heater container, bucket, waste paper bakset, cooler tray, water draining channel, involving different sheet metal operation. Including calculation of the cost of material and labour cost required for the job from the drawing.

Shop 6 DEMONSTRATION OF POWER TOOLS AND PRACTICE UTILITY ITEMS

Content

Assignment

1. Draw a line sketch of power tools, pneumatic tools, electric wiring tools and accessories, label the parts and state its use.

Demonstration

1. Observe the operation of power tools, pneumatic tools, electric wiring tools.
2. Practice for use of electric wiring tools.

Job

1. Prepare a electrical switch board with two socket, holder, bulbs and piono buttons and with electrical wiring for three meter length. OR any other electric item as per requirement of institute

References :

Learning Resources:

1. Workshop Technology (*S.K. Hajara, Chaudhary*) Media promoters and publisher, new Delhi
2. Workshop Technology (*B.S. Raghuwanshi*) Dhanpat rai And Sons, New Delhi
3. Production Technology (*R.K. Jain*) Khanna Publishers, New Delhi
4. Plumbing (Design and Practice) (*S.G. Deolallkar*) M C Grawhill, New Delhi
5. Workshop Practice (*H.S. Bawa*) M C Grawhill, New Delhi
6. Website
   - www.copper.org
   - www.wikipedia.com/plumbing
   - www.howstuffworks.com
7. CDs
   Videos and presentation about variouse tools, equipment are available on the webseti of tools and equipment manufacturer and also avilable on the slide share website.
   - www.copper.org
   - www.wikipedia.com/plumbing
   - www.howstuffwork.com
8. Visits
   - Visit to local carpentryshop to show different carpentry operation, jionery works.
   - Visit to fabrication to observe the process of ARC welding. Gas welding Etc

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